SYBASE iAnywhere

SQL Anywhere® 10
Changes and Upgrading

Published: March 2007

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Contents

About This Manual

Subject

This book describes new features in SQL Anywhere 10 and in previous versions of the software.

Audience

This manual is for users of previous versions who want to find out what is new and different in this version of the software.

SQL Anywhere documentation

This book is part of the SQL Anywhere documentation set. This section describes the books in the documentation set and how you can use them.

The SQL Anywhere documentation

The complete SQL Anywhere documentation is available in two forms: an online form that combines all books, and as separate PDF files for each book. Both forms of the documentation contain identical information and consist of the following books:

- **SQL Anywhere 10 - Introduction** This book introduces SQL Anywhere 10—a product that provides data management and data exchange technologies, enabling the rapid development of database-powered applications for server, desktop, mobile, and remote office environments.
- **SQL Anywhere 10 - Changes and Upgrading** This book describes new features in SQL Anywhere 10 and in previous versions of the software, as well as upgrade instructions.
- **SQL Anywhere Server - Database Administration** This book covers material related to running, managing, and configuring SQL Anywhere databases. It describes database connections, the database server, database files, backup procedures, security, high availability, and replication with Replication Server, as well as administration utilities and options.
- **SQL Anywhere Server - SQL Usage** This book describes how to design and create databases; how to import, export, and modify data; how to retrieve data; and how to build stored procedures and triggers.
- **SQL Anywhere Server - SQL Reference** This book provides a complete reference for the SQL language used by SQL Anywhere. It also describes the SQL Anywhere system views and procedures.
- **SQL Anywhere Server - Programming** This book describes how to build and deploy database applications using the C, C++, and Java programming languages, as well as Visual Studio .NET. Users of tools such as Visual Basic and PowerBuilder can use the programming interfaces provided by these tools.
- **SQL Anywhere 10 - Error Messages** This book provides a complete listing of SQL Anywhere error messages together with diagnostic information.
- **MobiLink - Getting Started** This manual introduces MobiLink, a session-based relational-database synchronization system. MobiLink technology allows two-way replication and is well suited to mobile computing environments.
- **MobiLink - Server Administration** This manual describes how to set up and administer MobiLink server-side utilities and functionality.
- **MobiLink - Client Administration** This manual describes how to set up, configure, and synchronize MobiLink clients. MobiLink clients can be SQL Anywhere or UltraLite databases.
- **MobiLink - Server-Initiated Synchronization** This manual describes MobiLink server-initiated synchronization, a feature of MobiLink that allows you to initiate synchronization or other remote actions from the consolidated database.

- **QAnywhere** This manual describes QAnywhere, which is a messaging platform for mobile and wireless clients as well as traditional desktop and laptop clients.
- **SQL Remote** This book describes the SQL Remote data replication system for mobile computing, which enables sharing of data between a SQL Anywhere consolidated database and many SQL Anywhere remote databases using an indirect link such as email or file transfer.
- **SQL Anywhere 10 - Context-Sensitive Help** This manual contains the context-sensitive help for the Connect dialog, the Query Editor, the MobiLink Monitor, MobiLink Model mode, the SQL Anywhere Console utility, the Index Consultant, and Interactive SQL.
- **UltraLite - Database Management and Reference** This manual introduces the UltraLite database system for small devices.
- **UltraLite - AppForge Programming** This manual describes UltraLite for AppForge. With UltraLite for AppForge you can develop and deploy database applications to handheld, mobile, or embedded devices, running Palm OS, Symbian OS, or Windows CE.
- **UltraLite - .NET Programming** This manual describes UltraLite.NET. With UltraLite.NET you can develop and deploy database applications to computers, or handheld, mobile, or embedded devices.
- **UltraLite - M-Business Anywhere Programming** This manual describes UltraLite for M-Business Anywhere. With UltraLite for M-Business Anywhere you can develop and deploy web-based database applications to handheld, mobile, or embedded devices, running Palm OS, Windows CE, or Windows XP.
- **UltraLite - C and C++ Programming** This manual describes UltraLite C and C++ programming interfaces. With UltraLite, you can develop and deploy database applications to handheld, mobile, or embedded devices.

Documentation formats

SQL Anywhere provides documentation in the following formats:

- **Online documentation** The online documentation contains the complete SQL Anywhere documentation, including the books and the context-sensitive help for SQL Anywhere tools. The online documentation is updated with each maintenance release of the product, and is the most complete and up-to-date source of documentation.

  To access the online documentation on Windows operating systems, choose Start ► Programs ► SQL Anywhere 10 ► Online Books. You can navigate the online documentation using the HTML Help table of contents, index, and search facility in the left pane, as well as using the links and menus in the right pane.

  To access the online documentation on Unix operating systems, see the HTML documentation under your SQL Anywhere installation or on your installation CD.

- **PDF files** The complete set of SQL Anywhere books is provided as a set of Adobe Portable Document Format (pdf) files, viewable with Adobe Reader.

On Windows, the PDF books are accessible from the online documentation via the PDF link at the top of each page, or from the Windows Start menu (Start ► Programs ► SQL Anywhere 10 ► Online Books - PDF Format).

On Unix, the PDF books are available on your installation CD.

Documentation conventions

This section lists the typographic and graphical conventions used in this documentation.

Syntax conventions

The following conventions are used in the SQL syntax descriptions:

- **Keywords** All SQL keywords appear in uppercase, like the words ALTER TABLE in the following example:

  ALTER TABLE [*owner*.]*table-name*

- **Placeholders** Items that must be replaced with appropriate identifiers or expressions are shown like the words *owner* and *table-name* in the following example:

  ALTER TABLE [*owner*.]*table-name*

- **Repeating items** Lists of repeating items are shown with an element of the list followed by an ellipsis (three dots), like *column-constraint* in the following example:

  ADD *column-definition* [*column-constraint*, …]

  One or more list elements are allowed. In this example, if more than one is specified, they must be separated by commas.

- **Optional portions** Optional portions of a statement are enclosed by square brackets.

  RELEASE SAVEPOINT [*savepoint-name*]

  These square brackets indicate that the *savepoint-name* is optional. The square brackets should not be typed.

- **Options** When none or only one of a list of items can be chosen, vertical bars separate the items and the list is enclosed in square brackets.

  [**ASC** | **DESC**]

  For example, you can choose one of ASC, DESC, or neither. The square brackets should not be typed.

- **Alternatives** When precisely one of the options must be chosen, the alternatives are enclosed in curly braces and a bar is used to separate the options.

  [**QUOTES** { **ON** | **OFF** }]

  If the QUOTES option is used, one of ON or OFF must be provided. The brackets and braces should not be typed.

Operating system conventions

- **Windows** The Microsoft Windows family of operating systems for desktop and laptop computers. The Windows family includes Windows Vista and Windows XP.

- **Windows CE** Platforms built from the Microsoft Windows CE modular operating system, including the Windows Mobile and Windows Embedded CE platforms.

  Windows Mobile is built on Windows CE. It provides a Windows user interface and additional functionality, such as small versions of applications like Word and Excel. Windows Mobile is most commonly seen on mobile devices.

  Limitations or variations in SQL Anywhere are commonly based on the underlying operating system (Windows CE), and seldom on the particular variant used (Windows Mobile).

- **Unix** Unless specified, Unix refers to both Linux and Unix platforms.

File name conventions

The documentation generally adopts Windows conventions when describing operating system dependent tasks and features such as paths and file names. In most cases, there is a simple transformation to the syntax used on other operating systems.

- **Directories and path names** The documentation typically lists directory paths using Windows conventions, including colons for drives and backslashes as a directory separator. For example,

  ```
  MobiLink\redirector
  ```

  On Unix, Linux, and Mac OS X, you should use forward slashes instead. For example,

  ```
  MobiLink/redirector
  ```

  If SQL Anywhere is used in a multi-platform environment you must be aware of path name differences between platforms.

- **Executable files** The documentation shows executable file names using Windows conventions, with the suffix *.exe*. On Unix, Linux, and Mac OS X, executable file names have no suffix. On NetWare, executable file names use the suffix *.nlm*.

  For example, on Windows, the network database server is *dbsrv10.exe*. On Unix, Linux, and Mac OS X, it is *dbsrv10*. On NetWare, it is *dbsrv10.nlm*.

- **install-dir** The installation process allows you to choose where to install SQL Anywhere, and the documentation refers to this location using the convention *install-dir*.

  After installation is complete, the environment variable SQLANY10 specifies the location of the installation directory containing the SQL Anywhere components (*install-dir*). SQLANYSH10 specifies the location of the directory containing components shared by SQL Anywhere with other Sybase applications.

  For more information on the default location of *install-dir*, by operating system, see "SQLANY10 environment variable" [*SQL Anywhere Server - Database Administration*].

- **samples-dir** The installation process allows you to choose where to install the samples that are included with SQL Anywhere, and the documentation refers to this location using the convention *samples-dir*.

After installation is complete, the environment variable SQLANYSAMP10 specifies the location of the directory containing the samples (*samples-dir*). From the Windows Start menu, choosing Programs ► SQL Anywhere 10 ► Sample Applications and Projects opens a Windows Explorer window in this directory.

For more information on the default location of *samples-dir*, by operating system, see "Samples directory" [*SQL Anywhere Server - Database Administration*].

- **Environment variables** The documentation refers to setting environment variables. On Windows, environment variables are referred to using the syntax *%envvar%*. On Unix, Linux, and Mac OS X, environment variables are referred to using the syntax *$envvar* or *${envvar}*.

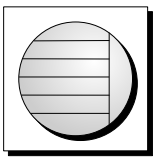
  Unix, Linux, and Mac OS X environment variables are stored in shell and login startup files, such as *.cshrc* or *.tcshrc*.

Graphic icons

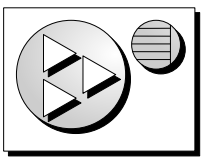
The following icons are used in this documentation.

- A client application.

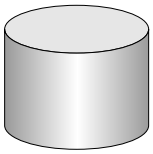
- A database server, such as SQL Anywhere.



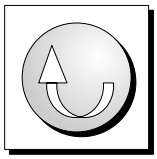
- An UltraLite application.



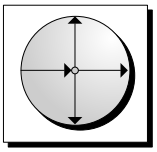
- A database. In some high-level diagrams, the icon may be used to represent both the database and the database server that manages it.



- Replication or synchronization middleware. These assist in sharing data among databases. Examples are the MobiLink server and the SQL Remote Message Agent.



- A Sybase Replication Server



- A programming interface.

Finding out more and providing feedback

Finding out more

Additional information and resources, including a code exchange, are available at the iAnywhere Developer Network at http://www.ianywhere.com/developer/.

If you have questions or need help, you can post messages to the Sybase iAnywhere newsgroups listed below.

When you write to one of these newsgroups, always provide detailed information about your problem, including the build number of your version of SQL Anywhere. You can find this information by entering **dbeng10 -v** at a command prompt.

The newsgroups are located on the *forums.sybase.com* news server. The newsgroups include the following:

- sybase.public.sqlanywhere.general
- sybase.public.sqlanywhere.linux
- sybase.public.sqlanywhere.mobilink
- sybase.public.sqlanywhere.product_futures_discussion
- sybase.public.sqlanywhere.replication
- sybase.public.sqlanywhere.ultralite
- ianywhere.public.sqlanywhere.qanywhere

Newsgroup disclaimer
iAnywhere Solutions has no obligation to provide solutions, information, or ideas on its newsgroups, nor is iAnywhere Solutions obliged to provide anything other than a systems operator to monitor the service and ensure its operation and availability.
iAnywhere Technical Advisors as well as other staff assist on the newsgroup service when they have time available. They offer their help on a volunteer basis and may not be available on a regular basis to provide solutions and information. Their ability to help is based on their workload.

Feedback

We would like to receive your opinions, suggestions, and feedback on this documentation.

You can email comments and suggestions to the SQL Anywhere documentation team at iasdoc@ianywhere.com. Although we do not reply to emails sent to that address, we read all suggestions with interest.

In addition, you can provide feedback on the documentation and the software through the newsgroups listed above.

CHAPTER 1

What's New in Version 10.0.1

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Deprecated feature lists subject to change
As with all forward-looking statements, the lists of deprecated features are not guaranteed to be complete and are subject to change.

SQL Anywhere

The following sections describe the new features, behavior changes, and deprecated features in SQL Anywhere for version 10.0.1.

> **Note**
> Prior to version 10, the SQL Anywhere database server was called Adaptive Server Anywhere.

New features

Following is a list of additions to SQL Anywhere databases and database servers introduced in version 10.0.1.

Encryption enhancements

The following changes have been made to enhance support for encryption.

- **Extension to the CREATE DATABASE statement ENCRYPTION clause** The syntax for the ENCRYPTION clause of the CREATE DATABASE statement has been extended to allow you to specify SIMPLE as an encryption type. Additionally, you can specify the encryption key and the algorithm in any order. See "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
- **Enhancements to dbinit and dbunload -ea option** The -ea option for dbinit and dbunload now accepts both none and simple as encryption types. Specifying none results in no encryption. Specifying simple results in simple encryption. Also, the default encryption type has changed, depending on whether the -ek, -et, or -ep options are specified with -ea. See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*], and "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].

  The -e option is deprecated. See "Behavior changes and deprecated features" on page 7.
- **Strong encryption on Mac OS X** You can now encrypt client/server communications using RSA encryption on Mac OS X. See "Encrypting SQL Anywhere client/server communications" [*SQL Anywhere Server - Database Administration*].

Support for client statement caching

Client statement caching is now supported and enabled by default, so that when the same SQL text is prepared and dropped repeatedly, the client caches the statement, leaving it prepared on the server after it has been dropped by the application. This saves the database server the extra work of dropping and re-preparing the statement. Both a version 10.0.1 client library and a version 10.0.1 database server are required to use client statement caching.

The following changes have been made to provide support for client statement caching.

- **max_client_statements_cached option** This option specifies the maximum number of statements which can remain cached (prepared) on the database server even though they have been dropped by the application. See "max_client_statements_cached option [database]" [*SQL Anywhere Server - Database Administration*].

- **New connection and server properties** The ClientStmtCacheHits, ClientStmtCacheMisses, and max_client_statements_cached properties have been added. See "Connection-level properties" [*SQL Anywhere Server - Database Administration*], and "Server-level properties" [*SQL Anywhere Server - Database Administration*].
- **New request statistics** The Statement Cache Hits and Statement Cache Misses statistics have been added. See "Request statistics" [*SQL Anywhere Server - SQL Usage*].

SQL Flagger enhancements

The SQL Flagger feature has been enhanced to allow better detection of compatibility, and to add support for newer standards. For example, you can now test compatibility with a specific SQL standard, or compatibility with UltraLite SQL.

To support these enhancements, the following changes have been made:

- **New SQLFLAGGER function** You can use the new SQLFLAGGER function to test that a SQL statement conforms to a specified SQL standard, without actually running the statement. See "SQLFLAGGER function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].
- **New sa_ansi_standard_packages system procedure** Using the new sa_ansi_standard_packages system procedure, you can specify a SQL standard and a SQL statement, and obtain the list of non-core SQL extensions that would be used during the execution of the statement. See "sa_ansi_standard_packages system procedure" [*SQL Anywhere Server - SQL Reference*].

  You must upgrade your database to use this feature. See "Upgrading version 10.0.0 databases" on page 316.
- **New values for the sql_flagger_error_level and sql_flagger_warning_level database options** Several new values are available for the sql_flagger_error_level and sql_flagger_warning_level database options to support the SQL/1999 and SQL/2003 standards. See "sql_flagger_error_level option [compatibility]" [*SQL Anywhere Server - Database Administration*], and "sql_flagger_warning_level option [compatibility]" [*SQL Anywhere Server - Database Administration*].
- **New values for the SQL preprocessor (sqlpp) -e and -w options** Several new values are available for the -e and -w options of the SQL preprocessor (sqlpp) to support the SQL/1999 and SQL/2003 standards. See "SQL preprocessor" [*SQL Anywhere Server - Programming*].

SQL statements

The following enhancements have been made to SQL statements and functions.

- **START DATABASE statement enhancement** The START DATABASE statement now supports a DIRECTORY clause that lets you specify the directory where the database's dbspace files are located. See "START DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
- **INSERT, UPDATE, DELETE, SELECT, UNION, EXCEPT, and INTERSECT statements include an OPTION clause** The INSERT, UPDATE, DELETE, SELECT, UNION, EXCEPT, and INTERSECT statements support an OPTION clause that controls how materialized views are used by the statement, specifies how the query is optimized, and can override the settings of the following database options:

- isolation_level
- max_query_tasks
- optimization_goal
- optimization_level
- optimization_workload

See:

- "INSERT statement" [*SQL Anywhere Server - SQL Reference*]
- "UPDATE statement" [*SQL Anywhere Server - SQL Reference*]
- "DELETE statement" [*SQL Anywhere Server - SQL Reference*]
- "SELECT statement" [*SQL Anywhere Server - SQL Reference*]
- "UNION statement" [*SQL Anywhere Server - SQL Reference*]
- "EXCEPT statement" [*SQL Anywhere Server - SQL Reference*]
- "INTERSECT statement" [*SQL Anywhere Server - SQL Reference*]

- **HTML_DECODE function** The HTML_DECODE function now decodes more Unicode codepoints given as numeric entities, such as the trademark symbol (™). If a codepoint cannot be represented in the database character set, it is left in its codepoint form. Previously, codepoints less than 0x7F were converted to characters (for some character sets, codepoints less than 0xFF were converted to characters), while all other codepoints remained in their codepoint form. See "HTML_DECODE function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

Support for collation tailoring

SQL Anywhere now supports collation tailoring when creating a database. The following changes have been made to support collation tailoring:

- **Enhancements to CREATE DATABASE statement** When creating a database using the CREATE DATABASE statement, or the Initialization utility (dbinit), you can now specify tailoring options for additional control over the sorting and comparing of characters.

  For the CREATE DATABASE statement, collation tailoring is supported using the COLLATION and NCHAR COLLATION clauses. See "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

  For the Initialization utility, collation tailoring is supported using the -z and -zn options. See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*].

  Note
  Databases created with collation tailoring options cannot be started using a pre-10.0.1 database server. If you want to use collation tailoring in an existing database, you must create a new version 10.0.1 database that supports collation tailoring, unload the existing database, and then reload the database into the new version 10.0.1 database. See "Rebuilding version 10.0.0 databases" on page 317.

- **New HasCollationTailoring database property** A new database property, HasCollationTailoring, indicates whether tailoring support was enabled when creating the database. See "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **New extended property values** The following new DB_EXTENDED_PROPERTY values are available when querying the Collation, NcharCollation, and CatalogCollation database properties: CaseSensitivity, AccentSensitivity, PunctuationSensitivity, Properties, and Specification. See "DB_EXTENDED_PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*].
- **Enhancements to the SORTKEY and COMPARE functions** In addition to accepting a collation name as a parameter, the SORTKEY and COMPARE functions now accept the same parenthesized set of collation tailoring options as the CREATE DATABASE statement. See "SORTKEY function [String]" [*SQL Anywhere Server - SQL Reference*], and "COMPARE function [String]" [*SQL Anywhere Server - SQL Reference*].

Enhancements to web services

The following enhancements have been made to improve the configurability of HTTP and SOAP headers:

- **Improved configurability** The new SET clause of the CREATE PROCEDURE and CREATE FUNCTION statements lets you modify the following options for the HTTP and SOAP protocols: the HTTP version used by the client, whether to use chunking, and, in the case of SOAP requests, the name of the SOAP operation to call, if it is different from the name of the procedure or function. See "CREATE PROCEDURE statement" [*SQL Anywhere Server - SQL Reference*].
- **HTTP header specification** The syntax for the HEADER clause of the CREATE PROCEDURE and CREATE FUNCTION statements has been extended to allow you to suppress a given HTTP request header, or to provide an empty value for it. This functionality extends to HTTP request headers that are generated automatically, which were not modifiable in previous releases. See "CREATE PROCEDURE statement" [*SQL Anywhere Server - SQL Reference*], and "Modifying HTTP headers" [*SQL Anywhere Server - Programming*].
- **Support for data types for the SOAP:RPC client** Data typing can be enabled using the DATATYPE clause of the CREATE SERVICE statement. Data type information is included in the XML encoding of parameter input and result set output or responses for all SOAP service formats. This simplifies parameter passing from SOAP toolkits by not requiring client code to explicitly convert parameters to Strings. See "Working with data types" [*SQL Anywhere Server - Programming*].
- **HTTPS supported on Mac OS X** In previous releases, only the HTTP protocol was supported for Mac OS X. You can now use HTTPS when running the SQL Anywhere database server as a web server on Mac OS X. See "-xs server option" [*SQL Anywhere Server - Database Administration*], and "SQL Anywhere Web Services" [*SQL Anywhere Server - Programming*].

Enhancements to database mirroring

The following enhancements have been added to the database mirroring feature:

- **Specifying a preferred database server for database mirroring** You can now specify which database server should assume the role of primary server in the mirroring system. See "-xp database option" [*SQL Anywhere Server - Database Administration*], and "Specifying a preferred database server" [*SQL Anywhere Server - Database Administration*].
- **Initiating a database mirroring failover from the primary server to the mirror server** You can now initiate a failover from the primary server to the mirror server using the SET PARTNER

FAILOVER clause of the ALTER DATABASE statement. See "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*], and "Initiating failover on the primary server" [*SQL Anywhere Server - Database Administration*].

SQL Anywhere plug-in

- **Triggers folder column names changed** In the Triggers folder, the Table Name and Table Owner columns have been replaced with Object Name, Object Owner, and Object Type columns. The Object Type column does not appear by default, but can be displayed by choosing View ► Choose Columns.
- **Triggers tab added to View property sheet** The property sheet for non-materialized views now has a Triggers tab that lists the view's INSTEAD OF triggers.
- **INSTEAD OF trigger support added to Create Trigger wizard** Several enhancements have been made to the Create Trigger wizard to support INSTEAD OF triggers, including the option of choosing whether you are creating a trigger for a table or a non-materialized view. See "Creating triggers" [*SQL Anywhere Server - SQL Usage*].
- **Collation tailoring support added to Create Database wizard** The Create Database wizard now includes a Collation Tailoring page if the selected database server is a version 10.0.1 or later server, or if you have chosen to create the database on the local computer by starting a new database server.

Miscellaneous enhancements

- **Plan caching for simple DML statements** Plan caching has been extended to include INSERT, UPDATE, and DELETE statements that qualify for query bypass (simple statements). See "Plan caching" [*SQL Anywhere Server - SQL Usage*].
- **Materialized views with left and right outer joins now eligible for use during cost-based optimization** Previously, left and right outer joins were allowed in the definition of a materialized view. However, this disqualified the materialized view for use in cost-based optimization. Now, materialized views that have left or right outer joins can be used during cost-based optimization. See "Improving performance with materialized views" [*SQL Anywhere Server - SQL Usage*].
- **Support for INSTEAD OF triggers** A BEFORE or AFTER trigger fires before or after the triggering operation, respectively. An INSTEAD OF trigger replaces the triggering operation. INSTEAD OF triggers can give you more control over the trigger's behavior during insert, update, or delete operations. See "CREATE TRIGGER statement" [*SQL Anywhere Server - SQL Reference*].
- **DBTools enhancement** You can now determine whether a database was created using SQL Anywhere 10.0.0, or a prior version, without starting the database, by using the DBCreatedVersion function. See "DBCreatedVersion function" [*SQL Anywhere Server - Programming*].
- **OLAP enhancements** Two new window aggregate functions, FIRST_VALUE and LAST_VALUE, are now supported. These functions return the first or last value, respectively, of a window, eliminating the need to return these values using self-joins. You can then use these values as baselines in further calculations performed on the window. See "FIRST_VALUE function [Aggregate]" [*SQL Anywhere Server - SQL Reference*], and "LAST_VALUE function [Aggregate]" [*SQL Anywhere Server - SQL Reference*].

- **Enhanced Unix support for IPv6** On Unix you can specify either an interface identifier or interface name as part of the IPv6 address. On Linux (kernel 2.6.13 and later), an interface identifier is required when you specify an IP address on the client or server (for example, when using the HOST=, MYIP=, or BROADCAST= TCP protocol options). See "IPv6 support in SQL Anywhere" [*SQL Anywhere Server - Database Administration*].
- **Support for TDS DATE and TIME data types** The TDS DATE and TDS TIME data types were recently introduced into TDS clients. Applications that use Open Client 15 or newer versions or EBFs of jConnect can now fetch date and time columns as TDS DATE or TDS TIME values instead of TDS DATETIME.

  SQL Anywhere has been enhanced so that TDS-based applications can fetch date and time data as TDS DATE and TDS TIME values. Applications that use older versions of Open Client or jConnect will continue to fetch date and time data as TDS DATETIME. Note that non-TDS-based applications (applications that use embedded SQL, ODBC, or the iAnywhere JDBC driver) have always been able to fetch date and time data as date and time values.
- **New dbinit option to list available character set encodings** Use the Initialization utility (dbinit) -le option to list the available character set encodings for a database. See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*].
- **New -ds server option** The -ds server option allows you to specify the directory where the dbspace files for a database are located. See "-ds database option" [*SQL Anywhere Server - Database Administration*].
- **SADbType.Xml data type** The SADbType.Xml enumeration constant has been added to the SQL Anywhere .NET provider.
- **Units are supported for dynamic traps for the SQL Anywhere SNMP Extension Agent** When setting dynamic traps, you can now use k, m, g, or t to specify units of kilobytes, megabytes, gigabytes, or terabytes when specifying a numeric value for the trap. See "Creating dynamic traps" [*SQL Anywhere Server - Database Administration*].
- **Creating ODBC data sources for the iAnywhere Solutions Oracle driver** You can now use the Data Source utility (dbdsn) to create ODBC data sources for the iAnywhere Solutions Oracle driver by specifying the -or option. See "Data Source utility (dbdsn)" [*SQL Anywhere Server - Database Administration*].
- **Enhancement to dialog for submitting error reports** The dbsupport dialog that prompts you to submit an error report to iAnywhere now includes a View Error Report button, so you can view the information contained in the error report before submitting it.

Behavior changes and deprecated features

Following is a list of changes to SQL Anywhere databases and database servers introduced in version 10.0.1, grouped by category.

Behavior changes

- **Changes to when intra-query parallelism is used** Intra-query parallelism is no longer used for connections with background_priority set to on. Additionally, intra-query parallelism is not used if the number of server threads that are currently handling a request (ActiveReq server property) recently exceeded the number of CPU cores on the machine that the database server is licensed to use. See "Parallelism during query execution" [*SQL Anywhere Server - SQL Usage*].

  A new server property, ExchangeTasksCompleted, returns the total number of internal tasks used for intra-query parallelism since the database server started. See ."Server-level properties" [*SQL Anywhere Server - Database Administration*]

- **Encryption results are no longer deterministic** Previously, encrypting values using the ENCRYPT function was deterministic. If you entered two identical input strings and two identical encryption keys, identical output data (ciphertext) was returned. Now, you can control whether encryption is deterministic using the new encrypt_aes_random_iv database option. The new default behavior is non-deterministic. See "encrypt_aes_random_iv option [database]" [*SQL Anywhere Server - Database Administration*].

  Note
  Database servers that do not have this database option (version 10.0.0 and earlier) cannot decrypt data from databases that have this option set, even if it is set to Off.

- **ALTER DBSPACE RENAME attempts to open the dbspace if it was not open** Previously, if a database that uses dbspaces was started and one of its dbspaces could not be found, executing an ALTER DBSPACE ... RENAME statement for that dbspace updated the dbspace name in the catalog, but did not attempt to start the dbspace. Now, the database server attempts to open the dbspace after the catalog has been updated. See "ALTER DBSPACE statement" [*SQL Anywhere Server - SQL Reference*].

- **Changes to CREATE, ALTER, and DROP DBSPACE statements** The CREATE DBSPACE and DROP DBSPACE statements no longer accept the names of pre-defined dbspaces (SYSTEM, TEMPORARY, TEMP, TRANSLOG, and TRANSLOGMIRROR). If a user dbspace in a database created by an older version of the SQL Anywhere database server has the same name as one of the pre-defined dbspace names, the database server always refers to the user dbspace. See "Pre-defined dbspaces" [*SQL Anywhere Server - Database Administration*].

- **Changes to the output of the sa_conn_info system procedure** The output of the sa_conn_info system procedure has been changed to give more information about locks that connections are waiting on. The LockName field has been removed. Instead, two new fields, LockRowID and LockIndexID, have been added. If the connection is waiting on a lock that is associated with a particular row identifier, LockRowID contains that row identifier. If the connection is waiting on a lock that is associated with a particular index, LockIndexID contains the identifier of that index. See "sa_conn_info system procedure" [*SQL Anywhere Server - SQL Reference*].

  You must upgrade your database to use this feature. See "Upgrading version 10.0.0 databases" on page 316.

- **DBA permission no longer required for some system procedures** The sa_dependent_views, sa_get_dtt, sa_check_commit, and sa_materialized_view_info system procedures no longer require DBA permission to run.

- **Default unit of measure for CREATE DATABASE statement removed** When creating a database using the CREATE DATABASE statement, specifying the unit of measurement is no longer optional if you specify a value for DATABASE SIZE. See "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
- **New maximum value for the default_timestamp_increment option** The maximum value for the default_timestamp_increment option is now 1000000 (1 second). See "default_timestamp_increment option [database] [MobiLink client]" [*SQL Anywhere Server - Database Administration*].
- **dbdata10.dll removed** The functionality provided by the dbdata10 Dynamic Link Library has been incorporated in the SQL Anywhere .NET provider DLL. As a result, for Windows CE, there are now platform-specific versions of the SQL Anywhere .NET provider DLL.
- **Default cache size increased on NetWare** The default size of the database server cache on NetWare has been increased from 2 MB to 8 MB. See "-c server option" [*SQL Anywhere Server - Database Administration*].
- **Behavior changes resulting from client statement caching** The following behavior changes have been introduced as a result of the support for client statement caching:
  - An incorrect describe can occur in the case of the same SQL statement that was described as having no result set, and then later does have a result set. For example:

    ```
    CREATE PROCEDURE p() NO RESULT SET BEGIN ... END
    Prepare, Describe, Drop "call p"
    ALTER PROCEDURE p() RESULT( ... ) BEGIN ... END
    Prepare, Describe, Drop "call p"        // describe returns no result set
    ```

  - When client statement caching is enabled and RememberLastStatement is enabled (-zl server option), the LastStatement property is the empty string when reusing a cached statement.
  - When client statement caching is enabled, if sa_get_request_times or sa_get_request_profile is used to process the request level log, the number of times a statement is executed may be incorrect. See "max_client_statements_cached option [database]" [*SQL Anywhere Server - Database Administration*].
- **The Language utility (dblang) no longer requires administrator privileges** In previous versions of SQL Anywhere, users had to log in as an administrator to change language settings for localized versions of SQL Anywhere by using the dblang utility. This requirement has been removed.
- **Forward slashes in DISH service names no longer allowed** To prevent misinterpretation of DISH service names, forward slashes (/) are no longer permitted as part of the name for the service. See "CREATE SERVICE statement" [*SQL Anywhere Server - SQL Reference*].
- **Change to default value of SACommand.UpdateRowSource** Previously, the default value of SACommand.UpdatedRowSource was UpdatedRowSource.Both. It has been changed to UpdatedRowSource.OutputParameters. See "UpdatedRowSource property" [*SQL Anywhere Server - Programming*].
- **Change to the default value of the PrefetchRows connection parameter** When using the .NET Data Provider, the default value of the PrefetchRows connection parameter has changed from 10 to 200, to improve performance. The default value of SAConnectionStringBuilder.PrefetchRow has

also been changed to 200. Prefetching is disabled if the result set contains BLOB columns. See "PrefetchRows connection parameter [PROWS]" [*SQL Anywhere Server - Database Administration*].

- **Authenticated applications now use authenticate.sql instead of saopts.sql** In previous releases of the OEM Edition of SQL Anywhere, it was recommended that you store the authentication statement in the file *install-dir\scripts\saopts.sql*, so that it was applied whenever you created, rebuilt, or upgraded a database.

  It is now recommended that you store the authentication string in the file *install-dir\scripts\authenticate.sql*. See "Upgrading authenticated databases" [*SQL Anywhere Server - Database Administration*].

- **Long hostnames on HP-UX now accepted** Starting with the HP-UX 11i v2 September 2004 Update, system administrators could enable support for 255 byte hostnames by setting a kernel parameter. However, on SQL Anywhere servers on HP-UX computers with long hostname support enabled, the MachineName property and AppInfo HOST key returned at most 64 bytes of the hostname. Both MachineName and AppInfo can now return 255 byte hostnames.

- **iAnywhere JDBC driver URL header** In previous releases, when applications connected to SQL Anywhere using the iAnywhere JDBC driver, the URL passed to the JDBC driver began with the header **jdbc:odbc:**. Now, you can also begin the URL header with **jdbc:ianywhere:**. It is recommended that you use **jdbc:ianywhere:** to avoid conflicts with the Sun JDBC-ODBC bridge. See "Supplying a URL to the driver" [*SQL Anywhere Server - Programming*].

- **Retrieving a list of tables using jConnect when the Remarks value is longer than 128 characters in length** Previously, if a JDBC application connected using jConnect and requested a list of tables, the results could be empty even though tables exist. This occurred when the string_rtruncation option was set to On, the application used the DatabaseMetaData.getTables method, and the Remarks value for any table was longer than 128 characters. Now, Remarks values that are too long are truncated to 128 characters, and the list of tables is returned. You must either run *jcatalog.sql*, or upgrade your database, in order to use this change. See "Installing jConnect system objects into a database" [*SQL Anywhere Server - Programming*], or "Upgrade utility (dbupgrad)" [*SQL Anywhere Server - Database Administration*].

- **Comparing CHAR and NCHAR values** For SQL Anywhere 10.0.0, combining CHAR and NCHAR domains resulted in an NCHAR comparison. However, this meant that applications upgraded to 10.0.0 could get different results, or experience performance degradation, when using host variables bound as SQL_C_WCHAR. In SQL Anywhere 10.0.0 variables bound as SQL_C_WCHAR are represented as NCHAR. In SQL Anywhere 10.0.1, new inference rules have been introduced to improve compatibility with existing applications, and to provide consistent, predictable results when combining CHAR and NCHAR domains. See "Comparisons between CHAR and NCHAR" [*SQL Anywhere Server - SQL Reference*].

- **Asynchronous I/O disabled on Linux kernels earlier than 2.6.12** Because of a bug in Linux kernels earlier than 2.6.12, when you run a SQL Anywhere database server on one of the affected kernels, asynchronous I/O is disabled by default. If you want to use asynchronous I/O, then you must upgrade your kernel to 2.6.12 or later.

- **OEM Edition documentation moved** In previous releases of the SQL Anywhere OEM Edition, instructions for setting up authenticated applications were included in a separate *.pdf* or *.html* file. Now, this information is available in the following locations:

- "Running authenticated SQL Anywhere applications" [*SQL Anywhere Server - Database Administration*]
- "connection_authentication option [database]" [*SQL Anywhere Server - Database Administration*]
- "database_authentication [database]" [*SQL Anywhere Server - Database Administration*]

- **Unload utility -e and -t options no longer require case sensitive table names for case sensitive databases** In previous releases, when you unloaded a case sensitive database using the dbunload utility with the -e or -t options, these options required case sensitive table names. Now, the table names are now case insensitive.

- **Loading data into temporary tables** The behavior when loading data into temporary tables has changed. With the exception of a LOCAL TEMPORARY TABLE that is defined with ON COMMIT DELETE ROWS, a commit is now automatically performed before and after performing a LOAD TABLE on a temporary table. If the load fails, all rows in the temporary table are now removed, including rows which were present prior to the load.

  In the case of a LOCAL TEMPORARY TABLE with ON COMMIT DELETE ROWS, there is no change in behavior; no commits are performed. This means that in the event of a partial load due to a failure during the load, this type of temporary table would contain only some of the loaded rows, and may also be missing other rows that were present prior to the load.

  Also, loading into a temporary table now fails if the table contains rows referenced by the foreign key of another table.

- **Default case sensitivity for Japanese databases using the UCA collation** The default case and accent sensitivity of UCA collations when creating a Japanese database is now *sensitive*. A Japanese database is defined as any database created on a Japanese computer where the OS language or character set is Japanese, or any database created with a Japanese CHAR collation, such as 932JPN, or EUC_JAPAN.

  The default case sensitivity of UCA collations when creating a non-Japanese database is still *insensitive*.

  The defaults for case and accent sensitivity can still be overridden using the dbinit -c and -a (or -c- and -a-) options, respectively, by using collation tailoring syntax, or by using the CASE and ACCENT clauses of the CREATE DATABASE STATEMENT. See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*], and "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

Deprecated and discontinued features

- **SQL Flagger support for the SQL/1992 standard** SQL Flagger support for SQL:1992 (all levels) is deprecated.

- **dbinit -e option is deprecated** The dbinit -e option, used for specifying simple encryption when creating a database, has been deprecated. Use the -ea option (specifically, -ea simple) to specify simple encryption. See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*].

- **SADbType.oldbit data type removed** The SADbType.oldbit enumeration constant has been removed from the SQL Anywhere .NET provider.

- **-gx server option deprecated** On Windows desktop platforms, the database server scheduler now attempts to maintain the affinity of requests so it can use CPU cache. As a result, requests run on one CPU as much as possible. As well, the -gx server option, which was used for specifying the number of operating system threads for the database server to use has been deprecated. This option is now ignored by the database server.
- **CASE and ACCENT clauses of CREATE DATABASE statement deprecated** As a result of the addition of collation tailoring support using the COLLATION and NCHAR COLLATION of the CREATE DATABASE STATEMENT, the CASE and ACCENT clauses of this statement are deprecated. See "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

MobiLink

The following sections describe the new features, behavior changes, and deprecated features in MobiLink for version 10.0.1.

New features

MobiLink server

- **New ODBC driver for Oracle** There is now an ODBC driver for Oracle called iAnywhere Solutions 10 - Oracle that is custom-tailored for MobiLink applications.

  See "New ODBC driver for Oracle" on page 20.

- **Restructured encryption layer** The MobiLink encryption layer has been restructured and improved. This change is transparent and does not require any changes to applications.

- **MobiLink Server Log File Viewer** A new dialog has been added that allows you to view MobiLink log files. The Log File Viewer provides enhanced functionality such as filtering logged information and viewing summaries and statistics.

  See "MobiLink Server Log File Viewer" [*MobiLink - Server Administration*].

- **Improved memory use** On Windows, the MobiLink server (a 32-bit process) will now use more memory if required. Previously, it was limited to less than 2 GB, but it can now use significantly more memory if more is required and available. Use the mlsrv10 -cm option to set the maximum size for the server memory cache. More memory can lead to less paging to disk, which can improve performance.

MobiLink plug-in to Sybase Central

- **New functionality in Model mode**

  - **Table Mapping** It is easier to create and change table and column mappings. You can enable a table mapping by selecting from a dropdown list in the Mapping Direction column for a table. Similarly, you now specify whether a column is mapped in the Column Mappings tab. The New Table Mappings wizard has been removed.

    See "Modifying table and column mappings" [*MobiLink - Getting Started*].

  - **Create new remote tables** It is easier to create new remote tables based on the consolidated database schema. You can create a new remote table with the same name and columns as a table in the consolidated database using the Create New Remote Tables dialog. This dialog also maps the remote database tables to the consolidated tables in the model.

    See "Modifying the remote database that your model will create" [*MobiLink - Getting Started*].

  - **Delete remote database tables and columns** You can now delete remote database tables and columns in the Mappings tab. You can remove a remote table or column from the remote database schema in the model by selecting the table or column and choosing Edit ► Delete.

    See "Modifying the remote database that your model will create" [*MobiLink - Getting Started*].

MobiLink clients

- **More convenient way to specify network name on Windows CE** You can now specify the keywords default_internet or default_work as the name in the network_name protocol option so that your default setting is the name that is used.

  See "network_name" [*MobiLink - Client Administration*].

- **Enhanced functionality for delete_old_logs** The database option delete_old_logs now allows you to specify a number of days. Logs are then deleted that were created after that time period.

  See "delete_old_logs option [MobiLink client] [SQL Remote] [Replication Agent]" [*SQL Anywhere Server - Database Administration*].

- **New hook** The new hook sp_hook_dbmlsync_set_ml_connect_info allows you to set the network protocol and network protocol options immediately before dbmlsync attempts to connect to the MobiLink server.

  See "sp_hook_dbmlsync_set_ml_connect_info" [*MobiLink - Client Administration*].

Security

There are two new utilities called createcert and viewcert for managing transport-layer security. See:

- "Transport-layer security" on page 20
- "Certificate utilities" [*SQL Anywhere Server - Database Administration*]

Behavior changes and deprecated features

Following is a list of changes to MobiLink introduced in version 10.0.1.

MobiLink plug-in to Sybase Central

- **Add Table Mappings wizard is removed** New functionality has been added to Model mode to add new tables to the remote database schema.

  See "Modifying table and column mappings" [*MobiLink - Getting Started*].

- **Default dbmlsync batch file improved** When you deploy a MobiLink model, you create a file called *model-name_dbmlsync.bat*. Previously, the default dbmlsync command in this file included the -qc option, which closed the dbmlsync window after synchronization. This meant that it was difficult to determine whether the synchronization was successful. The -qc option is now removed from the default dbmlsync command line.

Security

The TLS utilities readcert, gencert, and reqtool have been deprecated. They are replaced with utilities called createcert and viewcert. See:

- "Certificate utilities" [*SQL Anywhere Server - Database Administration*]

QAnywhere

The following sections describe the new features, behavior changes, and deprecated features in QAnywhere for version 10.0.1.

New features

Following is a list of additions to QAnywhere introduced in version 10.0.1.

- **Dynamic addressing** The QAnywhere Agent can now detect active networks and automatically adjust the communication protocol and address of the MobiLink server without restarting.

  See "-xd option" [*QAnywhere*].

- **Maximum download size** You can now set a maximum size for the download of messages.

  See "-idl option" [*QAnywhere*] and ias_MaxDownloadSize in "Pre-defined client message store properties" [*QAnywhere*].

- **QAnywhere Server Log File Viewer** A new viewer has been added that allows you to view QAnywhere server log files. The Log File Viewer provides enhanced functionality such as filtering logged information and viewing summaries and statistics.

  See "Logging the QAnywhere server" [*QAnywhere*].

Client API enhancements

- **Ability to handle exceptions during processing for a message listener in the .NET API** ExceptionListener delegates have been added to the .NET API. This functionality already exists in the Java API.

  See:

  - "ExceptionListener delegate" [*QAnywhere*]
  - "ExceptionListener2 delegate" [*QAnywhere*]

- **Ability to pass the owning QAManager of a message to the Listener** New interfaces have been added to the .NET and Java APIs that are convenient for calling QAManagerBase API calls inside the Listener. This is useful, for example, when acknowledging a message. The new interfaces do not require you to reference a global instance of the QAManagerBase or use other coding techniques to pass the QAManagerBase into the Listener.

  See:

  - .NET API: "MessageListener2 delegate" [*QAnywhere*]
  - Java API: "Interface QAMessageListener2" [*QAnywhere*]

Behavior changes and deprecated features

Following is a list of changes to QAnywhere introduced in version 10.0.1.

- **Client message store transaction log** By default, the contents of the client message store transaction log are now deleted at checkpoints.

  See "-m database option" [*SQL Anywhere Server - Database Administration*].

  You can change this behavior by specifying the StartLine parameter in the qaagent -c option.

  See "-c option" [*QAnywhere*].

SQL Remote

The following sections describe behavior changes and deprecated features in SQL Remote for version 10.0.1.

Behavior changes and deprecated features

Following is a list of changes to SQL Remote introduced in version 10.0.1.

- **VIM and MAPI deprecated** Support for the VIM and MAPI message systems is deprecated in this release. The file, ftp, and SMTP message types are still supported. See "Using message types" [*SQL Remote*].

UltraLite

The following sections describe the new features, behavior changes, and deprecated features in UltraLite for version 10.0.1.

New features

Following is a list of additions to UltraLite introduced in version 10.0.1.

- **New platforms and devices** Windows Vista is now supported in this release.
- **Improved SQL performance** Historically, UltraLite would default to using the primary key index if, the UltraLite query optimizer determined that there was not any benefit to using an existing index for the query.

  With this version, instead of using the primary key, UltraLite will now access rows directly from the database pages. When this happens, you can expect to see query results returned in a different order from previous releases, because rows are no longer ordered by the primary key index. If the ordering of data is a concern, use an ORDER BY clause in your query. See "Using direct page scans" [*UltraLite - Database Management and Reference*] and "Using index scans" [*UltraLite - Database Management and Reference*].
- **Database property and option accessibility via SQL** Previous versions only allowed you to access database properties and options with methods from each UltraLite API. Now, UltraLite SQL introduces the following statement and function, so that you can set and retrieve properties and options via SQL (including Interactive SQL):
  - the SET OPTION statement. See "UltraLite SET OPTION statement" [*UltraLite - Database Management and Reference*].
  - the DB_PROPERTY function. See "DB_PROPERTY function [System]" [*UltraLite - Database Management and Reference*].
- **Increased number of concurrent connections** UltraLite now supports more concurrent connections. A single database still supports 14 connections. However, the number of overall concurrent database connections have increased:
  - 8 databases and 16 concurrent connections for Palm OS and Symbian OS.
  - 32 databases and 64 concurrent connections for all remaining platforms.

SQLCA restrictions can further limit connections
The total number of SQLCAs you can use to connect to the engine is 31. Keep this number in mind knowing that some components use one SQLCA per database manager and one SQLCA per connection. That means, for example, if your application is using the UltraLite.NET API, your real connection limit is reduced to a total of 30 connections only.

- **Commit flush operations** Historically, any commit operation performed with either the COMMIT statement or API call would only complete after UltraLite flushed a transaction safely to storage. With this release, you can now configure these behaviors and logically separate them as distinct operations:

  - A logical commit now gives you the ability to roll transactions back in an application.
  - A checkpoint now gives you a recovery point after a failure. This allows you to recover to the last committed transaction that has been flushed to memory.

  However, you can also enhance the performance of UltraLite applications that use the autocommit feature —particularly if you use group commit flushes. See "Backups and recoveries in UltraLite" [*UltraLite - Database Management and Reference*] and "Flushing single or grouped transactions" [*UltraLite - Database Management and Reference*].

  This new behavior is supported with the following features:

  - The CHECKPOINT statement. See "UltraLite CHECKPOINT statement" [*UltraLite - Database Management and Reference*].

    The Checkpoint methods for the UltraLite embedded SQL API and C++ API components. Other languages must use the CHECKPOINT statement instead. See:

    - UltraLite Embedded SQL: "ULCheckpoint function" [*UltraLite - C and C++ Programming*]
    - UltraLite C++: "Checkpoint function" [*UltraLite - C and C++ Programming*]

  - The COMMIT_FLUSH connection parameter. See "UltraLite COMMIT_FLUSH connection parameter" [*UltraLite - Database Management and Reference*].
  - The commit_flush_timeout and commit_flush_count database options. See "UltraLite commit_flush_timeout option [temporary]" [*UltraLite - Database Management and Reference*] and "UltraLite commit_flush_count option [temporary]" [*UltraLite - Database Management and Reference*]. For an overview of both options, see "UltraLite commit flush considerations" [*UltraLite - Database Management and Reference*].

Behavior changes and deprecated features

Following is a list of changes to UltraLite introduced in version 10.0.1.

- **ulafreg** ulafreg has been changed so standard output is no longer available. You still run this utility from the command line with the options you require. However, you must now click the Edit ► Copy to copy the output to the clipboard. You can then save it to file using a text editor of your choosing.

  See "UltraLite AppForge Registry utility (ulafreg)" [*UltraLite - Database Management and Reference*].

- **FIPS support on Windows CE** You no longer need to run the following executable to support FIPS on Windows CE devices: *install-path\ultralite\ce\arm\fips\setup.exe*. Now, you simply deploy the following file: *install-dir\ultralite\ce\arm\sbgse2.dll*.

Product-wide features

The following sections describe the new features, behavior changes, and deprecated features that affect all components of SQL Anywhere version 10.0.1.

New features

Following is a list of product-wide additions introduced in version 10.0.1.

New ODBC driver for Oracle

There is now a native ODBC driver for Oracle called iAnywhere Solutions 10 - Oracle.

Previously, iAnywhere rebranded an Oracle driver that was created by a third party. Now, iAnywhere has its own Oracle ODBC driver for use by SQL Anywhere applications. Using this driver, you can expect faster bug fixes and improved functionality when dealing with international character data. If you have MobiLink deployments using an Oracle consolidated database or you use OMNI to connect to Oracle, you are strongly urged to switch to this new driver.

See "iAnywhere Solutions Oracle driver" [*MobiLink - Server Administration*].

Transport-layer security

- **New certificate utilities** Two new utilities, createcert and viewcert, allow you to make, modify, and view security certificates. Previously, the utilities gencert, reqtool, and readcert were used for this purpose (those utilities have been deprecated).

  Viewcert allows you to view several types of PKI object. Previously, you could only view certificates. Viewcert also allows you to view both PEM and DER objects; previously, you could only view PEM objects. With viewcert you can also convert between PEM and DER, as well as encrypt or decrypt passwords.

  Createcert combines the functionality of the old gencert and reqtool utilities, and provides new functionality. When creating an ECC curve, you can now choose your curve; previously you had to use sect163k1. You can use key sizes from 512 to 16384 bits; previously, the size limit was 512 to 2048 bits. There is now a default GUID serial number; previously there was no default. You can now optionally create certificates that can sign other certificates. You can also specify advanced options that determine how a certificate's private key can be used. Finally, you can now use unencrypted private keys; previously, all private keys had to have a password.

  See "Certificate creation utility [createcert]" [*SQL Anywhere Server - Database Administration*] and "Certificate viewer utility [viewcert]" [*SQL Anywhere Server - Database Administration*].

- **Upgraded Certicom Security Builder for FIPS support on Windows CE** SQL Anywhere products can use one of two FIPS-certified modules for encryption, both from Certicom:

  - On Palm OS, you must still use Security Builder Government Services Edition v1.0.1.
  - On Windows CE, you must now use Security Builder Government Services Edition v2.0.0 because these libraries can be signed for use on Windows Mobile.

See "FIPS-approved encryption technology" [*SQL Anywhere Server - Database Administration*].

Behavior changes

Following is a list of product-wide changes in version 10.0.1.

Transport-layer security

- **gencert, readcert, and reqtool are deprecated** The security utilities gencert, reqtool, and readcert are deprecated. Gencert and reqtool are replaced by createcert. Readcert is replaced by viewcert.

  See "Certificate utilities" [*SQL Anywhere Server - Database Administration*].

Licensing

- **Server licensing information is now stored in .lic files** In previous releases, licensing information for the SQL Anywhere personal database server, the SQL Anywhere network database server, and the MobiLink server was stored in the server executable. This information is now stored in a *.lic* file that is located in the same directory as the server executable. If the *.lic* cannot be found for an executable, then the executable does not start.

  As a result of this change, the exename member of the a_dblic_info structure now specifies the executable or license file name.

  See:

  - "Server Licensing utility (dblic)" [*SQL Anywhere Server - Database Administration*]
  - "Deploying database servers" [*SQL Anywhere Server - Programming*]
  - "Deploying the MobiLink server" [*MobiLink - Server Administration*]
  - "a_dblic_info structure" [*SQL Anywhere Server - Programming*]

Windows Vista support issues

SQL Anywhere version 10.0.1 supports the Windows Vista operating system. Following are some issues relating to running SQL Anywhere software on Vista:

- **Windows Vista security** Windows Vista incorporates a new security model. User Account Control (UAC) is enabled by default and may affect the behavior of programs that expect to be able to write files, especially when the computer supports more than one user. Depending on where and how files and directories are created, a file created by one user may have permissions that do not allow another user to read or write to that file. If you install SQL Anywhere into the default directories, files and directories that require read/write access for multiple users are set up appropriately.
- **SQL Anywhere elevated operations agent** In Vista, certain actions require privilege elevation to execute when run under User Account Control. The following programs may require elevation in SQL Anywhere: *dbdsn.exe*, *dbelevate10.exe*, *dblic.exe*, *dbsvc.exe*, *installULNet.exe*, *mlasinst.exe*, and *ulafreg.exe*.

  The following dlls require elevation when they are registered or unregistered: *dbcond10.dll*, *dbctrs10.dll*, *dbodbc10.dll*, *dboledb10.dll*, *dboledba10.dll*.

On a Vista system with User Account Control activated, you may receive an elevation prompt for the SQL Anywhere elevated operations agent. The prompt is issued by the Vista User Account Control system to confirm that you want to continue running the identified program (if logged on as an administrator) or to provide administrator credentials (if logged on as a non-administrator).

- **Deployment changes** The program *dbelevate10.exe* is used internally by SQL Anywhere components to perform operations that require elevated privileges. This executable must be included in deployments of SQL Anywhere.
- **ActiveSync removed** The Microsoft ActiveSync utility is not supported in Vista. It is replaced by the Windows Mobile Device Center. You can use the SQL Anywhere ActiveSync Provider Installation utility with Windows Mobile Device Center.
- **SQL Anywhere executables signed** SQL Anywhere executables on Vista are signed by iAnywhere Solutions, Inc.
- **New license files** The installation of 10.0.1 includes procedures that create new license files for SQL Anywhere. License information from an existing installation is extracted from the old location within the executable files and moved to the new location (*dbsrv10.lic*, *dbeng10.lic*, and *mlsrv10.lic* files in the same directory as the executables).

  See "Server Licensing utility (dblic)" [*SQL Anywhere Server - Database Administration*].
- **Samples** Samples now correctly handle SQL Anywhere installation path names that contain one or more spaces.
- **Windows services** Vista-compliant services are not allowed to interact with the desktop. On Windows Vista, no SQL Anywhere services interact with the desktop (even if Allow Interaction with Desktop is enabled in the service definition). SQL Anywhere database servers can be monitored using the dbconsole utility or from Sybase Central.

  Sybase Central disables the option to allow service to interact with desktop when running on Windows Vista.
- **Using an AWE cache** To use an AWE cache on Windows Vista, you must run the database server as administrator. Starting a non-elevated database server with an AWE cache results in a warning that the database server must be run as an administrator to use AWE. See "-cw server option" [*SQL Anywhere Server - Database Administration*].
- **PowerDesigner, InfoMaker, and DataWindow.NET** The PowerDesigner, InfoMaker, and DataWindow.NET components included with SQL Anywhere are not officially supported on Windows Vista. As a result, you may experience issues running these components in a Vista environment. Refer to the respective product documentation for instructions on how to run in a Vista environment, as well as how to obtain a Vista-supported version of these products.

CHAPTER 2

What's New in Version 10.0.0

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Deprecated feature lists subject to change
As with all forward-looking statements, the lists of deprecated features are not guaranteed to be complete and are subject to change.

SQL Anywhere

The following sections describe the new features, behavior changes, and deprecated features in SQL Anywhere for version 10.0.0.

> **Note**
> Prior to version 10, the SQL Anywhere database server was called Adaptive Server Anywhere.

New features

Following is a list of additions to SQL Anywhere databases and database servers introduced in version 10.0.0.

Main features

- **Support for parallelism to improve performance** The database server now supports the use of multiple processors for processing a single query. Intra-query parallelism is beneficial when the number of simultaneously executing queries is less than the number of available processors. See "Parallelism during query execution" [*SQL Anywhere Server - SQL Usage*].
- **Support for database mirroring** SQL Anywhere now supports database mirroring, which is a mechanism to increase the availability of a database. It involves using either two or three database servers running on separate computers and communicating with each other in either synchronous or asynchronous mode. See "Introduction to database mirroring" [*SQL Anywhere Server - Database Administration*].

  The following features have been added to support database mirroring:

  - "synchronize_mirror_on_commit option [database]" [*SQL Anywhere Server - Database Administration*]
  - Alternate server names for database servers. See "-sn database option" [*SQL Anywhere Server - Database Administration*] and "START DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
  - ServerName property
  - AlternateServerName property
  - RetryConnectionTimeout property
  - ALTER DATABASE *dbname* FORCE START. See "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
  - MirrorServerDisconnect and MirrorFailover system events. See "Understanding system events" [*SQL Anywhere Server - Database Administration*].
  - "-xf server option" [*SQL Anywhere Server - Database Administration*]
  - "-xp database option" [*SQL Anywhere Server - Database Administration*]

- A new trap for the SQL Anywhere SNMP Extension Agent. See "Using traps" [*SQL Anywhere Server - Database Administration*].
- MirrorServerName parameter added to the EVENT_PARAMETER function. See "EVENT_PARAMETER function [System]" [*SQL Anywhere Server - SQL Reference*].

In addition to database mirroring, SQL Anywhere now provides Veritas Cluster Server agents for both databases (SADatabase agent) and database servers (SAServer agent). See "Using the SQL Anywhere Veritas Cluster Server agents" [*SQL Anywhere Server - Database Administration*].

- **Support for snapshot isolation** When you use snapshot isolation, the database keeps a copy of the original data while a user is changing it, and makes the original data available to other users who want to read it. Snapshot isolation is completely transparent to users, and can help reduce deadlocks and lock contentions. See "Snapshot isolation" [*SQL Anywhere Server - SQL Usage*].

  The following features have been added or enhanced to support snapshot isolation:

  - "allow_snapshot_isolation option [database]" [*SQL Anywhere Server - Database Administration*]
  - "isolation_level option [compatibility]" [*SQL Anywhere Server - Database Administration*]
  - "sa_snapshots system procedure" [*SQL Anywhere Server - SQL Reference*]
  - "sa_transactions system procedure" [*SQL Anywhere Server - SQL Reference*]
  - LockCount, SnapshotCount, SnapshotIsolationState, and VersionStorePages database properties
  - allow_snapshot_isolation, LockCount, and SnapshotCount connection properties
  - Version Store Pages Performance Monitor statistic
  - "SET statement [T-SQL]" [*SQL Anywhere Server - SQL Reference*]
  - "OPEN statement [ESQL] [SP]" [*SQL Anywhere Server - SQL Reference*]
  - "The ValuePtr parameter" [*SQL Anywhere Server - SQL Usage*]

- **Support for application profiling and diagnostic tracing** Existing application profiling capabilities, such as stored procedure profiling and request logging, have been integrated into a single, unified interactive interface the SQL Anywhere plug-in for Sybase Central. When you profile your application from Sybase Central, recommendations are provided to help you improve database performance.

  For more information about application profiling in Sybase Central, see "Application profiling" [*SQL Anywhere Server - SQL Usage*].

- **Support for materialized views** To improve performance in environments where the database is large and frequent queries result in repetitive aggregation and join operations on large amounts of data, SQL Anywhere now supports materialized views. See "Working with materialized views" [*SQL Anywhere Server - SQL Usage*].

  The database server has been enhanced to automatically decide, based on cost, which materialized views can be used to answer parts of a query instead of using base tables referenced directly by the query. See "Improving performance with materialized views" [*SQL Anywhere Server - SQL Usage*].

  Two new system tables, ISYSMVOPTION and ISYSMVOPTIONNAME, have been added to store information about materialized views. See "SYSMVOPTION system view" [*SQL Anywhere Server - SQL Reference*] and "SYSMVOPTIONNAME system view" [*SQL Anywhere Server - SQL Reference*].

- **Support for NCHAR data** SQL Anywhere now supports the NCHAR data type. NCHAR data types are used for storing Unicode character data. See "NCHAR data type" [*SQL Anywhere Server - SQL Reference*].

  The following new functions have been added in support of NCHAR:

  - "UNISTR function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "CONNECTION_EXTENDED_PROPERTY function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "UNICODE function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "NCHAR function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "TO_CHAR function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "TO_NCHAR function [String]" [*SQL Anywhere Server - SQL Reference*]

  The following functions SORTKEY and COMPARE functions have new parameters to support the NCHAR data type:

  - "SORTKEY function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "COMPARE function [String]" [*SQL Anywhere Server - SQL Reference*]

  SQL Anywhere now properly sorts multibyte character sets when using the Unicode Collation Algorithm (UCA).

  The Initialization utility (dbinit) and Unload (dbunload) utilities also have new options to support the NCHAR data type. See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*], and "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].

  SQL Anywhere now uses International Components for Unicode (ICU) for Unicode support. See "International Languages and Character Sets" [*SQL Anywhere Server - Database Administration*].

  To support ICU and the handling of NCHAR data, the following property changes have been made:

  - A new NcharCharSet database and connection extended property has been added. This property returns the NCHAR character set in use by the database or connection.
  - A new AccentSensitive database property has been added. This property returns the status of the accent sensitivity feature.
  - The CharSet database and connection properties are now extended properties.

  See "Database-level properties" [*SQL Anywhere Server - Database Administration*], and "Connection-level properties" [*SQL Anywhere Server - Database Administration*].

- **Internal performance enhancements** To improve database server performance, virtual machine technology has been used to re-architect the representation and evaluation of SQL expressions, which significantly improves throughput.

- **Support for view dependencies** The catalog now stores information about the dependencies of views. Specifically, the catalog keeps track of the views, tables and columns upon which each view in the database depends. When you make an alteration to an object upon which a view depends, the database server automatically performs additional operations to ensure that the view definition is not left in a state where it could return incorrect results. See "View dependencies" [*SQL Anywhere Server - SQL Usage*].

Two new tables, ISYSDEPENDENCY and ISYSOBJECT, have been added to store information about system objects and their dependencies. See "SYSDEPENDENCY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSOBJECT system view" [*SQL Anywhere Server - SQL Reference*].

- **Improved checkpoint algorithm** The database server can now initiate a checkpoint and perform other operations while the checkpoint takes place. Previously, all activity would stop while the checkpoint took place. If a checkpoint is already in progress, then any operation like an ALTER TABLE or CREATE INDEX that initiates a new checkpoint must wait for the current checkpoint to finish. See "Checkpoints and the checkpoint log" [*SQL Anywhere Server - Database Administration*].
- **Locking enhancements** The following enhancements have been made to locking:
  - **Classes of locks** SQL Anywhere now supports four distinct classes of locks: schema locks, table locks, row locks, and position locks. The sa_locks system procedure has been modified to more clearly document the types of locks that each transaction holds to permit more accurate analysis of locking issues. See "How locking works" [*SQL Anywhere Server - SQL Usage*] and "sa_locks system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **Support for intent locks** A new type of lock, called an intent lock, has been introduced for both table locks and row locks. Intent locks are used by an application to signal its intention to update a table or a set of rows within that table. Intent locks are now acquired when an application uses SELECT FOR UPDATE or FETCH FOR UPDATE statements (or their equivalent constructions in various programming interfaces). Intent locks block other intent locks and write locks, but do not block read locks. This support gives a higher degree of concurrency to those applications that use locking as an explicit concurrency control mechanism. See "Using cursors" [*SQL Anywhere Server - Programming*] and "Intent locks" [*SQL Anywhere Server - SQL Usage*].
  - **Key range locking eliminated in some situations** Changes to index maintenance algorithms now permit the database server to place write locks on individual index entries, rather than on a range of keys. This will improve concurrency and eliminate unnecessary blocking due to concurrent INSERT operations in a variety of circumstances. See "How locking works" [*SQL Anywhere Server - SQL Usage*].
- **Indexing enhancements** The following enhancements have been made to indexing:
  - **New index implementation** Previous releases of SQL Anywhere contained two different indexing implementations that were chosen automatically based on the declared size of the indexed columns. In SQL Anywhere 10, a new implementation of compressed B-tree indexes is used throughout, and older B-tree indexing technology has been eliminated. The new indexes store a compressed form of the index key value in the index entry, separate and distinct from the value in the row. This is required to support snapshot isolation.
  - **Support for snapshot isolation** In previous SQL Anywhere releases, index entries were deleted on UPDATE or DELETE statements immediately. To support snapshot isolation, there is potential for several index entries to point to the same logical row with different index key values. These multiple index entries are managed by the database server so that any one connection can see only one of the entries for any given row. Periodically, a daemon within the server will physically delete these extra index entries when they are no longer needed (as transactions COMMIT or ROLLBACK). Retaining index entries for uncommitted DELETEs also improves semantic consistency of the concurrency control mechanisms in SQL Anywhere. See "Snapshot isolation" [*SQL Anywhere Server - SQL Usage*].

- **Improved BLOB storage control and performance** You can now control the amount of a BLOB value that is stored in a table row (inline). You can also control whether to index BLOB values. These enhancements improve searching through, and accessing, BLOBs, and are made available through three new clauses in the CREATE TABLE and ALTER TABLE statements: INLINE, PREFIX, and [NO] INDEX. BLOB values can now be shared within, or among rows of the same table, reducing storage requirements by eliminating the need to store duplicate BLOB values. See "BLOB storage" [*SQL Anywhere Server - SQL Usage*], "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*], and "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*].
- **Support for column compression** You can now compress individual columns in a table. Compression is achieved using the deflate compression algorithm. This is the same compression used by the COMPRESS function, and is also the algorithm used in Windows *.zip* files. See "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*] and "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*].
- **Support for table encryption** Instead of encrypting an entire database to secure data, you can now encrypt individual tables in the database. Table encryption must be enabled in the database when it is initialized. See "Table encryption" [*SQL Anywhere Server - Database Administration*].

Database connections

- **Support for single or double quotes** Values in connection strings can now be enclosed in single or double quotes. This allows characters such as spaces and semicolons to be used in connection string values. See "Connection parameters passed as connection strings" [*SQL Anywhere Server - Database Administration*] and "Connection parameter tips" [*SQL Anywhere Server - Database Administration*].
- **Connection strings now allow T, Y, F, and N as boolean values** You can now specify T or Y to indicate true, and F or N to indicate false, when specifying connection parameters and protocol options in connection strings. See "Connection parameters" [*SQL Anywhere Server - Database Administration*].
- **Some connection strings and protocol options now accept values with k, m, and g suffixes** The following connection parameters and protocol options now accept k, m, and g as suffixes indicating kilobytes, megabytes, and gigabytes, respectively:
  - "CommBufferSize connection parameter [CBSIZE]" [*SQL Anywhere Server - Database Administration*]
  - "CompressionThreshold connection parameter [COMPTH]" [*SQL Anywhere Server - Database Administration*]
  - "PrefetchBuffer connection parameter [PBUF]" [*SQL Anywhere Server - Database Administration*]
  - "LogMaxSize protocol option [LSIZE]" [*SQL Anywhere Server - Database Administration*]
  - "MaxRequestSize protocol option [MAXSIZE]" [*SQL Anywhere Server - Database Administration*]
  - "ReceiveBufferSize protocol option [RCVBUFSZ]" [*SQL Anywhere Server - Database Administration*]
  - "SendBufferSize protocol option [SNDBUFSZ]" [*SQL Anywhere Server - Database Administration*]
- **AppInfo returns IP address for Windows clients** In previous releases, the AppInfo connection parameter only returned the IP address of the client computer on Unix and NetWare clients. The IP address

is now returned for Windows clients as well. See "AppInfo connection parameter [APP]" [*SQL Anywhere Server - Database Administration*].

- **Auditing individual connections** The conn_auditing temporary database option allows you to enable or disable auditing for a specific connection when the option is set in a login procedure. The Auditing database property has been added to help you obtain information about the auditing status of a database. See "conn_auditing option [database]" [*SQL Anywhere Server - Database Administration*].
- **RetryConnectionTimeout connection parameter** The RetryConnectionTimeout (RetryConnTO) connection parameter tells the client library to retry the connection attempt, as long as the server is not found, for the specified period of time. See "RetryConnectionTimeout connection parameter [RetryConnTO]" [*SQL Anywhere Server - Database Administration*].
- **Support for IPv6** IPv6 is supported now on Windows, Linux, Mac OS X, Solaris, AIX, and HP-UX. Servers running on these operating systems now listen on all available IPv4 and IPv6 addresses, and anywhere you can specify an IP address on the client or server (such as the HOST=, MYIP=, and BROADCAST= TCP protocol options), you can now specify an IPv6 address. See "IPv6 support in SQL Anywhere" [*SQL Anywhere Server - Database Administration*].
- **New parameters for LDAP registration** The read_authdn and read_password parameters can be used to register the database server with LDAP if the database server is an Active Directory server. See "Connecting using an LDAP server" [*SQL Anywhere Server - Database Administration*].

Backup and recovery

- **Checksums calculated automatically for critical database pages** The database server records checksums for critical database pages, regardless of whether checksums are enabled for the database. As a result, you may see warnings about checksum violations when you validate your database, even if the database does not have checksums enabled. Additionally, the database server shuts down with a fatal error when it tries to access a corrupt critical page. See "Validating checksums" [*SQL Anywhere Server - Database Administration*].
- **Applying multiple transaction logs at startup for recovery** By default, you must apply transaction logs individually, in the correct order when recovering a database. When the new -ad, -ar, and -as recovery options specified when starting the database server, you do not need to manually specify the order in which transaction logs are applied to the database. Because the database server and the database are running while the transaction logs are applied, the server's cache remains in a warm state, reducing total recovery time. See "-ad database option" [*SQL Anywhere Server - Database Administration*], "-ar database option" [*SQL Anywhere Server - Database Administration*], and "-as database option" [*SQL Anywhere Server - Database Administration*].
- **Support for parallel database backups** The SQL Anywhere database server now supports parallel backups for server-side image backups. Parallel database backups take advantage of physical I/O to perform read and write information in parallel, instead of sequentially, which improves performance. You can perform parallel backups in any of the following ways:

  - "Backup utility (dbbackup)" [*SQL Anywhere Server - Database Administration*]
  - "BACKUP statement" [*SQL Anywhere Server - SQL Reference*]
  - "db_backup function" [*SQL Anywhere Server - Programming*]

- **Tracking information on the last backup** A new column, LAST_BACKUP, has been added to the ISYSHISTORY system table to store information about the last backup. See "SYSHISTORY system view" [*SQL Anywhere Server - SQL Reference*].

Security

This section explains the enhancements made to SQL Anywhere to improve security.

- **RSA now included with SQL Anywhere** You no longer have to purchase a separate license to use RSA encryption. See "Separately licensed components" [*SQL Anywhere 10 - Introduction*].
- **Enhancements to FIPS support** The following FIPS-related changes have been made to the database server:
  - The FIPS DLL has been renamed from *dbrsa10f.dll* to *dbfips10.dll*.
  - The HASH function now accepts two new algorithms: SHA1_FIPS and SHA256_FIPS. These are the same as the SHA1 and SHA256 algorithms, but are the FIPS-validated Certicom versions.
  - If the -fips server option is specified and a non-FIPS algorithm is given to the HASH function, the database server uses SHA1_FIPS instead of SHA1, SHA256_FIPS instead of SHA256, and returns an error if MD5 is used (MD5 is not a FIPS algorithm).
  - If the -fips option is specified, the database server uses SHA256_FIPS for password hashing.

  Also, the -fips option and FIPS functionality are now available on more platforms. To see the list of platforms on which the -fips option is supported, see "Supported platforms" [*SQL Anywhere 10 - Introduction*].
- **Kerberos authentication** SQL Anywhere now supports Kerberos authentication. Kerberos authentication lets you use your Kerberos credentials to connect to the database without specifying a user ID or password. See "Using Kerberos authentication" [*SQL Anywhere Server - Database Administration*].
- **New authorities added** The following authorities have been added:
  - **BACKUP authority** You can assign BACKUP authority to a user so that they can perform backups, instead of granting the user DBA authority. See "BACKUP authority overview" [*SQL Anywhere Server - Database Administration*].
  - **VALIDATE authority** A new authority for validation operations, VALIDATE, has been added. VALIDATE authority is required to perform the operations executed by the different VALIDATE statements, such as database, table, index, and checksum validation. See "VALIDATE authority overview" [*SQL Anywhere Server - Database Administration*].
- **Securing features for a database server** The -sf database server option lets you specify features, or groups of features, that are secured (disabled) for databases running on the database server. See "-sf server option" [*SQL Anywhere Server - Database Administration*].

  The -sk server option lets you specify a key that can be used to enable disabled features when used with the secure_feature_key database option. You can also change the set of disabled features using the

sa_server_option system procedure SecureFeatures property. See "-sk server option" [*SQL Anywhere Server - Database Administration*].

Database utilities

- **@filename can be reused for several utilities** Command parameter files can now be selectively parsed for the utility using the parameter file. The parsing is based on simple conditional directives placed in the parameter file. See "Using conditional parsing in configuration files" [*SQL Anywhere Server - Database Administration*].
- **Data Source utility (dbdsn) enhancements** The following options have been added to the dbdsn utility:
  - **-dr** includes the DRIVER= parameter when you list the command that was used to create a data source. This allows you to recreate data sources so that they use a different version of the ODBC driver than the one included with the current version of the software.
  - **-f** displays the name of the system information file (typically *.odbc.ini*) being used.
  - **-ns** tells dbdsn not to search for the system information file (typically *.odbc.ini*), but to use the existing environment variables to determine where the file should be. This is useful when the file specified by one or more of the environment variables does not exist, and a ODBC data source is being created.
  - **-pe** encrypts the password field in the data source.

  See "Data Source utility (dbdsn)" [*SQL Anywhere Server - Database Administration*].
- **Histogram utility (dbhist) enhancements** Sheets within the Excel output file created by dbhist are now named to reflect the column name they apply to, instead of Sheet1, Sheet2, and so on. See "Histogram utility (dbhist)" [*SQL Anywhere Server - Database Administration*].
- **Information utility (dbinfo) enhancements** The -u option now includes information about materialized views. See "Information utility (dbinfo)" [*SQL Anywhere Server - Database Administration*].
- **Initialization utility (dbinit) enhancements** The Initialization utility (dbinit) now supports the following new options:
  - **-a** uses accent sensitivity for UCA string comparisons
  - **-af** uses French accent sensitivity rules for UCA string comparisons.
  - **-dba** changes the user ID and/or password of the default DBA database user in a new database.
  - **-dbs** specifies the initial size of the database file.
  - **-ze** specifies the character set encoding for the CHAR data type.
  - **-zn** specifies the collation sequence for the NCHAR data type.

  See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*].

- **Log Transfer Manager (LTM) enhancements** The Log Transfer Manager (LTM) utility, also known as the Replication Agent, now supports identifiers up to 128 bytes for table, column, procedure, function, and parameter names when using the Replication Agent with Replication Server 15.0 and Open Server/Open Client 15.0. In earlier versions of the software, identifiers were limited to 30 bytes. See "Identifiers in Replication Server" [*SQL Anywhere Server - Database Administration*].

  Timestamps in informational, warning, and error messages generated by dbltm now use the non-ambiguous ISO 8601 datetime format: **{I|W|E}** *yyyy-mm-dd hh:mm:ss message*.

- **Ping utility (dbping) enhancements** You can use the Ping utility (dbping) to obtain information about the performance of embedded SQL connections and your network's performance by specifying the -s or -st options. These options report statistics about the performance between the computer running dbping and the computer running the database server. See "Testing embedded SQL connection performance" [*SQL Anywhere Server - Database Administration*].

  The -pd option now lets you specify the name of the database you want to obtain the property value from. See "Ping utility (dbping)" [*SQL Anywhere Server - Database Administration*].

- **Server Enumeration utility (dblocate) enhancements** The Server Enumeration utility (dblocate) now supports several new options to search for databases:

  - **-d** displays the server name and address, and a comma-separated list of all databases running on each server.
  - **-dn** displays the server name and address only if the server is running a database with the specified name.
  - **-dv** displays the server name and address, and lists all databases running on each server on a separate line.
  - **-p** displays servers using the specified TCP/IP port number.
  - **-s** displays servers with the specified name.
  - **-ss** displays server names that contain the specified substring.

  See "Server Enumeration utility (dblocate)" [*SQL Anywhere Server - Database Administration*].

- **Service utility (dbsvc) enhancements** The Service utility (dbsvc) supports the DBLTM service type, which allows you to manage services for the Log Transfer Manager, and the dbsln service type, which lets you manage services for the Listener utility.

  The Service utility also supports the -o option, which allows you to log output from the utility to a file. See "Service utility (dbsvc) for Windows" [*SQL Anywhere Server - Database Administration*] and "Service utility (dbsvc) for Linux" [*SQL Anywhere Server - Database Administration*].

- **New SQL Anywhere Broadcast Repeater utility (dbns10)** The SQL Anywhere Broadcast Repeater utility allows SQL Anywhere clients to find SQL Anywhere database servers on other subnets and through firewalls, where UDP broadcasts do not normally reach, without using the HOST parameter or LDAP. See "SQL Anywhere Broadcast Repeater utility (dbns10)" [*SQL Anywhere Server - Database Administration*].

- **New SQL Anywhere Report Submission utility (dbsupport)** The new SQL Anywhere Report Support utility (dbsupport) provides the ability to submit error reports and statistics, the ability to query for updates (availability of EBFs), and the ability to check if previously submitted problems have been fixed. See "SQL Anywhere Support utility (dbsupport)" [*SQL Anywhere Server - Database Administration*].
- **Unload utility (dbunload) enhancements** The following dbunload enhancements have been made:
  - unprocessed statements are logged when dbunload encounters a failure. See "Failed unloads" [*SQL Anywhere Server - Database Administration*].
  - support for binary data in unloaded tables.
  - many internal enhancements have been made to improve performance for unloading databases

  The following new options have been added:
  - **-dc** recalculates the values for all computed columns in the database.
  - **-g** initializes materialized views during reload.
  - **-k** creates an auxiliary table for tracing support. Specifying this option populates the sa_diagnostic_auxiliary_catalog table. This option is useful when creating a tracing database.
  - **-nl** creates a *reload.sql* file that includes LOAD TABLE and INPUT statements for each table, but no data.

  See "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].
- **Validation utility (dbvalid)** A new database validation option, -d, has been added. This option performs a database validation that includes checksum validation, checks for orphaned table pages and BLOBs, as well as structural checks. Data is not checked. See "Validation utility (dbvalid)" [*SQL Anywhere Server - Database Administration*].

Database options

The following database options have been added or have enhanced functionality:

- **ansi_substring database option** This option controls the behavior of the SUBSTRING function. By default, the behavior of the SUBSTRING function now corresponds to ANSI/ISO SQL/99 behavior. A negative or zero start offset is treated as if the string were padded on the left with non-characters, and gives an error if a negative length is provided. See "ansi_substring option [compatibility]" [*SQL Anywhere Server - Database Administration*].
- **collect_statistics_on_dml_updates database option** Controls the gathering of statistics during the execution of DML statements (INSERT, DELETE, and UPDATE). See "collect_statistics_on_dml_updates option [database]" [*SQL Anywhere Server - Database Administration*].

- **default_dbspace option** This option allows you to specify the default dbspace where your tables are created. See "default_dbspace option [database]" [*SQL Anywhere Server - Database Administration*].
- **http_session_timeout option** The http_session_timeout option provides variable session timeout control. The option setting is in units of minutes. By default the public setting is 30 minutes. Minimum is 1 minute and maximum is 525600 minutes (365 days). See "http_session_timeout option [database]" [*SQL Anywhere Server - Database Administration*].
- **max_temp_space database option** You can specify the maximum amount of temporary space a connection can use with the max_temp_space option. See "max_temp_space option [database]" [*SQL Anywhere Server - Database Administration*].
- **materialized_view_optimization database option** This option controls the optimizer's use of materialized views. See "materialized_view_optimization option [database]" [*SQL Anywhere Server - Database Administration*].
- **oem_string database option** You can store information in the header page of a database file using the oem_string database option. This string can be accessed by applications and used for such purposes as storing version information, or validating that the database file is intended for your application. See "oem_string option [database]" [*SQL Anywhere Server - Database Administration*].
- **request_timeout database option** This option allows you to specify the maximum time a single request can run to help prevent connections from consuming a significant amount of server resources for a long period of time. See "request_timeout option [database]" [*SQL Anywhere Server - Database Administration*].
- **synchronize_mirror_on_commit option** This option controls when database changes are assured to have been sent to a mirror server when running database mirroring in asynchronous or asyncfullpage mode. See "synchronize_mirror_on_commit option [database]" [*SQL Anywhere Server - Database Administration*].
- **uuid_has_hyphens database option** This option controls the formatting of uniqueidentifier values when they are converted to strings. See "uuid_has_hyphens option [database]" [*SQL Anywhere Server - Database Administration*].
- **verify_password_function database option** The verify_password_function database option allows you to specify a function that can be used to implement password rules. The function is called on a GRANT CONNECT statement. See "verify_password_function option [database]" [*SQL Anywhere Server - Database Administration*].
- **New database options for Java support** The following database options have been added:
  - "java_location option [database]" [*SQL Anywhere Server - Database Administration*]
  - "java_main_userid option [database]" [*SQL Anywhere Server - Database Administration*]
  - "java_vm_options option [database]" [*SQL Anywhere Server - Database Administration*]

Database server options

In addition to any server options that have been documented in the New Features section, the following new server options have been added:

- **-cm server option** This server option allows you to specify the amount of address space allocated for Address Windowing Extensions (AWE) on Windows. See "-cm server option" [*SQL Anywhere Server - Database Administration*].
- **-dh server option** This server option makes a database undetectable when the Server Enumeration utility (dblocate) is run against the server. See "-dh database option" [*SQL Anywhere Server - Database Administration*].
- **-dt server option** This server option allows you to specify the directory where temporary files are stored. This option cannot be specified for database servers using shared memory connections on Unix. See "-dt server option" [*SQL Anywhere Server - Database Administration*].
- **-gtc server option** This option lets you control the number of threads that can run concurrently on a CPU. See "-gtc server option" [*SQL Anywhere Server - Database Administration*].
- **-ot server option** When you specify this server option, the console log file is truncated before any messages are written to it. See "-ot server option" [*SQL Anywhere Server - Database Administration*].
- **-su server option** This option lets you specify the password for the DBA user when connecting to the utility database. You should use -su instead of the *util_db.ini* file. See "-su server option" [*SQL Anywhere Server - Database Administration*].
- **-zp server option** When you specify this server option, the query optimization plan that was most recently used is stored for each connection. See "-zp server option" [*SQL Anywhere Server - Database Administration*].

Properties and Performance Monitor statistics

Several new connection, server, and database properties, as well as new Performance Monitor statistics, have been added to help you administer your database.

- **Connection properties** The following connection properties have been added in this release:
  - allow_snapshot_isolation
  - ansi_substring
  - ApproximateCPUTime
  - conn_auditing
  - default_dbspace
  - ExprCacheAbandons
  - ExprCacheDropsToReadOnly
  - ExprCacheEvicts
  - ExprCacheHits
  - ExprCacheInserts
  - ExprCacheLookups
  - ExprCache

- GetData
- HeapsCarver
- HeapsLocked
- HeapsQuery
- HeapsRelocatable
- HttpServiceName
- http_session_timeout
- java_location
- java_main_userid
- LastPlanText
- LockCount
- LockedCursorPages
- LockTableOID
- materialized_view_optimization
- max_query_tasks
- max_temp_space
- MultiPageAllocs
- NcharCharSet
- oem_string
- post_login_procedure
- QueryHeapPages
- ReqCountActive
- ReqCountBlockContention
- ReqCountBlockLock
- ReqCountBlockIO
- ReqCountUnscheduled
- ReqTimeActive
- ReqTimeBlockContention
- ReqTimeBlockIO
- ReqTimeBlockLock
- ReqTimeUnscheduled
- ReqStatus
- RequestsReceived
- RetryConnectionTimeout
- SessionCreateTime
- SessionID
- SessionLastTime
- SnapshotCount
- synchronize_mirror_on_commit
- tsql_outer_joins
- verify_password_function

For more information about connection properties, see "Connection-level properties" [*SQL Anywhere Server - Database Administration*].

- **Server properties** The following server properties have been added in this release:

  - CachePinned

- CacheReadEng
- CacheSizingStatistics
- CarverHeapPages
- ConsoleLogMaxSize
- CollectStatistics
- DebuggingInformation
- DefaultNcharCollation
- DiskReadEng
- ExchangeTasks
- FirstOption
- FunctionMaxParms
- FunctionMinParms
- HeapsRelocatable
- HeapsLocked
- HeapsQuery
- HeapsCarver
- IsEccAvailable
- IsRsaAvailable
- LastConnectionProperty
- LastDatabaseProperty
- LastOption
- LastServerProperty
- MapPhysicalMemoryEng
- MaxConnections
- MultiProgrammingLevel
- NumLogicalProcessors
- NumLogicalProcessorsUsed
- NumPhysicalProcessors
- NumPhysicalProcessorsUsed
- QueryHeapPages
- RememberLastPlan
- RemoteputWait
- RequestFilterConn
- RequestFilterDB
- RequestLogMaxSize
- RequestsReceived
- ServerName
- StartDBPermission

For more information about these properties, see "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **Database properties** The following database properties have been added in this release:

  - AccentSensitive
  - AlternateServerName
  - ArbiterState
  - AuditingTypes

- CleanablePagesAdded
- CleanablePagesCleaned
- EncryptionScope
- http_session_timeout
- IOParallelism
- JavaVM
- LockCount
- MirrorState
- NcharCollation
- NcharCharSet
- NextScheduleTime
- PartnerState
- ReceivingTracingFrom
- SendingTracingTo
- SnapshotCount
- SnapshotIsolationState
- VersionStorePages
- XPathCompiles

For more information about these properties, see "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **Performance monitor statistics properties** The following Performance Monitor statistics have been added in this release:

  - Cache: Multi-Page Allocations
  - Cache: Panics
  - Cache: Scavenge Visited
  - Cache: Scavenges
  - Cache Pages: Allocated Structures
  - Cache Pages: File
  - Cache Pages: File Dirty
  - Cache Pages: Free
  - Comm: Requests Received
  - Heaps: Carver
  - Heaps: Query Processing
  - Heaps: Relocatable Locked
  - Heaps: Relocatable
  - Mem Pages: Carver
  - Mem Pages: Pinned Cursor
  - Mem Pages: Query Processing
  - Version Store Pages

  For more information about these statistics, see "Performance Monitor statistics" [*SQL Anywhere Server - SQL Usage*].

System procedures and functions

Following are several new system procedures and functions, and new extensions to existing system procedures and functions.

- **Enhancements to all procedures and functions to support the DEFAULT clause** For procedures and user-defined functions, the value DEFAULT may be provided as an argument if the corresponding parameter was defined with a default value. In cases where the procedure has several parameters and the ones being defaulted are not all at the end, it may be easier to specify DEFAULT in the argument list than to use named parameters. Also, named parameters are not permitted in function calls.
- **New system procedures** The following system procedures have been added:
  - **sa_clean_database system procedure** Sets the duration of time for which the database cleaner runs. See "sa_clean_database system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_column_stats system procedure** The sa_column_stats system procedure returns string-related statistics about the specified column(s). See "sa_column_stats system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_conn_list system procedure** The sa_conn_list system procedure returns a connection ID. See "sa_conn_list system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_conn_options system procedure** The sa_conn_options system procedure returns property information for connection properties that correspond to database options. See "sa_conn_options system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_db_list system procedure** The sa_db_list system procedure returns a database ID. See "sa_db_list system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_describe_query system procedure** The sa_describe_query system procedure returns one row per column and describes the domain of the result expression and its nullability. This procedure is equivalent to performing the EXPRTYPE function on each column. See "sa_describe_query system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_get_bits system procedure** The sa_get_bits system procedure decodes a bit string, returning one row for each bit in the bit string, indicating the value of the bit. See "sa_get_bits system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_make_object system procedure** You can now specify an events as an object type for the sa_make_object system procedure. See "sa_make_object system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_materialized_view_info system procedure** The sa_materialized_view_info system procedure returns information about a specified materialized view, such as its status and the owner of the view. See "sa_materialized_view_info system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_refresh_materialized_views system procedure** The sa_refresh_materialized_views system procedure refreshes all materialized views in the database that are currently in an uninitialized

state. See "sa_refresh_materialized_views system procedure" [*SQL Anywhere Server - SQL Reference*].

- **sa_remove_tracing_data system procedure** This procedure permanently deletes all record of a given logging session from the diagnostic tracing tables. See "sa_remove_tracing_data system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_save_trace_data system procedure** This procedure saves data from temporary tracing tables to the base tables. See "sa_save_trace_data system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_set_tracing_level system procedure** Sets the level of tracing data to generate for the database being profiled. See "sa_set_tracing_level system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_snapshots system procedure** Returns a list of snapshots that are currently active for the database. See "sa_snapshots system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_split_list system procedure** Takes a string representing a list of values and returns a result set containing that list. See "sa_split_list system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_table_stats system procedure** Returns information about how many pages have been read from each table. See "sa_table_stats system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_transactions** Returns a list of transactions that are currently running against a database. See "sa_transactions system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_unload_cost_model and sa_load_cost_model system procedures** You can now unload the cost model from one database and load it into another database using the new system procedures sa_unload_cost_model and sa_load_cost_model, respectively. This eliminates repetitive, time-consuming recalibration activities when there is a large number of similar hardware installations. See "sa_unload_cost_model system procedure" [*SQL Anywhere Server - SQL Reference*] and "sa_load_cost_model system procedure" [*SQL Anywhere Server - SQL Reference*].

- **New functions** The following functions have been added:
  - **BIT_LENGTH function** Returns the number of bits stored in the array. See "BIT_LENGTH function [Bit array]" [*SQL Anywhere Server - SQL Reference*].
  - **BIT_SUBSTR function** Returns a sub-array of a bit array. See "BIT_SUBSTR function [Bit array]" [*SQL Anywhere Server - SQL Reference*].
  - **BIT_AND function** Takes two bit arrays and returns a bitwise AND-ing of its arguments using the following logic: for each bit compared, if both bits are 1, return 1; otherwise, return 0. See "BIT_AND function [Aggregate]" [*SQL Anywhere Server - SQL Reference*].
  - **BIT_OR function** Takes two bit arrays and returns a bitwise OR-ing of its arguments using the following logic: for each bit compared, if either bit (or both) is 1, return 1; otherwise, return 0. See "BIT_OR function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]

- **BIT_XOR function** Takes two bit arrays and returns a bitwise exclusive OR-ing of its arguments using the following logic: for each bit compared, if just one bit (but not both) is 1, return 1; otherwise, return 0. See "BIT_XOR function [Aggregate]" [*SQL Anywhere Server - SQL Reference*].
- **COUNT_SET_BITS function** Returns a count of the number of bits set to 1 (TRUE) in the array. See "COUNT_SET_BITS function [Bit array]" [*SQL Anywhere Server - SQL Reference*].
- **GET_BIT function** Returns the value (1 or 0) of a specified bit in a bit array. See "GET_BIT function [Bit array]" [*SQL Anywhere Server - SQL Reference*].
- **REVERSE function** This new function returns the reverse of a character expression. See "REVERSE function [String]" [*SQL Anywhere Server - SQL Reference*].
- **SET_BIT function** Sets the value of a specific bit in a bit array. See "SET_BIT function [Bit array]" [*SQL Anywhere Server - SQL Reference*].
- **SET_BITS function** Creates a bit array where specific bits, corresponding to values from a set of rows, are set to 1 (TRUE). See "SET_BITS function [Aggregate]" [*SQL Anywhere Server - SQL Reference*].
- **TRACED_PLAN function** Generates a graphical plan for a query using tracing data and information about optimizer conditions when the query was traced. See "TRACED_PLAN function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

- **Enhancements to various system procedures and functions** The following system procedures and functions have been enhanced as described:
  - **Enhancements to property functions** Property functions can now return LONG VARCHAR.

    See:

    - "CONNECTION_PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*]
    - "DB_PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*]
    - "PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*]
  - **Enhancements to DB_EXTENDED_PROPERTY function** You can now use the DB_EXTENDED_PROPERTY function with the NextScheduleTime database property to obtain the next scheduled execution time for an event. You can also use the function the return extended information about the CHAR character set. See "DB_EXTENDED_PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*].
  - **New CONNECTION_EXTENDED_PROPERTY function** You can use the CONNECTION_EXTENDED_PROPERTY function to find out extended information for certain connection parameters. See "CONNECTION_EXTENDED_PROPERTY function [String]" [*SQL Anywhere Server - SQL Reference*].
  - **sa_procedure_profile system procedure** The output from sa_procedure_profile system procedure can now be saved to a file, has new syntax, requires fewer parameters, and has new uses. See "sa_procedure_profile system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_procedure_profile_summary system procedure** The sa_procedure_profile_summary system procedure now supports saving its output to a file, has new syntax, accepts fewer parameters,

and has new uses. See "sa_procedure_profile_summary system procedure" [*SQL Anywhere Server - SQL Reference*].

- **sa_server_option system procedure** The sa_server_option system procedure lets you change settings for the database server while it is still running. You can now change the following settings:
  - **CacheSizingStatistics property** Display cache information in the Server Messages window whenever the cache size changes.
  - **CollectStatistics property** Collect Performance Monitor statistics for the database server.
  - **ConsoleLogFile property** Specify the name of the output file where Server Messages window information is recorded.
  - **ConsoleLogMaxSize property** Specify the maximum size of the output file used to record Server Messages window information.
  - **DebuggingInformation property** Display diagnostic communication messages and other messages for troubleshooting purposes.
  - **IdleTimeout server option** Disconnect TCP/IP or SPX connections that have not submitted a request for the specified number of minutes.
  - **ProfileFilterConn property** Capture profiling information for a specific connection ID, without preventing other connections from using the database.
  - **RequestFilterDB property** You can use the sa_server_option system procedure to filter connections to a single database for request logging.
  - **RequestLogging property** The request log can now record blocking and unblocking events, plan information, procedures, and triggers.
  - **RequestTiming property** Turning on request timing instructs the database server to maintain timing information for each request.

  For more information, see "sa_server_option system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Enhancement to xp_startsmtp system procedure** The xp_startsmtp system procedure supports three new parameters: smtp_user_name, smtp_auth_username, and smtp_auth_password. See "xp_startsmtp system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Enhancement to xp_sendmail system procedure** The xp_sendmail system procedure now supports attachments when sending mail using SMTP, using the new include_file parameter. In addition, xp_sendmail supports MIME content when using SMTP mail, using the new content_type parameter. See "xp_sendmail system procedure" [*SQL Anywhere Server - SQL Reference*].
- **sa_conn_info system procedure now returns several new property values** The sa_conn_info system procedure now returns the following additional properties: ClientPort, ServerPort, and LockTable. The procedure no longer returns the LastIdle property, and the UncmtOps value has been renamed to UncommitOps. See "sa_conn_info system procedure" [*SQL Anywhere Server - SQL Reference*].

- **sa_performance_diagnostics returns more information** The sa_performance_diagnostics system procedure now returns the LockCount and SnapshotCount when you use snapshot isolation. See "sa_performance_diagnostics system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Enhancement to the HASH function** The HASH function now accepts the following new algorithms: SHA256, SHA1_FIPS, and SHA256_FIPS. The FIPS related algorithms are only for use on systems that use FIPS-certified software. See "HASH function [String]" [*SQL Anywhere Server - SQL Reference*].
- **COMPRESS and DECOMPRESS functions support new algorithm** The gzip algorithm is now available to compress and decompress a string in a function. See "COMPRESS function [String]" [*SQL Anywhere Server - SQL Reference*], and "DECOMPRESS function [String]" [*SQL Anywhere Server - SQL Reference*].

SQL statements

Following are several new SQL statements, and new extensions to existing SQL statement syntax. These new features are in addition to statement changes listed in the previous feature sections of this document.

- **SQL statements to support materialized views** The following SQL statements have been added, or have had their syntax and functionality extended, to support materialized views:
  - "ALTER MATERIALIZED VIEW statement" [*SQL Anywhere Server - SQL Reference*]
  - "COMMENT statement" [*SQL Anywhere Server - SQL Reference*]
  - "CREATE INDEX statement" [*SQL Anywhere Server - SQL Reference*]
  - "CREATE MATERIALIZED VIEW statement" [*SQL Anywhere Server - SQL Reference*]
  - "DROP statement" [*SQL Anywhere Server - SQL Reference*]
  - "REFRESH MATERIALIZED VIEW statement" [*SQL Anywhere Server - SQL Reference*]
  - "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*]

  A new OPTION clause in the SELECT statement can be used to override the materialized_view_optimization database option. See "SELECT statement" [*SQL Anywhere Server - SQL Reference*].
- **New SQL statements to support diagnostic tracing and application profiling** The new SQL statements to support the Application Profiling feature are listed below:
  - "ATTACH TRACING statement" [*SQL Anywhere Server - SQL Reference*]
  - "DETACH TRACING statement" [*SQL Anywhere Server - SQL Reference*]
  - "REFRESH TRACING LEVEL statement" [*SQL Anywhere Server - SQL Reference*]
- **New VALIDATE DATABASE statement** You can now validate the database using the VALIDATE DATABASE statement. See "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*].
- **New VALIDATE MATERIALIZED VIEW statement** You can now validate materialized views using the VALIDATE MATERIALIZED VIEW statement. See "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*].

- **New ALTER STATISTICS statement** You can now control whether column statistics are automatically updated using the ALTER STATISTICS statement. You can still force an update of statistics on columns where automatic updating has been disabled, using an explicit CREATE STATISTICS or DROP STATISTICS statement. See "ALTER STATISTICS statement" [*SQL Anywhere Server - SQL Reference*].

- **ALTER INDEX statement enhancement** You can now rebuild an index using the REBUILD clause of the ALTER INDEX statement. See "ALTER INDEX statement" [*SQL Anywhere Server - SQL Reference*].

- **ALTER TABLE and CREATE TABLE statement enhancements** You now have finer control over what constitutes a match between a foreign key in a referencing table, and the primary key in the referenced table using the MATCH clause. You are also able to declare a foreign key as unique, thereby eliminating the need to declare uniqueness separately. See "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*] and "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **New CALIBRATE PARALLEL READ clause for the ALTER DATABASE statement** Use the new CALIBRATE PARALLEL READ clause of the ALTER DATABASE statement to detect hardware capable of parallel input and output. You can retrieve the calibration result for a dbspace by querying the new IOParallelism extended database property using the DB_EXTENDED_PROPERTY function. See "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*], and "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **New PRIMARY KEY ON clause for COMMENT statement** You can now create remarks for primary keys using the PRIMARY KEY ON clause of the COMMENT statement. See "COMMENT statement" [*SQL Anywhere Server - SQL Reference*].

- **CREATE ENCRYPTED FILE statement enhancement to change encryption keys** Using extensions to the CREATE ENCRYPTED FILE statement, you can now change the encryption key used to encrypt a database, transaction log, or dbspace without unloading and reloading the database. If the database is not encrypted, but table encryption is enabled, you can use the CREATE ENCRYPTED FILE statement to change the key used for table encryption. See "CREATE ENCRYPTED FILE statement" [*SQL Anywhere Server - SQL Reference*].

- **CREATE DATABASE statement enhancements** Three new clauses, ENCODING, NCHAR COLLATION, and ACCENT, have been added for improved handing of character sets. Also, a DATABASE SIZE clause has been added so you can specify the initial size of a database. See "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

- **SELECT statement enhancements** The FOR UPDATE clause, used in updating rows through a cursor, has been extended to allow column lists to restrict which columns can be modified using a subsequent positioned UPDATE statement. See "SELECT statement" [*SQL Anywhere Server - SQL Reference*].

  The FROM clause of a SELECT statement has been extended to support the READPAST table hint, which directs the database server to ignore locked rows, and the UPDLOCK table hint, which behaves similarly to XLOCK. See "FROM clause" [*SQL Anywhere Server - SQL Reference*].

  The SELECT statement has been extended to support an OPTION clause to control aspects of query optimization for that particular statement. The OPTION clause includes syntax for controlling the matching of materialized views via the MATERIALIZED VIEW OPTIMIZATION clause for this specific

SELECT statement. A second clause, FORCE OPTIMIZATION, directs the database server to perform optimization on a query, even if the query qualifies for bypassing cost-based optimization. See "SELECT statement" [*SQL Anywhere Server - SQL Reference*].

- **LOAD TABLE and UNLOAD TABLE statement enhancements** The STRIP clause for the LOAD TABLE statement now accepts options that allow you to control whether leading blanks are stripped from unquoted values before they are inserted. Additional STRIP options let you fine tune how the data is stripped.

  The LOAD TABLE statement has also been extended to support the COMMENTS INTRODUCED BY option. This option allows you to specify the string used to identify comments in the input data. Any lines in the input that begin with the specified string are ignored during the load operation.

  Both the LOAD TABLE and UNLOAD TABLE statements have been extended to support the following options:

  - **ENCODING option** Used to specify the encoding to use when loading or unloading data.
  - **ROW DELIMITED BY option** Used to specify the string that indicates the end of an input record when bulk loading or unloading data.
  - **QUOTE option** Similar to the QUOTE option for the OUTPUT statement in Interactive SQL. See "OUTPUT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].

  See "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*], and "UNLOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **VALIDATE INDEX statement enhancements** The syntax for VALIDATE INDEX has been enhanced to support index specifications. See "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*].

- **Enhancements to the ALTER INDEX statement to rename primary keys** You can now rename primary keys using the ALTER INDEX statement. See "ALTER INDEX statement" [*SQL Anywhere Server - SQL Reference*].

- **New CONTINUE statement** Use this statement to restart a loop. Statements in the loop following the CONTINUE statement are skipped. See "CONTINUE statement [T-SQL]" [*SQL Anywhere Server - SQL Reference*].

- **New BREAK statement [T-SQL]** Use this statement to leave a compound statement or loop. See "BREAK statement [T-SQL]" [*SQL Anywhere Server - SQL Reference*].

- **Enhancement to the INSERT statement control updating default values during an INSERT** You can control whether default values are updated during an INSERT when a row already exists using the DEFAULTS ON | OFF clause. This new capability does not extend to the following default fields: DEFAULT TIMESTAMP, DEFAULT UTC TIMESTAMP, and DEFAULT LAST USER; these fields are always updated. See "INSERT statement" [*SQL Anywhere Server - SQL Reference*].

- **Enhancement to the DELETE statement to support an ORDER BY clause** The DELETE statement now supports the ORDER BY clause, which allows you to specify the order in which rows are deleted from the database. See "DELETE statement" [*SQL Anywhere Server - SQL Reference*].

- **Enhancements to the START DATABASE statement** The START DATABASE statement now returns a wider range of error messages when the statement fails to indicate the reason why the database failed to start. As well, the START DATABASE clauses can now be specified in any order. See "START DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
- **Enhancement to the MESSAGE statement to support logging only to event or system log** In addition to being able to turn on or off logging, you can also specify whether to log only to the Event or System log. Syntax for the MESSAGE statement has been extended to allow the optional clause [EVENT | SYSTEM] in within the TO LOG clause. For example, TO EVENT LOG results in logging only to the Event log. See "MESSAGE statement" [*SQL Anywhere Server - SQL Reference*].
- **FOR OLAP WORKLOAD option** The syntax for the CREATE INDEX, CREATE TABLE, and ALTER TABLE statements has been extended to support a FOR OLAP WORKLOAD option in the foreign key definition. This option instructs the database server to perform certain optimizations and gather statistics on the key to improve OLAP performance. See "CREATE INDEX statement" [*SQL Anywhere Server - SQL Reference*], "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*], "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*], and "Clustered Hash Group By algorithm" [*SQL Anywhere Server - SQL Usage*].
- **Support for temporary stored procedures** You can now create temporary stored procedures using an extension to the CREATE PROCEDURE statement. Temporary stored procedures are visible only by the connection that created them, and are automatically dropped when the connection is dropped. See "CREATE PROCEDURE statement" [*SQL Anywhere Server - SQL Reference*].
- **Support for local temporary tables** You can now create local temporary tables using the CREATE LOCAL TEMPORARY TABLE statement. Local temporary tables created this way are dropped when the connection closes. See "CREATE LOCAL TEMPORARY TABLE statement" [*SQL Anywhere Server - SQL Reference*].
- **Enhancements to temporary tables** You can now create global temporary tables whose data can be shared by all connections to a database, using the SHARE BY ALL clause of the CREATE GLOBAL TEMPORARY TABLE statement. See "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*].

Data types

- **Support for character-length semantics for CHAR and VARCHAR data types** When you specify a CHAR or VARCHAR column, you can now use character-length semantics. Character-length semantics allow you to express the length in characters, instead of bytes. See "CHAR data type" [*SQL Anywhere Server - SQL Reference*], and "VARCHAR data type" [*SQL Anywhere Server - SQL Reference*].
- **Support for bit array data types** SQL Anywhere now supports the VARBIT and LONG VARBIT data types. These data types are used to store bit arrays. See "Bit array data types" [*SQL Anywhere Server - SQL Reference*].

  The following functions have been added for use with bit array data types:

  - "BIT_LENGTH function [Bit array]" [*SQL Anywhere Server - SQL Reference*]

- "BIT_SUBSTR function [Bit array]" [*SQL Anywhere Server - SQL Reference*]
- "BIT_AND function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
- "BIT_OR function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
- "BIT_XOR function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
- "COUNT_SET_BITS function [Bit array]" [*SQL Anywhere Server - SQL Reference*]
- "GET_BIT function [Bit array]" [*SQL Anywhere Server - SQL Reference*]
- "SET_BIT function [Bit array]" [*SQL Anywhere Server - SQL Reference*]
- "SET_BITS function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]

Programming interfaces

- **ADO.NET 2.0 support** The ADO.NET driver has been updated to support version 2.0 of the .NET framework. Several new classes and methods have been added as part of this support. See "SQL Anywhere .NET 2.0 API Reference" [*SQL Anywhere Server - Programming*].
- **SQL Anywhere Explorer** The SQL Anywhere Explorer lets you connect to SQL Anywhere databases from within Visual Studio .NET. In addition, you can open Sybase Central and Interactive SQL directly from Visual Studio .NET. See "Working with database connections in Visual Studio .NET" [*SQL Anywhere Server - Programming*].
- **Support for PreparedStatement.addBatch method** The iAnywhere JDBC driver now supports the PreparedStatement.addBatch method. This method is useful for performing batched (or wide) inserts.
- **iAnywhere JDBC driver supports JDBC 3.0** The iAnywhere JDBC driver now supports JDBC 3.0 calls. See "Introduction to JDBC" [*SQL Anywhere Server - Programming*].
- **Support for SQL_GUID added to ODBC driver** Support for UNIQUEIDENTIFIER columns has now been added to the SQL Anywhere ODBC driver. A UNIQUEIDENTIFIER column can now be typed as SQL_GUID.
- **Support for GUID escape sequences added to ODBC driver** Support for GUID escape sequences has been added to the SQL Anywhere ODBC driver. GUID escape sequences may be used in SQL statements prepared and executed through ODBC. A GUID escape sequence has the form {guid 'nnnnnnnn-nnnn-nnnn-nnnn-nnnnnnnnnnnn'}.
- **ODBC message callbacks are now per-connection** ODBC has supported message callbacks since Adaptive Server Anywhere version 9.0.0, but messages for all connections came to a single callback function. As of version 9.0.2, when you designate a message callback function, it applies only to a single connection. This is consistent with how DBLIB works. All messages now funnel through a single function in the ODBC driver, which filters the messages by connection, and only calls the connection's callback function for those connections that have one.
- **New functions added to the SQL Anywhere PHP module** The following new functions have been added to the SQL Anywhere PHP module:
  - sqlanywhere_execute
  - sqlanywhere_error
  - sqlanywhere_errorcode
  - sqlanywhere_insert_id

In addition, two new options have been added to the sqlanywhere_set_option function: verbose_errors and row_counts. See "SQL Anywhere PHP API reference" [*SQL Anywhere Server - Programming*].

- **Enhancements to db_locate_servers_ex function** The db_locate_servers_ex function supports two new flags: DB_LOOKUP_FLAG_ADDRESS_INCLUDES_PORT, which returns the TCP/IP port number in the a_server_address structure passed to the callback function, and DB_LOOKUP_FLAG_DATABASES, which indicates that the callback function is called once for each database or database server that is found. See "db_locate_servers_ex function" [*SQL Anywhere Server - Programming*].
- **Perl DBD::ASAny driver for the Perl DBI module renamed** The Perl driver has been renamed from DBD::ASAny to DBD::SQLAnywhere. Perl scripts that use SQL Anywhere must be changed to use the new driver name. The cursor attribute ASATYPE, which returns native SQL Anywhere types has not changed, and neither have the type names (ASA_STRING, ASA_FIXCHAR, ASA_LONGVARCHAR, and so on). See "SQL Anywhere Perl DBD::SQLAnywhere API" [*SQL Anywhere Server - Programming*].
- **SQL preprocessor (sqlpp) -o option values** The sqlpp -o option now accepts WINDOWS rather than WINNT for Microsoft Windows. As well, you can specify UNIX64 for supported 64-bit Unix operating systems. See "SQL preprocessor" [*SQL Anywhere Server - Programming*].

New ODBC Driver Manager and ODBC driver enhancements

- **ODBC driver manager enhancements** The ODBC Driver Manager now supports: all ODBC 3.x calls, wide CHAR entry points, tracing of connections. In addition, the ODBC Driver Manager is now able to switch between a non-threaded or threaded SQL Anywhere driver.
- **ODBC Driver Manager can now be used by both threaded and non-threaded applications** The ODBC Driver Manager can now be used by both threaded and non-threaded applications.

Deployment

- **Deployment wizard** The Deployment wizard has been added for creating deployments of SQL Anywhere for Windows. The Deployment wizard can be used to create both Microsoft Windows Installer package files and Microsoft Windows Installer Merge Module files. The InstallShield merge modules and templates provided with previous versions of SQL Anywhere are no longer supplied. Instead, use the Deployment wizard to create SQL Anywhere deployments. See "Using the Deployment wizard" [*SQL Anywhere Server - Programming*].

Windows CE enhancements

- **Dynamic cache sizing supported on Windows CE** Windows CE now supports dynamic cache sizing. Like Windows and Unix, on Windows CE the size of the database server cache increases and decreases depending on the load on the database server and the other demands on system memory. This feature removes the need for choosing an explicit cache size under in many circumstances, and can also boost performance. See "Dynamic cache sizing on Windows" [*SQL Anywhere Server - SQL Usage*].
- **Creating proxy ports for Windows CE** In previous releases of the software, you had to modify entries in the registry to configure ActiveSync to use a proxy port for connecting to a database on Windows

CE devices. The Connect dialog for Interactive SQL, Sybase Central, and the SQL Anywhere Console utility now includes a Setup Windows CE Proxy Port tool that allows you to create proxy ports for connecting to databases on Windows CE devices without editing the registry. See "Creating proxy ports for Windows CE devices" [*SQL Anywhere Server - Database Administration*].

- **Ability to rebuild databases on Windows CE** You can now rebuild your database on Windows CE using a two step process whereby you unload your database to file and then reload it into a new database using the dbunload utility. See "Rebuilding databases on Windows CE" [*SQL Anywhere Server - Database Administration*].
- **dbrunsql utility** The SQL Anywhere Script Execution utility (dbrunsql) allows you to type SQL commands or run command files on Windows CE. See "SQL Anywhere Script Execution utility (dbrunsql)" [*SQL Anywhere Server - Database Administration*].
- **Signed .cab files for Windows Mobile 5** The SQL Anywhere installation includes pre-built *.cab* files that are signed by Verisign. When you use these *.cab* files, you do not receive an unknown publisher warning. See "Installation considerations: Deploying SQL Anywhere 10 on Windows Mobile 5" [*SQL Anywhere Server - Database Administration*].

Unix/Linux enhancements

- **New ODBC driver manager that can be used on Unix platforms** The libdbodm10 shared object can now be used on Unix platforms as the ODBC Driver Manager. Applications using the iAnywhere ODBC Driver Manager must restrict their ODBC reliance to version 3.0 and above. See "Using an ODBC driver manager on Unix" [*SQL Anywhere Server - Programming*].
- **-uf server option** The -uf option allows you to specify the action taken by the database server when a fatal error occurs on Unix. See "-uf server option" [*SQL Anywhere Server - Database Administration*].
- **Service utility now supported on Linux** The Service utility is now available for use on Linux to create, delete, list, start, and stop SQL Anywhere services.
- **Additional samples supported on Unix** The following SQL Anywhere samples are now supported on Unix:
  - **DBTools** This sample is a database tools application that illustrates how to call and compile the database tools library by making a backup of the SQL Anywhere sample database.
  - **DiskFull** This sample illustrates a sample Disk-Full Callback DLL.
  - **HTTP** The samples in the HTTP directory demonstrate a variety of web service functionality, including how to use web services to set and retrieve client-side cookies within a SQL procedure, how to handle binary data within an HTTP web service procedure, how to use forms and HTML tables to display a simple calendar, how to use xp_read_file to retrieve images from the local disk and return them as the response to an HTTP request, and how to create, use, and delete HTTP sessions.
  - **oemString** This sample shows you how to determine if a database file is set up for an OEM's software.

- **PerformanceFetch** This sample shows you how to use fetchtest to test fetch rates for an arbitrary query.
- **PerformanceInsert** This sample shows you how to use instest to test insert rates into a table.

- **Support for fibers on Linux (thread affinity) and improved concurrent processing** The SQL Anywhere for Linux database server introduces a new co-routine processing model similar to that of Windows fibers. This processing model enables the server more control over context switching between tasks/routines providing better affinity to database operations.
- **Direct I/O support for Linux** SQL Anywhere for Linux now supports the Linux 2.6 O_DIRECT feature, which can improve I/O performance because the file system does not cache the I/O.
- **Asynchronous I/O for Linux** SQL Anywhere for Linux now supports the Linux AIO feature that enables even a single application thread to overlap I/O operations with other processing improving IO performance.
- **Linux desktop GUI** SQL Anywhere for Linux now offers an optional desktop GUI for the personal database server, network database server, MobiLink server, MobiLink synchronization client, and SQL Remote. This GUI can be invoked with the -ui option if you have GTK libraries installed.
- **Linux desktop icons** SQL Anywhere for Linux now offers optionally installed icons for the Linux Desktop to improve the usability of starting and managing of database servers, Sybase Central, Interactive SQL, the SQL Anywhere Console utility, and the MobiLink Monitor for users running the Linux Desktop.
- **64-bit client support for IBM AIX, HPUX, and Sun Solaris** SQL Anywhere client libraries are now available for the 64-bit memory model enabling you to take advantage of larger memory within your applications on IBM AIX, HP-UX, and Sun Solaris.

Web services

- **Web server is HTTP 1.1 compliant** For HTTP 1.1 compliance, the web server now accepts the following items:
  - pipelining of HTTP requests, enabling multiple HTTP requests such as GET and HEAD to be processed simultaneously
  - absolute URIs (previously only relative URIs were supported)
  - 100-continue request-header field, enabling a client to determine if the server would accept a request (based on the request headers) before the client sends the entire request body.
  - quality values in the Accept-Charset request-header field (these values were previously ignored)
- **HTTP client is HTTP 1.1 compliant** The following HTTP-related enhancements are now implemented:
  - **Support for HTTP string memory pooling** HTTP strings are no longer stored in contiguous memory. The cache is used as backend storage.
  - **Client chunk mode** An HTTP client can now send a POST request using HTTP chunked mode.
  - **HTTP sessions** HTTP connections can create an HTTP session to maintain state between HTTP requests.

- **HTTP server supports keep-alive** The database server now supports the keep-alive option when requested by HTTP clients. Instead of closing a connection after each request, an HTTP connection can be kept open after each request and response, so that multiple requests can be executed on the same connection. See "Working with HTTP headers" [*SQL Anywhere Server - Programming*].

  The KeepaliveTimeout procotol option has also been added to support this feature. See "KeepaliveTimeout protocol option [KTO]" [*SQL Anywhere Server - Database Administration*].

- **New HttpServiceName connection property** A new connection property, HttpServiceName, has been added to enable a web application to determine its service name origin. The property is useful for error reporting and control flow. See "Connection-level properties" [*SQL Anywhere Server - Database Administration*].

- **sa_set_http_option enhancements** You can now use the sa_set_http_option system procedure to control the character set used in the HTTP response based on the request Accept-Charset request-header field. See "sa_set_http_option system procedure" [*SQL Anywhere Server - SQL Reference*].

- **Support for data typing for SOAP services** The CREATE SERVICE and ALTER SERVICE statements have been extended to support a new DATATYPE clause. This clause is for use with SOAP services only, and controls whether data typing is supported for input parameters and output responses. See "CREATE SERVICE statement" [*SQL Anywhere Server - SQL Reference*], and "ALTER SERVICE statement" [*SQL Anywhere Server - SQL Reference*].

- **sa_set_soap_header system procedure** Use the sa_set_soap_header system procedure to set the response headers for SOAP services. See "sa_set_soap_header system procedure" [*SQL Anywhere Server - SQL Reference*].

- **SOAP_HEADER and NEXT_SOAP_HEADER functions** Use the SOAP_HEADER function to get request headers for SOAP services. See "SOAP_HEADER function [SOAP]" [*SQL Anywhere Server - SQL Reference*].

  Use the NEXT_SOAP_HEADER function to get the next header entry in a SOAP header. See "NEXT_SOAP_HEADER function [SOAP]" [*SQL Anywhere Server - SQL Reference*].

- **HEADER clause in CREATE PROCEDURE, ALTER PROCEDURE, CREATE FUNCTION, and ALTER FUNCTION statements** A new HEADER clause has been added to these statements, for use when creating HTTP web service client procedures and functions. This clause allows you to add or modify HTTP request header entries.

  See "CREATE PROCEDURE statement" [*SQL Anywhere Server - SQL Reference*], "CREATE FUNCTION statement" [*SQL Anywhere Server - SQL Reference*], and "Working with HTTP headers" [*SQL Anywhere Server - Programming*].

- **SOAPHEADER clause in CREATE PROCEDURE, ALTER PROCEDURE, CREATE FUNCTION, and ALTER FUNCTION statements** A new SOAPHEADER clause has been added to these statements, for use when creating SOAP web service client procedures and functions. This clause allows you to specify the SOAP header entries sent, and the SOAP header data received, using IN (IN/OUT) substitution parameters.

  See "CREATE PROCEDURE statement" [*SQL Anywhere Server - SQL Reference*], "CREATE FUNCTION statement" [*SQL Anywhere Server - SQL Reference*], and "Working with SOAP headers" [*SQL Anywhere Server - Programming*].

Miscellaneous

- **Indexing enhancements** The following enhancements have been made to indexing in this release:
  - **Support for index sharing** When you create a primary key, secondary key, foreign key, or unique constraint, you now create a logical index that points to a physical index (an actual indexing structure on disk). The database server automatically determines whether a new physical index is required to satisfy the logical index. This model allows the sharing of physical indexes and prevents the creation and maintenance of duplicate physical indexes, which wastes disk space. See "Index sharing using logical indexes" [*SQL Anywhere Server - SQL Usage*].
  - **Improved storage of index information** There are several improvements to how index information is organized in the database. For example, the list of all indexes, including primary and foreign key indexes, is now stored in a single system table, ISYSIDX.

    Three new system tables, ISYSPHYSIDX, ISYSIDXCOL, and ISYSFKEY provide additional information about the indexes listed in ISYSIDX. See:

    - "Index information in the catalog" [*SQL Anywhere Server - SQL Usage*]
    - "SYSIDX system view" [*SQL Anywhere Server - SQL Reference*]
    - "SYSPHYSIDX system view" [*SQL Anywhere Server - SQL Reference*]
    - "SYSIDXCOL system view" [*SQL Anywhere Server - SQL Reference*]
    - "SYSFKEY system view" [*SQL Anywhere Server - SQL Reference*]
  - **Index Consultant enhancements** The Index Consultant has been enhanced to improve recommendations with respect to clustered indexes, database and server states in the workload, and complete workload statistics reporting. It has been integrated into the Application Profiling tool.
  - **Improved control over how indexes are created** When an application creates a referential integrity constraint (primary key, foreign key, or unique constraint), the database server enforces the constraint by implicitly creating an index on the columns that make up the key of the constraint. The database server now allows you to specify how that index is created. You can specify the order of columns in the constraint key and the sequencing of values (ascending or descending) for each column in the index. In addition, there is no requirement that the order and sequencing of columns in a foreign key match the corresponding primary key or unique constraint.

    Additional improvements include:

    - The primary key order can now be changed without having to reorder the columns in the table.
    - The sequencing of columns in all constraint indexes can be specified to match application requirements.
    - Foreign key indexes can now be tailored to match the application requirements for the foreign key table without being tied to the primary table design.
    - Foreign keys can now have unique constraints.
- **New outer join elimination rewrite optimization** Outer joins are eliminated from the query before execution if the resulting query is semantically equivalent to the original query. See "Semantic query transformations" [*SQL Anywhere Server - SQL Usage*].

- **Date format strings now use character-length semantics** Date format strings now use character-length semantics to control the amount of text substituted for format specifiers; previously, byte-length semantics were used. For example, when formatting dates using strings, MMM used to imply the use of 3 bytes to store the month, now it implies 3 characters.
- **Directory access servers** You can now create a remote server that accesses the directory structure of the computer running the database server by creating a directory access server. See "Using directory access servers" [*SQL Anywhere Server - SQL Usage*].
- **Norwegian collation** 1252NOR has been added to support Norwegian. On Norwegian Windows systems, the database server chooses 1252NOR as the default collation for a new database if no collation is specified. See "Supported and alternate collations" [*SQL Anywhere Server - Database Administration*].
- **UTF8BIN collation** The UTF8BIN collation has been added to offer improved sorting of binary data. This new collation replaces the UTF8 collation, which is now deprecated. See "Supported and alternate collations" [*SQL Anywhere Server - Database Administration*].
- **Server Messages window enhancements** The following enhancements have been made to the Server Messages window:
  - **New right-click choices for the window title bar** On all supported Windows platforms (except Window CE), when you right-click the title bar of the Server Messages window you can now choose About or Clear Message Area. Choosing About displays information about the database server, while choosing Clear Messages Area erases all of the messages in the Server Messages window. Replicas of this window (the console output log, the Sybase Central Server Messages and Executed SQL pane, and the SQL Anywhere Console utility) are not affected by the clearing action.
  - **Environment variables used by database server can be logged to Server Messages window** The -ze server option displays a list of the environment variables for a database server in the Server Messages window. This feature is not available on NetWare or Windows CE. See "-ze server option" [*SQL Anywhere Server - Database Administration*].
  - **Controlling window minimization on startup** By default, the Server Messages window minimizes once the database server starts. You can specify the -qn option if you do not want the Server Messages window to minimize once the database server is started. See "-qn server option" [*SQL Anywhere Server - Database Administration*].
- **Ability to track when a table was last updated** The database server now keeps track of the last time a table was updated. This is achieved using the new last_modified_at column in the SYSTAB system view. See "SYSTAB system view" [*SQL Anywhere Server - SQL Reference*].
- **JDBC driver now supports the SQL Server Native Client ODBC driver** The JDBC driver now checks if the ODBC driver is the Microsoft SQL Server Native Client ODBC driver and appropriately sets the default result set type and other attributes.
- **SNMP traps when changing to another server during mirroring** The SQL Anywhere SNMP Extension Agent now sends a trap when it is connected to a server involved in mirroring, the connection drops, and a new connection is reestablished but to a *different* server.

  This trap indicates that the original server went down, and the server that was acting as the mirror became the primary. See "Using traps" [*SQL Anywhere Server - Database Administration*].

- **Changes to request logging** The request log is now stored in a comma-delimited text format, reducing it to roughly one third of its original size. Also, where possible, instead of a normal time entry, times are now recorded as either an equal sign (=), which means the same time as the previous entry in the log, or *+nnn*, where *nnn* is the number of milliseconds after the previous entry in the log. Additional information is now also recorded. For example, for queries, the isolation level, number of rows fetched, and cursor type are now recorded. For INSERT, UPDATE, and DELETE statements, the number of rows affected and number of triggers fired are now recorded. See "Request logging" [*SQL Anywhere Server - SQL Usage*].

  The sa_get_request_times system procedure supports only the new request log format. However, the tracetime Perl script, *tracetime.pl*, processes both old and new request log formats. The tracetime script also performs faster on logs of the new format, noticeably so on large request logs.

- **ODBC driver enhancements** SQL Anywhere is using new drivers for remote data access when connecting to Adaptive Server Enterprise and DB2 databases. See: "Changes to ODBC drivers used by MobiLink, QAnywhere, and remote data access" on page 135.

- **SQLANYSAMP10 environment variable** The SQLANYSAMP10 environment variable specifies the location of the directory containing the SQL Anywhere 10 samples, including the *demo.db* and the *custdb.db* sample databases. See "SQLANYSAMP10 environment variable" [*SQL Anywhere Server - Database Administration*].

Version support

This section includes changes to the version numbers of supported and unsupported third-party components.

- **Support for version 8 and earlier databases** When using Sybase Central, Interactive SQL, or the SQL Anywhere Console utility, databases created with versions of the software older than Adaptive Server Anywhere 8.0.0 are no longer supported. This includes databases that were created with older software and then upgraded using newer software. Attempting to load such databases will result in an error on database startup. You can connect to these databases from Sybase Central to unload them into a new version 10 database. See "Upgrading SQL Anywhere" on page 312.

- **jConnect version 5.5 and 6.0.5 supported** SQL Anywhere now supports jConnect versions 5.5 and 6.0.5 (version 5.5 was supported in 9.0.2) for connecting to the database server. jConnect is available as a separate download from http://www.sybase.com/products/informationmanagement/softwaredeveloperkit/jconnect. Consult the jConnect documentation for information about its supported features.

- **Processor requirements on Intel x86 architectures** On Intel x86 architectures, SQL Anywhere supports only Pentium-class and newer processors, and will not start on older processors, such as the 80386 or 80486.

Behavior changes

Following is a list of changes to SQL Anywhere databases introduced in version 10.0.0, grouped by category.

Miscellaneous

- **Adaptive Server Anywhere renamed** In version 10.0.0, Adaptive Server Anywhere has been renamed SQL Anywhere.
- **Upgrade changes** The Upgrade Database wizard, the Upgrade utility (dbupgrad), and ALTER DATABASE UPGRADE statement cannot be used to upgrade version 9.0.2 and earlier databases to version 10. To upgrade older databases to version 10, you must rebuild the database by performing an unload and reload. See "Upgrading SQL Anywhere" on page 312.
- **Password changes** In newly-created databases, all passwords are case sensitive, regardless of the case-sensitivity of the database. The default DBA password for new databases is **sql**.

  When you rebuild an existing database, the case sensitivity of the password is determined as follows:

  - If the password was originally entered in a case-insensitive database, the password remains case-insensitive.
  - If the password was originally entered in a case-sensitive database, uppercase and mixed case passwords remain case sensitive. However, if the password was entered in all lowercase, then the password becomes *case-insensitive*.
  - Changes to existing passwords and new passwords are case sensitive.

  The database server now uses SHA256 to hash passwords. The old (proprietary) hashing algorithm is still supported for passwords reloaded from old databases, but all new passwords will use SHA256.

  Passwords are now stored in UTF-8, so they continue to work if the database is reloaded into a database with a different character set.

  In previous releases when connecting from embedded SQL, it was possible to connect to a database with DBA permission and then successfully make a second connection to the same database for any user without specifying the password. Now the password must be specified on every connection.
- **Blank padding changes** In previous releases of SQL Anywhere, the semantics of string comparisons with blank-padded databases was as if the two strings being compared were padded with an infinite number of blanks. In this version 10, these semantics have been changed so that the comparison is performed by ignoring trailing blanks in each string.

  For equal (=) and not equal (<>) comparisons, there is no change in semantics; the two techniques (blank padding versus ignoring trailing blanks) yields the same results. However, there are differences for inequality comparisons. For example, suppose you have the two-byte string value 'a*' where the '*' represents a character in the database's collation that is less than the value of a blank. In previous versions of SQL Anywhere, the comparison predicate `'a*' < 'a'` returns TRUE. In version 10, the predicate yields FALSE, since the shorter string is not padded with blanks before being compared.

  For more information about blank padding, see "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*] and "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
- **Case of return values for properties** Server properties (returned by the PROPERTY function) that returned YES or NO in previous releases now return Yes or No. Database properties (returned by the DB_PROPERTY function) and connection properties (returned by the CONNECTION_PROPERTY

function) that returned ON or OFF in previous releases now return On or Off. This change may affect case-sensitive databases or applications that use case-sensitive string comparisons.

- **Changes to server property return values** In previous releases, the ConnsDisabled and RememberLastStatement server properties returned the values ON and OFF. They now return the values Yes and No. See "Server-level properties" [*SQL Anywhere Server - Database Administration*].
- **Default location of sasrv.ini file has been changed** The default location of *sasrv.ini* is now *%ALLUSERSPROFILE%\Application Data\SQL Anywhere 10* on Windows and *~/.sqlanywhere10* on Unix. In previous releases, the Unix file was named *.sasrv.ini*. On all platforms, the file is now named *sasrv.ini*.
- **Connections to database servers with long names** On Windows and Unix, version 9.0.2 and earlier clients cannot connect to version 10.0.0 and later database servers with names longer than 40 bytes.
- **Character set conversion is always enabled on the database server** The -ct database server option for enabling and disabling character set conversion is no longer supported. Character set conversion is always enabled for the database server, but if the database server determines that it is not required, then it is not used. You can disable character set conversion from the client by specifying CharSet=none. See "CharSet connection parameter [CS]" [*SQL Anywhere Server - Database Administration*].
- **Character set conversion unsupported on Windows CE** Character set conversion is not supported on Windows CE. In previous releases, character set conversion was disabled on the database server for Windows CE, and you could use any character set for the database. Now you must create databases for Windows CE using either the operating system character set or UTF-8. See "Installation considerations: Using ICU on Windows CE" [*SQL Anywhere Server - Database Administration*].
- **Changes to system procedures and functions** Following is a list of changes to system procedures and functions:
  - **Several system procedures have been made internal** The external system procedures xp_read_file, xp_write_file, xp_sprintf, xp_scanf, and xp_cmdshell are now internal system procedures.
  - **sa_validate system procedure** The sa_validate system procedure now requires VALIDATE authority. See "sa_validate system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_reset_identity system procedure** The table-name parameter is now required. Additionally, if the owner-name parameter is not specified, the table-name parameter must uniquely identify a table in the database. See "sa_reset_identity system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **sa_locks system procedure** The output of the sa_locks system procedure has been changed to return additional information, including the connection ID, the user ID, the table name, the lock class, and lock duration. See "sa_locks system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **RAND function** Previously, each connection was seeded with the same value so that the RAND function would return identical sequences for each connection. Now, each connection is uniquely seeded so that each connection will see a different random sequence. See "RAND function [Numeric]" [*SQL Anywhere Server - SQL Reference*].
  - **DB_CALLBACK_START and DB_CALLBACK_FINISH callback functions** The DB_CALLBACK_START and DB_CALLBACK_FINISH callback functions are now supported on

all platforms (previously, they were only supported on Windows platforms). See "db_register_a_callback function" [*SQL Anywhere Server - Programming*].

- **Scattered reads no longer used for files specified using a UNC name** Scattered reads are no longer used for files on remote computers, or for files specified using a UNC name such as *\\mycomputer\myshare\mydb.db*. See "Use an appropriate page size" [*SQL Anywhere Server - SQL Usage*].
- **Column ordering in primary and foreign key constraints** When creating primary key constraint, you can specify any order to the columns, regardless of the order in which columns appear in the table. Also, you can now create foreign keys that have a column order different from the primary key to which they refer, provided you specify the mapping between the foreign key columns and primary key columns. See the PRIMARY KEY clause in "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*].
- **Duplicate column names no longer allowed in indexes** Previously, duplicate references to columns in an index were allowed, except for primary key, foreign key, and unique constraint specifications. Now, the behavior is consistent across all types of indexes; specifying duplicate column names returns an error. Additionally, if an older database contains an index with duplicate column references, the dbunload utility drops the duplicate columns from the index when generating reload.sql. See "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*].
- **Encryption database property** Executing `SELECT DB_PROPERTY( 'Encryption' )` may now return a value other than None, even when the database is not encrypted. This occurs when table encryption is enabled for the database. If you have an application that executes this command as a method for checking whether the database is encrypted, use `SELECT DB_PROPERTY ( 'EncryptionScope' )`, instead. See "Understanding database properties" [*SQL Anywhere Server - Database Administration*].
- **Change in syntax for starting HTTPS using FIPS** Previously, you would specify `-xs HTTPS_FIPS(...)`. Now, you must specify `-xs HTTPS(FIPS=yes;...)`. The former syntax is still supported, but is deprecated. See "-xs server option" [*SQL Anywhere Server - Database Administration*].
- **Maximum user ID length is 128 bytes** In previous releases, when a statement required a user ID, the database server truncated user IDs longer than 128 bytes before using them in database server. If the string_rtruncation option was set, a truncation error was returned. The database server now returns an error if you specify a user ID that is longer than 128 bytes, regardless of the setting of the string_rtruncation option. See "Identifiers" [*SQL Anywhere Server - SQL Reference*].
- **Maximum length for server names** The maximum length of database server names has been increased from 40 bytes to 250 bytes on TCP/IP and shared memory connections. See "-n server option" [*SQL Anywhere Server - Database Administration*].
- **Changes to acceptable characters in identifiers** Double quotes and backslashes are no longer permitted in identifiers. See "Identifiers" [*SQL Anywhere Server - SQL Reference*].
- **LicensesInUse server property renamed** The server property LicensesInUse has been renamed to UniqueClientAddresses. See "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **SQL Anywhere OLE DB provider name has changed** The SQL Anywhere OLE DB provider (previously, ASAProv, ASAProv.90, ASAProv.80) is now called SAOLEDB. The version 10 provider can be referenced specifically by the name SAOLEDB.10.
- **SQL Anywhere sample database ODBC DSN has changed** The ODBC data source (previously, ASA 9.0 Sample) is now called SQL Anywhere 10 Demo.
- **Changes to connection strings** For ODBC and OLE DB connections, the precedence of where a connection parameter is found is now: connection string, SQLCONNECT environment variable, data source. Previously, in ODBC and OLE DB the data source had higher precedence than SQLCONNECT. See "Notes about connection parameters" [*SQL Anywhere Server - Database Administration*].
- **Empty value connection parameters now treated as unspecified** For all APIs, connection parameters that are specified with empty values are treated as though the parameter was not specified. In previous releases, an empty value was treated as unspecified or as an empty string, depending on the location it was specified in and the API being used. See "Notes about connection parameters" [*SQL Anywhere Server - Database Administration*].
- **Transaction log cannot be turned off while auditing is on** In previous versions of the software, you could stop using the transaction log for a database that had auditing turned on. Now, you must use a transaction log if auditing is turned on for a database. You must turn auditing off if you want to stop using the transaction log.
- **Databases with auditing turned on cannot be started in read-only mode** In previous versions of the software, you could start databases in read-only mode with auditing turned on. Now, databases with auditing on cannot be started in read-only mode.
- **Precision of signed BIGINT columns now 19 instead of 20** Previously, when an ODBC application described a *signed* BIGINT column using SQL_BIGINT, a precision value of 20 was returned, which was incorrect. Now, a value of 19 is returned. You need to change any applications that relied on the previous (incorrect) value.
- **Java VM enhancements** SQL Anywhere no longer offers the Java option as a separately licensed component. Java in the database now uses an external VM to run your Java code instead of using an internal VM. As a result, you can now use any Java VM you want and you are no longer restricted to particular JDK versions or Java targets. Newly-initialized databases are always Java enabled.

  This results in the following changes:

  - **Unsupported database options** The following options are no longer supported in SQL Anywhere:

    - describe_java_format
    - java_heap_size
    - java_namespace_size
    - java_page_buffer_size
    - java_input_output
    - return_java_as_string

  - **Unsupported properties** Support has been removed for the following properties:

    - Database properties:

- JDKVersion
- JavaHeapSize
- JavaNSSize

- Database server properties:
  - IsJavaAvailable
  - JavaGlobFix
- Connection properties:
  - JavaHeapSize
  - java_input_output

- **New JavaVM property** The JavaVM database property returns the path to the Java VM that the database server uses to execute Java in the database.
- **Unsupported compatibility view columns** The following columns are no longer available in the system compatibility views:
  - SYSINFO.classes_version
  - SYSJAVACLASS.replaced_by
  - SYSJAVACLASS.type_id
- **Java options deprecated for database utilities** The following database utility options have been deprecated:
  - Initialization utility (dbinit): -ja, -jdk
  - Unload utility (dbunload): -jr
  - Upgrade utility (dbupgrad): -ja, -jdk, -jr, -j
- **Java support deprecated for some Java-related clauses in the CREATE DATABASE and ALTER DATABASE statements** The CREATE DATABASE statement no longer supports the JAVA ON | OFF and JDK version clauses, while the ALTER DATABASE statement no longer supports the REMOVE JAVA clause.
- **New Java file** In addition to the changes mentioned, the following file has been added: *java \sajvm.jar*.

- **Ping utility (dbping)** Previously, the Ping utility (dbping) reported an error if the database server returned NULL for a property value. Now, dbping prints NULL when a property value is unknown and exits with a success return code. You can specify the -en option if you want dbping to exit with a failed return code when a property value is unknown. See "Ping utility (dbping)" [*SQL Anywhere Server - Database Administration*].
- **Environment variables renamed** The following environment variables have been renamed for this release:

Previous name	New name
ASTMP	SATMP

Previous name	New name
ASDIR	SADIR
ASLOGDIR	SALOGDIR
ASLANG	SALANG
ASCHARSET	SACHARSET

- **Changes to PHP module file names** The naming convention for the PHP module files has been changed. In previous versions, the files were named *phpX_sqlanywhereY.dll*, where *X* was the PHP major version number and *Y* was the major SQL Anywhere version number. The PHP module files are now named *php-a.b.c_sqlanywhereY.dll*, where *a.b.c* is the full version number of the PHP source the file is built against and *Y* is the major SQL Anywhere version number. For example, *php-5.0.2_sqlanywhere10.dll*.

- **Specifying values for the PrefetchBuffer connection parameter** The PrefetchBuffer connection parameter now interprets values less than 16384 as kilobytes for backwards compatibility. Using kilobytes without the k suffix is deprecated. If the value of PrefetchBuffer is adjusted because it was out of the valid range or specified in kilobytes without the k suffix, the client log file shows the actual PrefetchBuffer value used. See "PrefetchBuffer connection parameter [PBUF]" [*SQL Anywhere Server - Database Administration*].

- **System-defined domains cannot be dropped** You can no longer drop system-defined domains, such as MONEY or UNIQUEIDENTIFIERSTR, from a database. See "DROP statement" [*SQL Anywhere Server - SQL Reference*].

- **Changes to database utilities** Following is a list of changes to the database utilities, as described:

  - **The Service utility (dbsvc) can grant the Login as a Service privilege** The Service utility (dbsvc) prompts you to grant the Login as a Service privilege if the -a option is used and you try to run a service under an account that does not have the Login as a Service privilege enabled. If the -y option is used, dbsvc attempts to grant the Login as a Service privilege without prompting you. See "Service utility (dbsvc) for Windows" [*SQL Anywhere Server - Database Administration*].

  - **The Unload utility (dbunload) -an option can be used against a remote server** Prior to this change you could only run dbunload -an against a server on the same computer. Now you can run dbunload -an against a server that is running on a different computer. See "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].

  - **The Server Enumeration utility (dblocate) host name or IP address formats** The host name or IP address can use any format, regardless of whether -n is specified. For example, if a server is running on myhost.mycompany.com, which has IP address of 1.2.3.4, to list only servers running on this computer from any computer with the mycompany.com domain, any of `dblocate myhost`, `dblocate myhost.mycompany.com`, or `dblocate 1.2.3.4` can be used. In previous versions, only `dblocate myhost.mycompany.com` or `dblocate -n 1.2.3.4` would have worked since the given hostname or IP address had to match the address string (excluding the port number) displayed by dblocate. See "Server Enumeration utility (dblocate)" [*SQL Anywhere Server - Database Administration*].

- **Default-related changes** The following changes have been made to defaults:
  - **Default TCP/IP listening address changed for personal database server** On Windows, the personal database server now listens for connections on 127.0.0.1, rather than 0.0.0.0. This change means that users running SQL Anywhere with Windows Firewall enabled do not need to add dbeng10 to the exception list before it can be used.

    As a result of this change, trying to connect with `LINKS=tcpip (HOST=`*hostname*`;DOBROADCAST=none)` will not work if *hostname* is the real host name or IP address of the computer. However, using a hostname of **localhost** or **127.0.0.1** will work.
  - **Default database page size changed to 4096** The default database page size for SQL Anywhere databases has been changed to 4096 bytes from 2048 bytes. This page size has been shown to improve performance in many environments. "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

    If you do not specify the -gp option and start a database server with no databases loaded, the default page size on the database server is 4096.
  - **Default maximum cache size changes** The default, maximum cache size on Windows (non-AWE) has been increased. The default maximum cache size is now limited to the lesser of:
    - `90% of (`*total_physical_memory* `- 4 MB)`, but no less than 2 MB
    - `(`*available address space* `- 512 MB)`
  - **Unix cache size** The way the maximum cache size is calculated on Unix has changed. The default maximum cache size is now calculated as follows:
    - On 32-bit Unix platforms, it is the lesser of 90% of total physical memory or 1,834,880 KB.

      On 64-bit Unix platforms, it is the lesser of 90% of total physical memory and 8,589,672,320 KB.

    See "Limiting the memory used by the cache" [*SQL Anywhere Server - SQL Usage*] and "-ch server option" [*SQL Anywhere Server - Database Administration*].
  - **Unix stored procedures** When upgrading existing Unix applications, if you are using the 64-bit database server, any existing external stored procedures must be changed to 64-bit.
  - **Default size when converting NULL constants to NUMERIC or string data types** When converting a NULL constant to the NUMERIC data type, or to string data types such as CHAR, and VARCHAR, the length is now set to 0, instead of 32767.
  - **Default URI for openxml system procedure has changed** When using the openxml system procedure, if a namespace declaration is not specified, then by default the prefix mp is bound to the Uniform Resource Identifier (URI). In previous releases of the software, this URI was urn:ianywhere-com:asa-xpath-metaprop. The default URI has been renamed to urn:ianywhere-com:sa-xpath-metaprop. See "openxml system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Changes to cache size percentage calculation for -c, -ch-, and -cl server options** When using P (percentage) with -c, -ch, or -cl, the system now calculates percentage against either the amount of physical system memory, or the amount of available address space, whichever is lower. This eliminates the risk of allocating more memory for the cache than is available for addressing. See "-c server

option" [*SQL Anywhere Server - Database Administration*], "-ch server option" [*SQL Anywhere Server - Database Administration*], and "-cl server option" [*SQL Anywhere Server - Database Administration*].

- **Procedure_profiling server option renamed** The correct name of the server option that controls procedure profiling is now ProcedureProfiling. The previous form, Procedure_profiling, is still accepted, but will be unsupported in a future release. See "sa_server_option system procedure" [*SQL Anywhere Server - SQL Reference*].

- **TCP/IP port number does not need to be specified by clients connecting to a database server on HP-UX which is not using the default port** In previous versions of the software, if you started a database server on HP-UX, you had to specify a port number using the ServerPort [PORT] protocol option if the default port (2638) was already in use or if you did not want to use the default port.

  On HP-UX, the TCP/IP ServerPort protocol option is no longer required when multiple database servers are started on one machine. On Mac OS X, the TCP/IP ServerPort option must still be specified when starting a network server if a server is already running on the same computer. See "ServerPort protocol option [PORT]" [*SQL Anywhere Server - Database Administration*].

- **SOAP CONCRETE response renamed from ASADataSet to SimpleDataset** The CONCRETE response has been renamed from ASADataSet to SimpleDataset. See "CREATE SERVICE statement" [*SQL Anywhere Server - SQL Reference*].

- **Unload Database wizard behavior changes** You can no longer unload a database into an database version earlier than version 10. When you unload a version 9.0.2 or earlier database into a version 10 database, you cannot connect to database automatically once the rebuild completes.

- **Extract Database wizard behavior changes** You cannot extract version 9.0.2 and earlier databases. You must extract from a version 10 database.

- **-ui and -ux server options unsupported on Solaris** The -ui and -ux options are no longer supported on Solaris. They are still available on Linux.

- **Converting numeric data types** When converting a DOUBLE type to NUMERIC, SQL Anywhere now uses an algorithm that more precisely approximates the original DOUBLE value. With these changes, DOUBLE values with 15 or fewer significant digits are precisely converted to NUMERIC. In some cases, this may lead to different answers than previous versions of SQL Anywhere. See, "Converting between numeric sets" [*SQL Anywhere Server - SQL Reference*].

- **sa_validate system procedure changes** The data, index, and full options for the sa_validate system procedure are no longer required and their use is deprecated. Unless you are requesting an express or checksum validation, the checks carried out using the former data, index, and full options are now performed by default. See "sa_validate system procedure" [*SQL Anywhere Server - SQL Reference*].

- **a_validate_type enumeration changes** The VALIDATE_DATA, VALIDATE_INDEX, and VALIDATE_FULL parameters for the a_validate_type enumeration are no longer required and their use is deprecated. The validations performed by these options are now performed by default when VALIDATE_NORMAL is specified. See "a_validate_type enumeration" [*SQL Anywhere Server - Programming*].

- **SQLPATH environment variable syntax change** The syntax for the SQLPATH environment variable has changed on Unix. In previous versions, the path elements were separated by semi-colons (;)

for all operating systems. In SQL Anywhere 10, the path elements are separated by colons (:) on Unix platforms, and by semi-colons on other platforms.

Database option changes

- **Case sensitivity and database options** The SET OPTION statement and CONNECTION_PROPERTY function use case insensitive option names. However, in databases that use a Turkish collation or are case sensitive, option names referenced in queries should be written using the case specified in "Alphabetical list of options" [*SQL Anywhere Server - Database Administration*].

  In either of these situations, executing a query on SYSOPTION or a query like the following may not match any rows if the option name is used with the wrong case:

  ```
  SELECT *
     FROM sa_conn_properties()
     WHERE propname = 'BLOCKING'
  ```

- **Using embedded SQL with ansi_blanks set to On** For embedded SQL with ansi_blanks set to On and a blank padded database, when you supply a value of data type DT_STRING, you must set the sqllen field to the length of the buffer containing the value (at least the length of the value plus space for the terminating null character).

  When a database is blank padded, the ansi_blanks option controls truncation warnings sent to the client if the expression being fetched is CHAR or NCHAR (not VARCHAR or NVARCHAR) and it is being fetched into a char or nchar (not VARCHAR or NVARCHAR) host variable. See "ansi_blanks option [compatibility]" [*SQL Anywhere Server - Database Administration*].

- **ansi_integer_overflow option default setting changed** When a new database is created, the default value for the ansi_integer_overflow database option is On. In previous versions of the software, the default value for this option was Off. See "ansi_integer_overflow option [compatibility]" [*SQL Anywhere Server - Database Administration*].

- **date_format option changes** The date_format option no longer supports the following values when specifying the format string:

  - **hh** two digit hours
  - **nn** two digit minutes
  - **ss[.ss..]** seconds and parts of a second
  - **aa** morning/afternoon indicator (A.M. or P.M., 12 hour clock)
  - **aaa[a...]** morning/afternoon indicator (A.M. or P.M., 12 hour clock)
  - **pp** afternoon indicator, if necessary (P.M., 12 hour clock)
  - **ppp[p...]** afternoon indicator, if necessary (P.M., 12 hour clock)

  Also, if the character data is multibyte, the length of each symbol now reflects the number of characters. For example, the 'mmm' symbol specifies a length of three characters for the month. In previous versions, the length of the symbol reflected the number of bytes. See "date_format option [compatibility]" [*SQL Anywhere Server - Database Administration*].

- **login_mode database option** The value Mixed is deprecated for the login_mode database option. Specify Standard,Integrated to allow both standard and integrated logins. See "login_mode option [database]" [*SQL Anywhere Server - Database Administration*].
- **string_rtruncation option default setting changed** When a new database is created, the default value for the string_rtruncation database option is On. In previous versions of the software, the default value for this option was Off. See "string_rtruncation option [compatibility]" [*SQL Anywhere Server - Database Administration*].

  If you use the CAST function to truncate strings, the string_rtruncation database option must be set to Off; otherwise, there will be an error.

  It is recommended that you use the LEFT function to truncate strings. See, "LEFT function [String]" [*SQL Anywhere Server - SQL Reference*].
- **temp_space_limit_check option default setting changed** The default setting for the temp_space_limit_check option has been changed to On. Now, by default, if a connection requests more than its quota of temporary file space, then the request fails and the error SQLSTATE_TEMP_SPACE_LIMIT is returned. See "temp_space_limit_check option [database]" [*SQL Anywhere Server - Database Administration*].
- **timestamp_format option changes** The timestamp_format option no longer supports the use of French days and months. Also, if the character data is multibyte, the length of each symbol now reflects the number of characters. For example, the 'mmm' symbol specifies a length of three characters for the month. In previous versions, the length of the symbol reflected the number of bytes. See "timestamp_format option [compatibility]" [*SQL Anywhere Server - Database Administration*].
- **truncate_date_values option removed** The truncate_date_values option has been removed. In previous releases, this option allowed you to include a time in columns defined using the DATE data type. In this release, columns defined with DATE can only contain dates. If you want to store dates and times, use the TIMESTAMP data type. See "TIMESTAMP data type" [*SQL Anywhere Server - SQL Reference*].

Server option changes

- **-ec server option and -xs server option TLS syntax for strong encryption types has changed** The syntax for the strong encryption types in the -ec server option, the -xs server option, and the Encryption connection parameter has changed. There are now only 3 types available: none, simple, and tls. Instead of specifying the key exchange algorithm to use as the type, you now specify tls as the encryption type, and use a new protocol option, tls_type, to specify the algorithm. See "-ec server option" [*SQL Anywhere Server - Database Administration*], "-xs server option" [*SQL Anywhere Server - Database Administration*], and "Encryption connection parameter [ENC]" [*SQL Anywhere Server - Database Administration*].
- **-os server option** In previous releases, the -os database server option renamed the log file to *current-file-name.old*. This is now the behavior of the -on option. The -os database server option now specifies a maximum size for the output log, at which point the log is renamed. Previously, using -os would result in two log files, but now it results in an unlimited number of log files. See "-os server option" [*SQL Anywhere*

Server - Database Administration] and "-on server option" [*SQL Anywhere Server - Database Administration*].

Catalog changes

The catalog has undergone major changes in version 10.0.0. The most significant change is that system tables have been renamed to include an I at the beginning of their name. If you attempt to access the system tables, you will receive a permission denied error. Information in the system tables is made available through system views. There is one system view per system table, and, for backward compatibility, the system view names coincide with the table names from previous versions of SQL Anywhere. For example, in 9.0.2, there was a system table called SYS.SYSARTICLE. In version 10.0.0 that system table is now called SYS.ISYSARTICLE, and a corresponding system view, SYS.SYSARTICLE.

The catalog now also contains consolidated views. These are views which provide commonly needed joins from two or more tables or views. Most of the consolidated views were present as system views in previous releases.

Some system tables and views have been deprecated or removed from the catalog. In most cases, however, compatibility views are provided.

The following table provides a complete mapping of the catalog from Adaptive Server Anywhere 9.0.2 to SQL Anywhere 10.0.0. The first column, **9.0.2 system table/view**, shows names of the 9.0.2 system tables, followed by a forward slash ('/'), and then the name the 9.0.2 associated view(s). The middle column, **10.0.0 system table**, contains the 10.0.0 table name. The final column, **10.0.0 system view**, contains the associated 10.0.0 view name(s), as well as compatibility notes.

Note
A dash (-) in any of the columns indicates that there is no equivalent object. For example, a new table in the catalog for the 10.0.0 release results in a dash for the table in the 9.0.2 column.

9.0.2 system table/view	10.0.0 system table	10.0.0 system view
DUMMY / -	DUMMY	-
RowGenerator / -	RowGenerator	-
SYSARTICLE / SYSARTICLES	ISYSARTICLE	"SYSARTICLE system view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility: "SYSARTICLES consolidated view" [*SQL Anywhere Server - SQL Reference*].
SYSARTICLECOL / SYSARTICLECOL	ISYSARTICLECOL	"SYSARTICLECOL system view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility: "SYSARTICLECOLS consolidated view" [*SQL Anywhere Server - SQL Reference*].

9.0.2 system table/view	10.0.0 system table	10.0.0 system view
SYSATTRIBUTE / -	ISYSATTRIBUTE	-
SYSATTRIBUTE-NAME / -	ISYSATTRIBUTE-NAME	-
SYSCAPABILITY / SYSCAPABILITIES	ISYSCAPABILITY	"SYSCAPABILITY system view" [*SQL Anywhere Server - SQL Reference*] "SYSCAPABILITIES consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSCAPABILITY-NAME / -	ISYSCAPABILITY-NAME	"SYSCAPABILITYNAME system view" [*SQL Anywhere Server - SQL Reference*]
- / SYSCATALOG		"SYSCATALOG consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSCHECK / -	ISYSCHECK	"SYSCHECK system view" [*SQL Anywhere Server - SQL Reference*]
- / SYSCOLAUTH	-	"SYSCOLAUTH consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSCOLLATION / -	-	"SYSCOLLATION compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSCOLLATIONMAPPINGS / -	-	"SYSCOLLATIONMAPPINGS compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSCOLPERM / -	ISYSCOLPERM	"SYSCOLPERM system view" [*SQL Anywhere Server - SQL Reference*]
SYSCOLSTAT / SYSCOLSTATS	ISYSCOLSTAT	"SYSCOLSTAT system view" [*SQL Anywhere Server - SQL Reference*] and "SYSCOLSTATS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSCOLUMN / SYSCOLUMNS	ISYSTABCOL	"SYSTABCOL system view" [*SQL Anywhere Server - SQL Reference*]and "SYSCOLUMNS consolidated view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility:"SYSCOLUMN compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSCONSTRAINT / -	ISYSCONSTRAINT	"SYSCONSTRAINT system view" [*SQL Anywhere Server - SQL Reference*]
- / -	ISYSDEPENDENCY	"SYSDEPENDENCY system view" [*SQL Anywhere Server - SQL Reference*]

9.0.2 system table/view	10.0.0 system table	10.0.0 system view
SYSDOMAIN / -	ISYSDOMAIN	"SYSDOMAIN system view" [*SQL Anywhere Server - SQL Reference*]
SYSEVENT / -	ISYSEVENT	"SYSEVENT system view" [*SQL Anywhere Server - SQL Reference*]
SYSEVENTTYPE / -	ISYSEVENTTYPE	"SYSEVENTTYPE system view" [*SQL Anywhere Server - SQL Reference*]
SYSEXTENT / -	-	-
SYSEXTERNLOGINS / -	ISYSEXTERNLOGIN	"SYSEXTERNLOGIN system view" [*SQL Anywhere Server - SQL Reference*]
SYSFILE / -	ISYSFILE	"SYSFILE system view" [*SQL Anywhere Server - SQL Reference*]
SYSFKCOL / -	ISYSIDXCOL	"SYSIDXCOL system view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility: "SYSFKCOL compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSFOREIGNKEY / SYSFOREIGNKEYS	ISYSFKEY	"SYSFKEY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSFOREIGNKEYS consolidated view" [*SQL Anywhere Server - SQL Reference*]. For pre-10.0.0 compatibility: "SYSFOREIGNKEY compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
- / SYSGROUPS	ISYSGROUP	"SYSGROUP system view" [*SQL Anywhere Server - SQL Reference*] and "SYSGROUPS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSHISTORY / -	ISYSHISTORY	"SYSHISTORY system view" [*SQL Anywhere Server - SQL Reference*]
SYSINDEX / SYSINDEXES	ISYSIDX	"SYSIDX system view" [*SQL Anywhere Server - SQL Reference*] and "SYSINDEXES consolidated view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility: "SYSINDEX compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSINFO / -	-	"SYSINFO compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]

9.0.2 system table/view	10.0.0 system table	10.0.0 system view
SYSIXCOL / -	ISYSIDXCOL	"SYSIDXCOL system view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility: "SYSIXCOL compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSJAR / -	ISYSJAR	"SYSJAR system view" [*SQL Anywhere Server - SQL Reference*]
SYSJARCOMPONENT / -	ISYSJARCOMPONENT	"SYSJARCOMPONENT system view" [*SQL Anywhere Server - SQL Reference*]
SYSJAVACLASS / -	ISYSJAVACLASS	"SYSJAVACLASS system view" [*SQL Anywhere Server - SQL Reference*]
SYSLOGIN / -	ISYSLOGINMAP	"SYSLOGINMAP system view" [*SQL Anywhere Server - SQL Reference*]
SYSOPTBLOCK / -	-	system use only
- / -	ISYSMVOPTION	"SYSMVOPTION system view" [*SQL Anywhere Server - SQL Reference*]
- / -	ISYSMVOPTIONNAME	"SYSMVOPTIONNAME system view" [*SQL Anywhere Server - SQL Reference*]
- / -	ISYSOBJECT	"SYSOBJECT system view" [*SQL Anywhere Server - SQL Reference*]
SYSOPTION / SYSOPTIONS	ISYSOPTION	"SYSOPTION system view" [*SQL Anywhere Server - SQL Reference*] and "SYSOPTIONS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSOPTJOINSTRATEGY / SYSOPTJOINSTRATEGIES	-	system use only
SYSOPTORDER / SYSOPTORDERS	-	system use only
SYSOPTQUANTIFIER / -	-	system use only
SYSOPTREQUEST / -	-	system use only
SYSOPTREWRITE / -	-	system use only
SYSOPTSTAT / -	ISYSOPTSTAT	"SYSOPTSTAT system view" [*SQL Anywhere Server - SQL Reference*]

9.0.2 system table/view	10.0.0 system table	10.0.0 system view
-	ISYSPHYSIDX	"SYSPHYSIDX system view" [*SQL Anywhere Server - SQL Reference*]
- / SYSPROCAUTH	-	"SYSPROCAUTH consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSPROCEDURE / SYSPROCEDURES	ISYSPROCEDURE	"SYSPROCEDURE system view" [*SQL Anywhere Server - SQL Reference*] The SYSPROCEDURES view has been renamed to SYSPROCS. See "SYSPROCS consolidated view" [*SQL Anywhere Server - SQL Reference*].
SYSPROCPARM / SYSPROCPARMS	ISYSPROCPARM	"SYSPROCPARM system view" [*SQL Anywhere Server - SQL Reference*] and "SYSPROCPARMS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSPROCPERM / -	ISYSPROCPERM	"SYSPROCPERM system view" [*SQL Anywhere Server - SQL Reference*]
-	ISYSPROXYTAB	"SYSPROXYTAB system view" [*SQL Anywhere Server - SQL Reference*]
SYSPUBLICATION / SYSPUBLICATIONS	ISYSPUBLICATION	"SYSPUBLICATION system view" [*SQL Anywhere Server - SQL Reference*] and "SYSPUBLICATIONS consolidated view" [*SQL Anywhere Server - SQL Reference*]
- / -	ISYSREMARK	"SYSREMARK system view" [*SQL Anywhere Server - SQL Reference*]
SYSREMOTEOPTION / SYSREMOTEOPTIONS, SYSREMOTEOPTION2	ISYSREMOTEOPTION	"SYSREMOTEOPTION system view" [*SQL Anywhere Server - SQL Reference*], "SYSREMOTEOPTION2 consolidated view" [*SQL Anywhere Server - SQL Reference*], and "SYSREMOTEOPTIONS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSREMOTEOPTIONTYPE / -	ISYSREMOTEOPTIONTYPE	"SYSREMOTEOPTIONTYPE system view" [*SQL Anywhere Server - SQL Reference*]
SYSREMOTETYPE / SYSREMOTETYPES	ISYSREMOTETYPE	"SYSREMOTETYPE system view" [*SQL Anywhere Server - SQL Reference*] and "SYSREMOTETYPES consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSREMOTEUSER / SYSREMOTEUSERS	ISYSREMOTEUSER	"SYSREMOTEUSER system view" [*SQL Anywhere Server - SQL Reference*] and "SYSREMOTEUSERS consolidated view" [*SQL Anywhere Server - SQL Reference*]

9.0.2 system table/view	10.0.0 system table	10.0.0 system view
SYSSCHEDULE / -	ISYSSCHEDULE	"SYSSCHEDULE system view" [*SQL Anywhere Server - SQL Reference*]
SYSSERVERS / -	ISYSSERVER	"SYSSERVER system view" [*SQL Anywhere Server - SQL Reference*]
- / -	ISYSSOURCE	"SYSSOURCE system view" [*SQL Anywhere Server - SQL Reference*]
SYSSQLSERVER-TYPE / -	ISYSSQLSERVER-TYPE	"SYSSQLSERVERTYPE system view" [*SQL Anywhere Server - SQL Reference*]
SYSSUBSCRIPTION / SYSSUBSCRIPTIONS	ISYSSUBSCRIPTION	"SYSSUBSCRIPTION system view" [*SQL Anywhere Server - SQL Reference*] and "SYSSUBSCRIPTIONS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSSYNC / SYSSYNCS, SYSSYNC2	ISYSSYNC	"SYSSYNC system view" [*SQL Anywhere Server - SQL Reference*], "SYSSYNC2 consolidated view" [*SQL Anywhere Server - SQL Reference*], and "SYSSYNC2 consolidated view" [*SQL Anywhere Server - SQL Reference*]
-	ISYSSYNCSCRIPT	"SYSSYNCSCRIPT system view" [*SQL Anywhere Server - SQL Reference*] and "SYSSYNCSCRIPTS consolidated view" [*SQL Anywhere Server - SQL Reference*]
- / SYSSYNCSUBSCRIPTIONS	-	"SYSSYNCSUBSCRIPTIONS consolidated view" [*SQL Anywhere Server - SQL Reference*]
- / SYSSYNCUSERS	-	"SYSSYNCUSERS consolidated view" [*SQL Anywhere Server - SQL Reference*]
- / SYSTABAUTH	-	"SYSTABAUTH consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSTABLE / -	ISYSTAB	"SYSTAB system view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility: "SYSTABLE compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
-	ISYSTABCOL	"SYSTABCOL system view" [*SQL Anywhere Server - SQL Reference*]
SYSTABLEPERM / -	ISYSTABLEPERM	"SYSTABLEPERM system view" [*SQL Anywhere Server - SQL Reference*]
SYSTRIGGER / SYSTRIGGERS	ISYSTRIGGER	"SYSTRIGGER system view" [*SQL Anywhere Server - SQL Reference*] and "SYSTRIGGERS consolidated view" [*SQL Anywhere Server - SQL Reference*]

9.0.2 system table/view	10.0.0 system table	10.0.0 system view
SYSTYPEMAP / -	ISYSTYPEMAP	"SYSTYPEMAP system view" [*SQL Anywhere Server - SQL Reference*]
-	ISYSUSER	"SYSUSER system view" [*SQL Anywhere Server - SQL Reference*]
- / SYSUSERAUTH	ISYSUSERAUTHORITY	"SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERAUTH compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
- / SYSUSERLIST		"SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERLIST compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSUSERMESSAGES / -	ISYSUSERMESSAGE	"SYSUSERMESSAGE system view" [*SQL Anywhere Server - SQL Reference*]
- / SYSUSEROPTIONS	-	"SYSUSEROPTIONS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSUSERPERM / SYSUSERPERMS	-	Data now located in the ISYSUSER and ISYSUSERAUTHORITY system tables. See: "SYSUSER system view" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*] For pre-10.0.0 compatibility: "SYSUSERPERM compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERPERMS compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*]
SYSUSERTYPE / -	ISYSUSERTYPE	"SYSUSERTYPE system view" [*SQL Anywhere Server - SQL Reference*]
- / SYSVIEWS	ISYSVIEW	"SYSVIEW system view" [*SQL Anywhere Server - SQL Reference*] and "SYSVIEWS consolidated view" [*SQL Anywhere Server - SQL Reference*]
SYSWEBSERVICE / -	ISYSWEBSERVICE	"SYSWEBSERVICE system view" [*SQL Anywhere Server - SQL Reference*]

Summary of new views

System view name	Link to more information
SYSDEPENDENCY	Each row in the SYSDEPENDENCY system view describes a dependency between two database objects. See "SYSDEPENDENCY system view" [*SQL Anywhere Server - SQL Reference*]
SYSFKEY	Each row in the SYSFKEY system view describes a foreign key constraint in the system. See "SYSFKEY system view" [*SQL Anywhere Server - SQL Reference*].
SYSIDX	Each row in the SYSIDX system table defines a logical index in the database. See "SYSIDX system view" [*SQL Anywhere Server - SQL Reference*].
SYSIDXCOL	Each row in the SYSIDXCOL system view describes one column of an index described in the SYSIDX system view. See "SYSIDXCOL system view" [*SQL Anywhere Server - SQL Reference*].
SYSLOGINMAP	The SYSLOGINMAP system view contains all the user names that can be used to connect to the database using either an integrated login, or Kerberos login. See "SYSLOGINMAP system view" [*SQL Anywhere Server - SQL Reference*].
SYSMVOPTION	Each row in the SYSMVOPTION system view describes the setting of one option value for a materialized view. See "SYSMVOPTION system view" [*SQL Anywhere Server - SQL Reference*].
SYSMVOPTION-NAME	Each row in the SYSMVOPTIONNAME system view contains the name of an option defined in the SYSMVOPTION system view. See "SYSMVOPTION-NAME system view" [*SQL Anywhere Server - SQL Reference*].
SYSOBJECT	Each row in the SYSOBJECT system view describes an object. Examples of database objects include tables, views, columns, indexes, and procedures. See "SYSOBJECT system view" [*SQL Anywhere Server - SQL Reference*].
SYSPHYSIDX	Each row in the SYSPHYSIDX system view defines a physical index in the database. See "SYSPHYSIDX system view" [*SQL Anywhere Server - SQL Reference*].
SYSPROCS	The SYSPROCS system view replaces the former SYSPROCEDURES view. See "SYSPROCS consolidated view" [*SQL Anywhere Server - SQL Reference*].
SYSPROXYTAB	Each row of the SYSPROXYTAB system view describes the remote parameters of one proxy table. See "SYSPROXYTAB system view" [*SQL Anywhere Server - SQL Reference*].
SYSREMARK	Each row in the SYSREMARK system view describes a remark (or comment) for an object. See "SYSREMARK system view" [*SQL Anywhere Server - SQL Reference*].
SYSSOURCE	Each row in the SYSSOURCE system view contains the source for an object listed in the ISYSOBJECT system table. See "SYSSOURCE system view" [*SQL Anywhere Server - SQL Reference*].

System view name	Link to more information
SYSSYNCSCRIPT	Each row in the SYSSYNCSCRIPT system view identifies a stored procedure for MobiLink scripted upload. See "SYSSYNCSCRIPT system view" [*SQL Anywhere Server - SQL Reference*].
SYSTABCOL	The SYSTABCOL system view contains one row for each column of each table and view in the database. See "SYSTABCOL system view" [*SQL Anywhere Server - SQL Reference*].
SYSUSER	Each row in the SYSUSER system view describes a user in the database. See "SYSUSER system view" [*SQL Anywhere Server - SQL Reference*].
SYSUSERAUTHORITY	Each row of SYSUSERAUTHORITY system view describes an authority granted to one user ID. See "SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*].

Summary of deprecated tables or views

Following is a list of catalog objects that are deprecated. In most cases, the object was a table in previous versions but is now a compatibility view. Referencing these objects does not result in an error; however, for future compatibility, you are encouraged to change your applications to point to the suggested object(s) instead.

Deprecated table or view	Transition information
SYSCOLLATION system table	Collation mapping information is now stored as database properties. See "SYSCOLLATION compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSCOLLATIONMAPPINGS system table	Collation mapping information is now stored as database properties. See "SYSCOLLATIONMAPPINGS compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSCOLUMN system table	Use the SYSTABCOL system view instead. See "SYSTABCOL system view" [*SQL Anywhere Server - SQL Reference*] and "SYSCOLUMN compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSFKCOL system table	Use the SYSFKEY system view instead. See "SYSFKEY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSFKCOL compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSFOREIGNKEY system table	Use the SYSFKEY system view instead. See "SYSFKEY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSFOREIGNKEY compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSINDEX system table	Use the SYSIDX system view instead. See "SYSIDX system view" [*SQL Anywhere Server - SQL Reference*] and "SYSINDEX compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].

Deprecated table or view	Transition information
SYSIXCOL system table	Use the SYSIDXCOL system view instead. See "SYSIDXCOL system view" [*SQL Anywhere Server - SQL Reference*] and "SYSIXCOL compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSTABLE system table	Use the SYSTAB system view instead. See "SYSTAB system view" [*SQL Anywhere Server - SQL Reference*] and "SYSTABLE compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSUSERAUTH system view	Use the SYSUSERAUTHORITY system view instead. See "SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERAUTH compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSUSERPERM system table	Use the SYSUSERAUTHORITY system view instead. See "SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERPERM compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSUSERLIST system view	Use the SYSUSERAUTHORITY system view instead. See "SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERLIST compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].
SYSUSERPERMS system view	Use the SYSUSERAUTHORITY system view instead. See "SYSUSERAUTHORITY system view" [*SQL Anywhere Server - SQL Reference*] and "SYSUSERPERMS compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*].

Summary of removed or renamed tables or views

Following is a list of catalog objects that are no longer present in the catalog. Referencing these objects results in an error.

Removed table or view	Transition information
SYSATTRIBUTE system table	Use the SYSTAB and SYSPHYSIDX system views instead. Information about percent free and clustered index is now maintained in the ISYSTAB system table. Information about key values, key distance, leaf pages, and depth is now stored in the ISYSPHYSIDX system table. See "SYSTAB system view" [*SQL Anywhere Server - SQL Reference*] and "SYSPHYSIDX system view" [*SQL Anywhere Server - SQL Reference*].
SYSATTRIBUTENAME system table	Use the SYSIDX and SYSPHYSIDX system views instead. See "SYSIDX system view" [*SQL Anywhere Server - SQL Reference*] and "SYSPHYSIDX system view" [*SQL Anywhere Server - SQL Reference*].
SYSEXTENT system table	The SYSEXTENT table is no longer available in the catalog in SQL Anywhere version 10.0.0 and higher. This table was previously unused.

Removed table or view	Transition information
SYSEXTERNLOGINS	Renamed to SYSEXTERNLOGIN. See "SYSEXTERNLOGIN system view" [*SQL Anywhere Server - SQL Reference*].
SYSLOGIN system table	The SYSLOGIN table has been replaced by the SYSLOGINMAP system view, with some changes. See "SYSLOGINMAP system view" [*SQL Anywhere Server - SQL Reference*].
SYSOPTBLOCK	This table was for internal use only.
SYSOPTJOINSTRATEGY	This table was for internal use only.
SYSOPTJOINSTRATEGIES	This view was for internal use only.
SYSOPTORDER	This table was for internal use only.
SYSOPTORDERS	This view was for internal use only.
SYSOPTQUANTIFIER	This table was for internal use only.
SYSOPTREQUEST	This table was for internal use only.
SYSOPTREWRITE	This table was for internal use only.
SYSPROCEDURES view	Use the SYSPROCS consolidated view instead. See "SYSPROCS consolidated view" [*SQL Anywhere Server - SQL Reference*].
SYSSERVERS	Renamed to SYSSERVER. See "SYSSERVER system view" [*SQL Anywhere Server - SQL Reference*].
SYSUSERMESSAGES	Renamed to SYSUSERMESSAGE. See "SYSUSERMESSAGE system view" [*SQL Anywhere Server - SQL Reference*].

Change to columns in system tables and system views

There have been numerous changes to columns in system tables and views. With the exception of the information below, all of the changes consist of adding new columns, or removing unused columns, neither of which impact your applications.

- **SYSCOLUMN and SYSCOLUMNS views** The width column for both of these views has changed from a SMALLINT to an UNSIGNED INT. See "SYSCOLUMN compatibility view (deprecated)" [*SQL Anywhere Server - SQL Reference*], and "SYSCOLUMNS consolidated view" [*SQL Anywhere Server - SQL Reference*].
- **SYSCONSTRAINT view** The previous SYSCONSTRAINT system table has been replaced by a new system table, ISYSCONSTRAINT, with a corresponding SYSCONSTRAINT system view. References to SYSCONSTRAINT now use the new system view, which is significantly different in this release. To see the contents of the SYSCONSTRAINT system view, see "SYSCONSTRAINT system view" [*SQL Anywhere Server - SQL Reference*].
- **SYSREMOTEOPTION view** You can no longer select from SYSREMOTEOPTION. Use SYSREMOTEOPTIONS or SYSREMOTEOPTION2 instead. See "SYSREMOTEOPTIONS

consolidated view" [*SQL Anywhere Server - SQL Reference*], or "SYSREMOTEOPTION2 consolidated view" [*SQL Anywhere Server - SQL Reference*].

- **SYSJAR, SYSJARCOMPONENT, and SYSJAVACLASS views** The create_time column has been removed. However the creation time information is available in SYSOBJECT.create_time. See "SYSOBJECT system view" [*SQL Anywhere Server - SQL Reference*].
- **SYSFILE system view** The store_type column is now an INTEGER. See "SYSFILE system view" [*SQL Anywhere Server - SQL Reference*].
- **SYSPROCPARM and SYSLOGINMAP views** The remarks column has been removed from these views. Also, the width column in SYSPROCPARM has changed from a SMALLINT to an UNSIGNED INT. See "SYSPROCPARM system view" [*SQL Anywhere Server - SQL Reference*], and "SYSLOGINMAP system view" [*SQL Anywhere Server - SQL Reference*].
- **SYSPROCPARMS view** SYSPROCPARM.width has changed from a SMALLINT to an UNSIGNED INT. See "SYSPROCPARMS consolidated view" [*SQL Anywhere Server - SQL Reference*].
- **SYSREMOTEUSER view** The log_send, log_sent, confirm_sent, log_received, and confirm_received columns are now UNSIGNED BIGINT. See "SYSREMOTEUSER system view" [*SQL Anywhere Server - SQL Reference*].
- **SYSSUBSCRIPTION view** The created and started columns are now UNSIGNED BIGINT. See "SYSSUBSCRIPTION system view" [*SQL Anywhere Server - SQL Reference*].
- **SYSSYNC view** The progress, created, and log_sent columns are now UNSIGNED BIGINT. See "SYSSYNC system view" [*SQL Anywhere Server - SQL Reference*].

SQL statements

- **REVOKE CONNECT statement** When the REVOKE CONNECT statement is executed to drop a user, all objects owned by the specified user are dropped along with the user. The REVOKE CONECT statement now returns an error if the database contains an active view, owned by another user, that is dependent upon an object owned by the user being dropped. See "REVOKE statement" [*SQL Anywhere Server - SQL Reference*].
- **Restrictions on key joins for derived tables** Key joins are not allowed for derived tables containing TOP N, START AT, FIRST, ORDER BY, window functions, FOR XML, or recursive tables. See "Key joins of views and derived tables" [*SQL Anywhere Server - SQL Usage*].
- **ALTER SERVER and CREATE SERVER statements** The ASAJDBC and ASAODBC server classes have been renamed to SAJDBC and SAODBC, respectively. See "ALTER SERVER statement" [*SQL Anywhere Server - SQL Reference*] and "CREATE SERVER statement" [*SQL Anywhere Server - SQL Reference*].
- **ALTER statements** All ALTER statements now use ALTER as a subclause, instead of MODIFY. If your applications use a MODIFY subclause, you should change them to use the ALTER subclause instead. The MODIFY syntax is still supported but deprecated. This impacts the following statements:
  - "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*]

- "ALTER EVENT statement" [*SQL Anywhere Server - SQL Reference*]
- "ALTER PUBLICATION statement [MobiLink] [SQL Remote]" [*SQL Anywhere Server - SQL Reference*]
- "ALTER SYNCHRONIZATION SUBSCRIPTION statement [MobiLink]" [*SQL Anywhere Server - SQL Reference*]
- "ALTER SYNCHRONIZATION USER statement [MobiLink]" [*SQL Anywhere Server - SQL Reference*]
- "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*]

- **BACKUP statement** In previous releases, you could specify the DBFILE ONLY clause with either the TRANSACTION LOG RENAME or TRANSACTION LOG TRUNCATE clause. Specifying DBFILE ONLY with either of these TRANSACTION LOG clauses now results in an error because these are two mutually exclusive types of backup. See "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

- **COMMENT statement** The syntax COMMENT ON LOGIN is no longer supported. Use the syntax COMMENT ON INTEGRATED LOGIN instead. See "COMMENT statement" [*SQL Anywhere Server - SQL Reference*].

- **INSERT statement** In SQL Anywhere 10, when using the ON EXISTING SKIP and ON EXISTING ERROR clauses, if the table contains default columns, the server computes the default values even for rows that already exist. As a consequence, default values such as AUTOINCREMENT cause side effects even for skipped rows. In this case of AUTOINCREMENT, this results in skipped values in the AUTOINCREMENT sequence. In previous versions, these computations were not performed on default columns for skipped rows. See "INSERT statement" [*SQL Anywhere Server - SQL Reference*].

- **VALIDATE statements** All validation activities, such as executing VALIDATE statements, or running the Validation utility (dbvalid), now require VALIDATE authority; REMOTE DBA permission is no longer accepted for performing validation activities.

  The VALIDATE TABLE statement (and VALIDATE MATERIALIZED VIEW) checks for orphaned BLOBs.

  The syntax for VALIDATE INDEX has changed to be consistent with the ALTER INDEX statement syntax. The old syntax is still supported, although deprecated. If your applications currently use the VALIDATE INDEX statement, you should change to the new syntax.

  For more information on these changes, see "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*].

Deprecated and discontinued features

- **-f, -fi, -fd, -fn options for the Validation utility (dbvalid) deprecated** The syntax for the dbvalid utility has been simplified. Previously, when no option was specified, the dbvalid utility performed express validation when validating tables. Now, the dbvalid utility performs full validation by default, as though the -f, -fi- and -fd options were specified. As a result, use of these options is deprecated and you must specify the -fx option to perform an express validation on tables.

Also, support for the -fn option, which performed validation using the algorithm from version 9.0.0 and earlier releases, is no longer supported.

For more information on the Validation utility, see "Validation utility (dbvalid)" [*SQL Anywhere Server - Database Administration*].

- **VALIDATE TABLE statement options deprecated** The syntax for the VALIDATE TABLE statement has been simplified. Previously, when no option was specified, the VALIDATE TABLE statement performed a normal validation. Now, the VALIDATE TABLE statement performs full validation by default, as though the WITH FULL CHECK options was specified. As a result, the WITH FULL CHECK, WITH INDEX, and WITH DATA options are deprecated. See "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*].
- **Transact-SQL outer joins deprecated** Transact-SQL outer joins have been deprecated in this release, and will not be supported in future versions of SQL Anywhere. The new tsql_outer_joins database option enables or disables the ability to use the Transact-SQL outer joins operators *= and =* in DML statements and views for the current connection. This option is set to Off by default. See "tsql_outer_joins option [compatibility]" [*SQL Anywhere Server - Database Administration*].
- **WITH HASH SIZE clause no longer supported** With the elimination of older B-tree index technology, the WITH HASH SIZE clause of the CREATE INDEX statement is no longer supported.
- **Unsupported properties** The NumProcessorsAvail and NumProcessorsMax server properties are no longer supported. You can use the NumLogicalProcessors, NumLogicalProcessorsUsed, NumPhysicalProcessors, and NumPhysicalProcessorsUsed server properties instead. See "Server-level properties" [*SQL Anywhere Server - Database Administration*].
- **STRIP ON clause of LOAD TABLE is deprecated** While the stripping of leading and trailing blanks has been enhanced in SQL Anywhere 10.0.0 to allow you to fine tune the stripping behavior, STRIP ON is deprecated. To continue stripping trailing blanks *only* (default behavior in previous releases when STRIP ON was specified), use STRIP RTRIM instead. See "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].
- **UTF8 collation is deprecated** The UTF8 collation is deprecated. Use the UTF8BIN collation instead. See "Supported and alternate collations" [*SQL Anywhere Server - Database Administration*].
- **jConnect 4.5 no longer supported** Applications that previously connected using jConnect 4.5 will still work, but the using jConnect 5.5 or 6.0.5 is recommended. See "Using the jConnect JDBC driver" [*SQL Anywhere Server - Programming*].
- **SQLLOCALE environment variable no longer supported** The SQLLOCALE environment variable is no longer supported. It has been replaced by the SALANG and SACHARSET environment variables. See "SALANG environment variable" [*SQL Anywhere Server - Database Administration*] and "SACHARSET environment variable" [*SQL Anywhere Server - Database Administration*].
- **Named Pipes no longer supported** The Named Pipes protocol is no longer supported. Applications that previously used Named Pipes must be changed to use shared memory instead. See "Selecting communications protocols" [*SQL Anywhere Server - Database Administration*].
- **Data Source utility (dbdsn) -o option deprecated** The -o option for the Data Source utility has been deprecated. If you want to write output messages to a file, you can specify the LogFile connection

parameter in the connection string. See "LogFile connection parameter [LOG]" [*SQL Anywhere Server - Database Administration*].

- **Creation of custom collations not supported** Creation of custom collations is no longer supported. The Create Custom Collation wizard, the Collation utility (dbcollat), the DBCollate function, and the a_db_collation structure, are no longer supported. See "Choosing collations" [*SQL Anywhere Server - Database Administration*].

  If you are rebuilding a database with a custom collation, the collation is preserved if you rebuild in a single step. If you choose to unload the database and then load the schema and data into a database that you create, then you must use one of the supplied collations. See "Rebuilding version 9 and earlier databases for version 10.0.0" on page 321.

- **Server Licensing utility -p option not supported** In previous releases, the Server Licensing utility supported the -p option, which was used to specify the operating system the database server was licensed for. This option is no longer supported.

- **Database server -d option not supported** The -d database server option, used on NetWare to force the use of POSIX I/O rather than DFS (Direct File System) I/O is no longer supported.

- **Database server -y option not supported** The -y database server option, used on Windows 95/98/Me to run the database server as a Windows service is no longer supported because these operating systems are no longer supported. To run the database server as a service on any of the supported platforms, use the dbsvc utility. See "Service utility (dbsvc) for Windows" [*SQL Anywhere Server - Database Administration*].

- **-sc option not supported** SQL Anywhere 7.0 was awarded a TCSEC (Trusted Computer System Evaluation Criteria) C2 security rating from the U.S. Government. The -sc server option allowed you to run the current version of SQL Anywhere in a manner equivalent to the C2-certified environment. Support for the -sc option, as well as the C2 server property, has been removed in version 10.0.0.

- **max_work_table_hash_size database option not supported** The max_work_table_hash_size option is no longer supported. The query optimizer allocates hash sizes for the internal temporary tables based on the data distribution within the table.

- **max_hash_size database option not supported** The max_hash_size option is no longer supported.

- **Compressed databases and write files not supported** As a result, the following features are no longer available:

  - **File extensions** The following file extensions are no longer supported:

    - the *.wrt* extension used to identify write files
    - the *.cdb* extension used to identify compressed database files

  - **Database server behavior on NetWare** The database server no longer looks for database files with the *.wrt* extension when a database file is specified without an extension. See "The SQL Anywhere database server" [*SQL Anywhere Server - Database Administration*].

  - **Deploying databases on read-only media** You can no longer supply a write file to record changes to a database supplied on read-only media, such as a CD-ROM. However, you can still deploy

databases on read-only media if they are run in read-only mode. See "Deploying databases on read-only media" [*SQL Anywhere Server - Programming*] and "-r server option" [*SQL Anywhere Server - Database Administration*].

- **Database utilities** The following utilities and wizards are no longer supported:
  - Compress Database wizard
  - Create Write File wizard
  - Uncompress Database wizard
  - Uncompression utility (dbexpand)
  - Compression utility (dbshrink)
  - Write File utility (dbwrite)
- **SQL statements** The following SQL statements are no longer supported:
  - ALTER WRITEFILE
  - CREATE WRITEFILE
  - CREATE COMPRESSED DATABASE
  - CREATE EXPANDED DATABASE
- **DBTools structures** The following structures or members of structures are no longer supported:
  - **a_backup_db structure** This structure holds the information needed to perform backup tasks using the DBTools library.

    The backup_writefile member now appears as _unused.
  - **a_compress_db structure** This structure has been removed.
  - **a_compress_stats structure** This structure holds the information needed to perform database compression tasks using the DBTools library.
  - **a_db_info structure** This structure holds the information needed to return dbinfo information using the DBTools library.

    The wrtbufsize member now appears as _unused1, the wrtnamebuffer member now appears as _unused2, and the compressed member now appears as _unused3.
  - **an_expand_db structure** This structure holds information needed for database expansion using the DBTools library.
  - **a_stats_line structure** This structure holds information needed for database compression and expansion using the DBTools library.
  - **a_writefile structure** This structure holds information needed for database write file management using the DBTools library.
- **DBTools functions** The following functions are no longer supported:
  - DBChangeWriteFile
  - DBCompress
  - DBCreateWriteFile
  - DBExpand

- DBStatusWriteFile

- **Database properties** The following database properties are no longer supported:
  - Compression
  - FileSize *writefile*
  - FreePages *writefile*
- **DB_BACKUP_WRITEFILE** This embedded SQL function is no longer supported.

- **Support for unused ASE-compatibility views and procedures removed** Support for the following unused Adaptive Server Enterprise views in the SQL Anywhere database has been removed:

View name	View name
SYSALTERNATES	SYSLOGINROLES
SYSAUDITOPTIONS	SYSLOGS
SYSAUDITS	SYSMESSAGES
SYSCHARSETS	SYSPROCEDURES
SYSCONFIGURES	SYSPROCESSES
SYSCONSTRAINTS	SYSPROTECTS
SYSCURCONFIGS	SYSREFERENCES
SYSDATABASES	SYSREMOTELOGINS
SYSDEPENDS	SYSROLES
SYSDEVICES	SYSSEGMENTS
SYSENGINES	SYSSERVERS
SYSKEYS	SYSSRVROLES
SYSLANGUAGES	SYSTHRESHOLDS
SYSLOCKS	SYSUSAGES

Support for the following unused Adaptive Server Enterprise procedures in the SQL Anywhere database has been removed:

Procedure name	Procedure name
sp_addalias	sp_helpindex
sp_addauditrecord	sp_helpjoins
sp_addlanguage	sp_helpkey

Procedure name	Procedure name
sp_addremotelogin	sp_helplanguage
sp_addsegment	sp_helplog
sp_addserver	sp_helpremotelogin
sp_addthreshold	sp_helpprotect
sp_adddumpdevice	sp_helpsegment
sp_auditdatabase	sp_helpserver
sp_auditlogin	sp_helpsort
sp_auditobject	sp_helpthreshold
sp_auditoption	sp_helpuser
sp_auditsproc	sp_indsuspect
sp_bindefault	sp_lock
sp_bindmsg	sp_locklogin
sp_bindrule	sp_logdevice
sp_changedbowner	sp_modifylogin
sp_checknames	sp_modifythreshold
sp_checkreswords	sp_monitor
sp_clearstats	sp_placeobject
sp_commonkey	sp_primarykey
sp_configure	sp_procxmode
sp_cursorinfo	sp_recompile
sp_dboption	sp_remap
sp_dbremap	sp_remoteoption
sp_depends	sp_rename
sp_diskdefault	sp_renamedb
sp_displaylogin	sp_reportstats
sp_dropalias	sp_role
sp_dropdevice	sp_serveroption

Procedure name	Procedure name
sp_dropkey	sp_setlangalias
sp_droplanguage	sp_spaceused
sp_dropremotelogin	sp_syntax
sp_dropsegment	sp_unbindefault
sp_dropserver	sp_unbindmsg
sp_dropthreshold	sp_unbindrule
sp_estspace	sp_volchanged
sp_extendsegment	sp_who
sp_foreignkey	sp_column_privileges
sp_help	sp_databases
sp_helpconstraint	sp_datatype_info
sp_helpdb	sp_server_info
sp_helpdevice	sp_table_privileges
sp_helpgroup	

- **index_type and index_owner columns removed from SYSINDEX system view** The index_type and index_owner columns have been removed from the SYSINDEX view. These columns previously contained the default values USER and SA, respectively. Index information is now stored in the ISYSIDX and ISYSIDXCOL system views. See "SYSIDX system view" [*SQL Anywhere Server - SQL Reference*] and "SYSIDXCOL system view" [*SQL Anywhere Server - SQL Reference*].

- **DLL protocol option removed on server** The DLL protocol option now applies only to clients running on Windows 32-bit platforms. The DLL protocol option has been removed from the database server as it uses only Winsock 2.2. Similarly, the DLL protocol has been removed from Windows CE clients as they use only Winsock 1.1.

  Winsock 2.2 is required for database servers on all Windows platforms. See "DLL protocol option" [*SQL Anywhere Server - Database Administration*].

- **ASANY and ASANYSH environment variables renamed** The ASANY and ASANYSH environment variables have been renamed SQLANY10 and SQLANYSH10, respectively. See "SQLANY10 environment variable" [*SQL Anywhere Server - Database Administration*] and "SQLANYSAMP10 environment variable" [*SQL Anywhere Server - Database Administration*].

- **PreserveSource property deprecated** The PreserveSource database property has been deprecated in this release and always returns the value On when its setting is queried.

- **Unsupported database properties** The following database properties have been removed in this release:
  - BlobArenas
  - ClusteredIndexes
  - CompressedBTrees
  - FileVersion
  - FreePageBitMaps
  - Histograms
  - HistogramHashFix
  - IndexStatistics
  - LargeProcedureIDs
  - NamedConstraints
  - SeparateCheckpointLog
  - SeparateForeignKeys
  - StringHistogramsFix
  - TableBitMaps
  - TablesQualTriggers
  - TransactionsSpanLogs
  - UniqueIdentifier
  - VariableHashSize
- **Unsupported system procedures** The sa_conn_properties_by_name and sa_conn_properties_by_conn system procedures are no longer supported. You can use the new sa_conn_options system procedure to obtain this information. See "sa_conn_options system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Algorithms removed from query optimization plans** The Lock, Nested Block Join, Sorted Block, and JNBO algorithms have been removed from query optimization plans, and lock nodes no longer appear in the plan. You can view locking information in the scan nodes in the plan.
- **util_db.ini file deprecated** Using the *util_db.ini* file to specify the password for the DBA user when connecting to the utility database has been deprecated. You can use the -su server option instead. See "Using util_db.ini with network database servers (deprecated)" [*SQL Anywhere Server - Database Administration*] and "-su server option" [*SQL Anywhere Server - Database Administration*].
- **Deprecated Windows CE platforms** Support for Windows CE MIPS processors have been removed. For a list of supported platforms, see "Supported platforms" [*SQL Anywhere 10 - Introduction*].

MobiLink

The following sections describe the new features, behavior changes, and deprecated features in MobiLink for version 10.0.0.

New features

Following is a list of additions to MobiLink introduced in version 10.0.0.

Main MobiLink new features

Enhancements to the MobiLink plug-in in Sybase Central

It is now much easier to set up MobiLink applications by using a wizard to create a **synchronization model file**. This file contains information you enter about remote and consolidated tables and how to synchronize them. When the model is ready, you can use another wizard to deploy it, which will generate scripts and tables required for the application.

- **Create Synchronization Model wizard** With the new Create Synchronization Model wizard, you can quickly create and deploy MobiLink applications. This wizard can create a remote database or use existing remotes. It automates the creation of synchronization scripts, and can automatically handle download deletes, conflict resolution, and other challenging synchronization issues.

  See "Create Synchronization Model wizard" [*MobiLink - Getting Started*].

- **Model mode** After using the Create Synchronization Model wizard, you can use Model mode to customize your synchronization project before it is deployed. When you are in Model mode, you are working offline. Model mode stores your synchronization model as an XML file.

  See "Model mode" [*MobiLink - Getting Started*].

- **Deploy wizard** When your model is customized, you can deploy it using the new Deploy wizard. The Deploy wizard adds the scripts, users, script versions, and so on to the MobiLink system tables on the consolidated database. Any changes you make to the consolidated database cannot be reengineered back to Model mode, although you can deploy the same model multiple times.

  See "Deploying models" [*MobiLink - Getting Started*].

- **Admin mode** The MobiLink plug-in as it existed before version 10.0.0 is now called Admin mode. Numerous enhancements have been made to Admin mode to make it easier to use. When you are in Admin mode, you are connected to your consolidated database and making changes live. You can use Admin mode to modify all your MobiLink consolidated databases.

  See "Admin mode" [*MobiLink - Getting Started*].

Synchronize to any data source

A new feature called **direct row handling** allows you to synchronize to virtually any data source. For example, you can synchronize to application servers, web servers, web services, text files, Excel

spreadsheets, J2ME devices, or an RDBMS that cannot be used as a consolidated database using SQL-based row handling (such as MySQL). You must still have a consolidated database to hold MobiLink system tables and data that you want MobiLink to manage. The new data source or sources can be fully integrated into your synchronization process.

The MobiLink server API has been extended to support direct row handling, and two new events have been added. See:

- "Direct Row Handling" [*MobiLink - Server Administration*]
- "handle_DownloadData connection event" [*MobiLink - Server Administration*]
- "handle_UploadData connection event" [*MobiLink - Server Administration*]

In addition, a new feature called **mobile web services** provides support for mobile-optimized asynchronous web services that you can integrate with remote applications.

See "Mobile Web Services" [*QAnywhere*].

Easier deployment

There is now a Deployment wizard that you can use to deploy the MobiLink server, SQL Anywhere clients, the MobiLink Monitor, and encryption components. The InstallShield merge modules and templates that were provided with previous versions are no longer provided. See:

- "Using the Deployment wizard" [*SQL Anywhere Server - Programming*]
- "Deploying MobiLink Applications" [*MobiLink - Server Administration*]

Consolidated databases

New setup procedures

- **Setup script required by SQL Anywhere consolidated databases** You must now run a setup script before using a SQL Anywhere database as a MobiLink consolidated database, and the MobiLink system tables that are created with the setup script are now owned by the user who ran the setup script. This behavior is consistent with other consolidated database types. In previous versions of MobiLink, MobiLink system tables were owned by DBO in SQL Anywhere consolidated databases.

  See "SQL Anywhere consolidated database" [*MobiLink - Server Administration*].

- **Simplified setup procedures** You can now set up your consolidated database in Sybase Central or using setup scripts. Previously, you had to run a setup script. In addition, each type of consolidated database now has only one setup script. There are no more version-specific setup scripts (such as *syncase125.sql*).

  See "MobiLink Consolidated Databases" [*MobiLink - Server Administration*].

New system objects

- **New ways to clean up MobiLink system tables on your consolidated database** New system procedures have been added that help you do the following:

  - Purge information about obsolete remote databases from the MobiLink system tables.

See "ml_delete_sync_state_before" [*MobiLink - Server Administration*].

- Delete unused or unwanted synchronization state information.

  See "ml_delete_sync_state" [*MobiLink - Server Administration*].

- Reset synchronization state information.

  See "ml_reset_sync_state" [*MobiLink - Server Administration*].

- **New MobiLink server system tables and schema** Following are changes to the MobiLink system tables:

  - Several new MobiLink system tables have been added. See:

    - "ml_database" [*MobiLink - Server Administration*]
    - "ml_column" [*MobiLink - Server Administration*]
    - "ml_qa_clients" [*MobiLink - Server Administration*]

  - The contents of ml_subscription are significantly different. The UltraLite synchronization sequence number, previously stored in ml_user.commmit_state, is now stored in ml_subscription.progress. The progress column also stores the SQL Anywhere remote synchronization progress.
    See "ml_subscription" [*MobiLink - Server Administration*].

  - The contents of ml_user are significantly different.
    See "ml_user" [*MobiLink - Server Administration*].

  - A checksum column has been added to the ml_script table.
    See "ml_script" [*MobiLink - Server Administration*].

  - The ml_user column of ml_listening has been changed to the name column.
    See "ml_listening" [*MobiLink - Server Administration*].

  - A new system table has been added that is used internally by Sybase Central for server-initiated synchronization.
    See "ml_sis_sync_state" [*MobiLink - Server Administration*].

  - There have been changes to several QAnywhere system tables. See:

    - "ml_qa_delivery" [*MobiLink - Server Administration*]
    - "ml_qa_delivery_client" [*MobiLink - Server Administration*]
    - "ml_qa_global_props" [*MobiLink - Server Administration*]
    - "ml_qa_global_props_client" [*MobiLink - Server Administration*]
    - "ml_qa_repository" [*MobiLink - Server Administration*]
    - "ml_qa_repository_client" [*MobiLink - Server Administration*]
    - "ml_qa_repository_props" [*MobiLink - Server Administration*]
    - "ml_qa_repository_props_client" [*MobiLink - Server Administration*]
    - "ml_qa_repository_staging" [*MobiLink - Server Administration*]

- **New system procedure ml_add_column** When you are using named row parameters, you may in some cases need to use this new system procedure to populate the ml_column MobiLink system table with information about columns on the remote database.

See "ml_add_column" [*MobiLink - Server Administration*].

MobiLink server

New mlsrv10 features

- **Server name change to mlsrv10** The MobiLink server is now called mlsrv10. Previously, it was called dbmlsrv9.
- **New syntax for mlsrv10 -x** The mlsrv10 -x option, used for setting network protocol options for MobiLink clients, has changed.

  See "-x option" [*MobiLink - Server Administration*].
- **New -xo option for older clients** To connect the MobiLink server to version 8 or 9 clients, you should use the mlsrv10 -xo option, which is identical to the dbmlsrv9 -x option. You can support version 8 and 9 clients, as well as version 10 clients, from one instance of mlsrv10, but to do so you need to use two different ports.

  The -xo option for HTTP and HTTPS includes a new option, session_key, which is useful if you cannot use JSESSIONID for tracking connections.

  See "-xo option" [*MobiLink - Server Administration*].
- **Improved handling of cache** The MobiLink server no longer maintains separate pools of memory for different tasks. All cache memory is shared by all synchronizations. You set the cache size using the new mlsrv10 -cm option. Other options for setting cache sizes (-bc, -d, -dd, and -u) have been removed.

  See "-cm option" [*MobiLink - Server Administration*].
- **Ignore option now affects all streams** Now every host name or IP address that you specify to ignore is ignored on all -x streams. Previously (and still with -xo), the host was ignored only on the stream where it was specified.

  See "ignore" in "-x option" [*MobiLink - Server Administration*].
- **Forcing upload scripts** The mlsrv10 -zus option allows you to force the MobiLink server to call upload scripts for a table, even when there is no data to upload for that table.

  See "-zus option" [*MobiLink - Server Administration*].
- **New verbosity option** The new verbosity option **e** allows you to capture system event scripts. When -ve is specified, the MobiLink server shows all system event scripts that are used to maintain MobiLink system tables, as well as the SQL statements that define the upload stream.

  See "-v option" [*MobiLink - Server Administration*].
- **File transfer directory** A new option has been added that allows you to use a directory for file transfers.

  See "-ftr option" [*MobiLink - Server Administration*].
- **Set the maximum number of concurrent synchronizations** You can now improve performance by setting the maximum number of synchronizations that can be actively worked on.

See "-sm option" [*MobiLink - Server Administration*].

- **Limit concurrent network connections** The new -nc option lets you specify a limit to the number of concurrent network connections.

  See "-nc option" [*MobiLink - Server Administration*].

- **mlsrv10 now uses ISO 8601 datetime format for message timestamps** Timestamps in informational, warning, and error messages now use the unambiguous ISO 8601 datetime format: **{I|W|E}** . *yyyy-mm-dd hh:mm:ss message*.

New MobiLink scripting features

- **Named script parameters** There are now names for MobiLink event parameters. Previously, you had to specify script parameters as question marks. Now, question marks are optional. You can choose from a set of predefined named parameters, or create your own, or both. User-defined named parameters are useful when your RDBMS does not support variables. You can specify the named parameters in any order, and use any subset of available parameters, unlike question marks. Also, in most cases you can use the same named parameter multiple times in the same script.

  See "Script parameters" [*MobiLink - Server Administration*].

- **New conflict detection event** There is a new event that you can script to detect conflicts at the column level. This is an alternative to the upload_fetch event, which detects conflicts at the row level.

  See "upload_fetch_column_conflict table event" [*MobiLink - Server Administration*].

- **Global script version** You can now create a global script version. You define the scripts associated with the global script version once and then they are automatically used in all synchronizations unless you specify a script for the same event in the script version you are using to synchronize. When you are using multiple script versions, this means that you can avoid duplicating connection level scripts.

  See "ml_global script version" [*MobiLink - Server Administration*].

Performance enhancements

- **Improved MobiLink architecture** The MobiLink server has been re-architected to improve throughput, flexibility, and maintainability. The internal MobiLink client/server protocol has been enhanced for the same reasons.

  See "MobiLink Performance" [*MobiLink - Server Administration*].

Other server enhancements

- **Snapshot isolation** For SQL Anywhere version 10 and Microsoft SQL Server 2005 and up consolidated databases, snapshot isolation is now the default for downloads, and is an option for uploads. MobiLink server options are added to help you control this behavior.

  See:

  - "MobiLink isolation levels" [*MobiLink - Server Administration*]
  - "-dsd option" [*MobiLink - Server Administration*]
  - "-dt option" [*MobiLink - Server Administration*]
  - "-esu option" [*MobiLink - Server Administration*]

- **Synchronization ID** Each synchronization is now identified by an integer that is between 1 and 4294967295. Each instance of the MobiLink server maintains its own synchronization IDs. When the MobiLink server is started, the ID is reset to 1. This ID is logged in the output file.
- **Improved MobiLink network layer** The network layer now includes compression, persistent connections (so you can synchronize multiple times on the same connection), IPv6 support, and improved error detection, liveness detection, and debugging.

MobiLink Monitor enhancements

- **Utility name change to mlmon** The MobiLink Monitor is now called mlmon. Previously, it was called dbmlmon.

  See "Starting the MobiLink Monitor" [*MobiLink - Server Administration*].
- **Multiple MobiLink Monitors** You can now connect multiple MobiLink Monitors to the same MobiLink server simultaneously. This allows multiple users to track synchronizations on the same server.

  See "Starting the MobiLink Monitor" [*MobiLink - Server Administration*].
- **Network options** The MobiLink Monitor now allows the same network options as MobiLink clients.

  See "Starting the MobiLink Monitor" [*MobiLink - Server Administration*].
- **New Utilization Graph** The Utilization Graph pane shows queue lengths within the MobiLink server.

  See "Utilization Graph pane" [*MobiLink - Server Administration*].
- **Viewing data in the Chart pane** In the Chart pane, you can still view data by user, or you can choose to view it in Compact view, which shows all active synchronizations in as few rows as possible. The Worker view has been removed because synchronization is no longer tied to a single worker thread.

  See "Chart pane" [*MobiLink - Server Administration*].
- **New Sample Properties dialog** The new Sample Properties shows data for a one-second interval or the average of all the one-second intervals in the selected period.

  See "Sample properties" [*MobiLink - Server Administration*].
- **Enhanced Session Properties dialog** Session properties now contains a detailed Statistics tab.

  See "Session properties" [*MobiLink - Server Administration*].
- **Ability to Monitor FIPS-enabled servers** The MobiLink Monitor can now monitor MobiLink servers that are running FIPS-approved encryption. Previously, it was not able to.
- **Changes to statistical properties** See "Changes to statistical properties" in "MobiLink server changes" on page 98.

MobiLink Redirector enhancements

- **Redirector supports groups of MobiLink servers** For some Redirectors, you can now create MobiLink server groups. Server groups can be used to support version 10 clients at the same time as

version 8 or 9 clients through one Redirector, or for other purposes. For information about which Redirectors support server groups, "Supported platforms" [*SQL Anywhere 10 - Introduction*].

See "MobiLink server groups" [*MobiLink - Server Administration*].

The Redirectors that support server groups have other enhancements to their configuration settings. In addition, they use a new sample configuration file called *redirector_server_group.config*.

See "Configuring Redirector properties (for Redirectors that support server groups)" [*MobiLink - Server Administration*].

- **HTTPS support** In previous versions of SQL Anywhere, when HTTPS is used for the connection between a remote database and web server, the web server decrypts the HTTPS and sends HTTP to MobiLink via the Redirector. Now, for some web servers, the Redirector re-encrypts the stream as HTTPS and sends it to the MobiLink server. There is new syntax for the ML directive in the Redirector configuration file. For information on which web servers have HTTPS support, see "Supported platforms" [*SQL Anywhere 10 - Introduction*].

  See "Configuring Redirector properties (for Redirectors that support server groups)" [*MobiLink - Server Administration*].

Unix/Linux enhancements

- **Console** Linux installations now have a GUI console that shows log information for dbmlsync and mlsrv10.

  See "-ux option" [*MobiLink - Client Administration*] and "-ux option" [*MobiLink - Server Administration*].

- **More consistent character conversions** There are improvements to the consistency of character conversions between Unix/Linux and Windows.

MobiLink clients

- **New remote ID** MobiLink now uses a new identifier called a remote ID to uniquely identify a remote database. Previous versions used the MobiLink user name. The remote ID is stored in the remote database. MobiLink generates a remote ID the first time a remote database synchronizes (or any time it encounters a NULL value for the remote ID). The remote ID is created automatically as a GUID, but you can set it to any string that has meaning to you. The remote ID lets the same MobiLink user synchronize multiple remote databases. In UltraLite remote databases, the remote ID is also useful for allowing multiple MobiLink users to synchronize the same remote database.

  Every script that accepts the MobiLink user name as a parameter now also accepts a remote_id parameter. The remote_id parameter is only available if you use named parameters.

  To help you change the remote ID, a new database option is added to both SQL Anywhere and UltraLite databases called ml_remote_id.

  See:

  - "Remote IDs" [*MobiLink - Client Administration*]

- "MobiLink user names and remote IDs" on page 104
- SQL Anywhere clients: "Setting remote IDs" [*MobiLink - Client Administration*]
- UltraLite clients: "UltraLite ml_remote_id option" [*UltraLite - Database Management and Reference*]

- **New file transfer functionality** New functionality helps you transfer files to remote devices using the same network path you use to synchronize data. SQL Anywhere clients can use the new mlfiletransfer utility, and UltraLite clients can use the new MLFileTransfer method. This functionality is especially useful when populating new remote databases or upgrading software. A new MobiLink event has been added to authenticate the file transfer, if desired. See:

  - SQL Anywhere clients: "MobiLink file transfer utility [mlfiletransfer]" [*MobiLink - Client Administration*]
  - UltraLite clients: "Using MobiLink file transfers" [*MobiLink - Client Administration*]
  - MobiLink server: "authenticate_file_transfer connection event" [*MobiLink - Server Administration*]

- **SendColumnNames has changed** The SendColumnNames dbmlsync extended option and Send Column Names UltraLite synchronization parameter were previously used to upload information about remote database columns so that the MobiLink server could generate sample synchronization scripts. The creation of sample synchronization scripts has been removed (and replaced with the Create Synchronization Model wizard). SendColumnNames is now used only by direct row handling. See:

  - "Direct Row Handling" [*MobiLink - Server Administration*]
  - "SendColumnNames (scn) extended option" [*MobiLink - Client Administration*]
  - "Send Column Names synchronization parameter" [*MobiLink - Client Administration*]

- **Simplified liveness timeout settings** Liveness timeout is now controlled by the client. A new network protocol option called timeout is introduced that replaces liveness_timeout, contd_timeout, unknown_timeout, and network_connect_timeout.

  See "timeout" [*MobiLink - Client Administration*].

- **Buffer_size enhancements** Using the buffer_size network protocol option, you can now control write buffering for TCP/IP protocols as well as HTTP body size for the HTTP protocols. The default values have also changed.

  See "buffer_size" [*MobiLink - Client Administration*].

UltraLite clients

- **Palm support for network_leave_open** On Palm devices you can now choose whether network connectivity stays open after synchronization finishes. This functionality was available on other platforms in previous releases.

  See "network_leave_open" [*MobiLink - Client Administration*].

- **UltraLite enhancements** For information on other UltraLite enhancements, see "Synchronization" on page 119.

SQL Anywhere clients

- **Scripted upload** In regular synchronization, dbmlsync uses the transaction log to create the upload, and so synchronizes all relevant data that has changed on the remote database since the last upload. You

can now write stored procedures that define exactly what rows get uploaded, and so bypass the use of the transaction log. These stored procedures can perform DML and upload the result set, so the rows can be created dynamically, if required.

See "Scripted Upload" [*MobiLink - Client Administration*].

Support for scripted uploads has required the following changes to SQL Anywhere system objects:

- New column (sync_type) in the ISYSPUBLICATION system table.See "SYSPUBLICATION system view" [*SQL Anywhere Server - SQL Reference*].
- New catalog objects in the ISYSSYNCSCRIPT system table for tracking synchronization scripts.

  See "SYSSYNCSCRIPT system view" [*SQL Anywhere Server - SQL Reference*].
- New system procedures convert progress values. See:
  - "sa_convert_ml_progress_to_timestamp system procedure" [*SQL Anywhere Server - SQL Reference*]
  - "sa_convert_timestamp_to_ml_progress system procedure" [*SQL Anywhere Server - SQL Reference*]

- **New scheduling options for dbmlsync** When using the EVERY and INFINITE scheduling options, you can now specify that a synchronization does not occur when dbmlsync starts.

  See "NoSyncOnStartup (nss) extended option" [*MobiLink - Client Administration*].
- **Download-only publications** You can now create publications that only download data. Download-only publications do not use a log file.

  See "Download-only publications" [*MobiLink - Client Administration*].
- **Error handling enhancements** New event hooks have been added that allow you to process errors reported by dbmlsync on the client.

  See:

  - "Handling errors and warnings in event hook procedures" [*MobiLink - Client Administration*]
  - "sp_hook_dbmlsync_all_error" [*MobiLink - Client Administration*]
  - "sp_hook_dbmlsync_communication_error" [*MobiLink - Client Administration*]
  - "sp_hook_dbmlsync_misc_error" [*MobiLink - Client Administration*]
  - "sp_hook_dbmlsync_sql_error" [*MobiLink - Client Administration*]
- **Stop dbmlsync from enforcing table order** By default, dbmlsync issues an error if a child table is uploaded before a parent table. A new extended option allows you to override this behavior.

  See "TableOrderChecking (toc) extended option" [*MobiLink - Client Administration*].
- **Persistent connections** You can now specify that dbmlsync should keep open the connection to the MobiLink server between synchronizations.

  See "-pc option" [*MobiLink - Client Administration*].

- **New way to track synchronizations** For SQL Anywhere remote databases only, you can now specify a subscription_id parameter in your begin_publication or end_publication script. This value is called sync_id in the SYSSYNC system table. This is an advanced feature that helps you track information about your synchronizations. See:
  - "begin_publication connection event" [*MobiLink - Server Administration*]
  - "end_publication connection event" [*MobiLink - Server Administration*]
- **dbmlsync now uses ISO 8601 datetime format for message timestamps** Timestamps in informational, warning, and error messages now use the non-ambiguous ISO 8601 datetime format: **{I|W|E}** . *yyyy-mm-dd hh:mm:ss message*.
- **Expanded values in #hook_dict** The dbmlsync utility exposes hooks and passes values as name/value pairs through a temporary table called #hook_dict. In the past, the values in the #hook_dict table were defined as VARCHAR(255). This has been increased to VARCHAR(10240).

Security

- **RSA now included with SQL Anywhere** You no longer have to purchase a separate license to use RSA encryption, unless you are using FIPS.
- **ECC encryption available with HTTPS** You can now use ECC encryption when you use HTTPS.
- **New mlsrv10 -fips option** You can now specify -fips when you start the MobiLink server, and thus force all secure connections to use FIPS-approved algorithms. This setting does not affect nonsecure streams.

  See "-fips option" [*MobiLink - Server Administration*].
- **New mluser -fips option** The MobiLink user authentication utility now provides an option that enforces the use of FIPS security.

  See "MobiLink user authentication utility [mluser]" [*MobiLink - Server Administration*].
- **FIPS security is supported on more platforms** FIPS security is now supported on more platforms. For a list of supported platforms, see "Supported platforms" [*SQL Anywhere 10 - Introduction*].
- **Simplified way to specify security streams** The syntax for specifying security options has been simplified on both the server and the client by treating security options as separate network protocols. The following protocols are now supported: TCP/IP, TLS (synchronization over TCP/IP with TLS security), HTTP, and HTTPS. The UltraLite Security parameter is removed.

  See:
  - MobiLink server: "-x option" [*MobiLink - Server Administration*]
  - MobiLink clients: "MobiLink client network protocol options" [*MobiLink - Client Administration*]
- **Integration with operating system** By default, MobiLink clients now trust certificates that are already trusted by the operating system on which they operate.

Server-initiated synchronization

Ease of use

- **Server-initiated synchronization is much easier to set up** Enhancements have been made to make it much quicker to set up a server-initiated synchronization application:
  - **Sybase Central support** Notifiers and Listeners can now be set up in Sybase Central Model mode, allowing a subset of useful Notification services. In Model mode, you identify a table for server-initiated synchronization, and your download_cursor is automatically used to determine what data is used for notification purposes. When data identified in your download cursor changes, a Notification is sent. The Deployment wizard generates a corresponding Listener options file.

    See "Setting up server-initiated synchronization in Model mode" [*MobiLink - Getting Started*].
  - **New default gateway** A new gateway called the SYNC gateway allows you to make a persistent connection over the same type of communication path you use for MobiLink synchronization. The SYNC gateway is now the default device tracker gateway, meaning that notification will first try the SYNC gateway, with fallback to the UDP and then SMTP gateways.

    See "Gateways and carriers" [*MobiLink - Server-Initiated Synchronization*].

Notifier enhancements

- **Shared connections** Multiple Notifiers can now share the same database connection, reducing contention and required server resources in the consolidated database.

  See "shared_database_connection property" [*MobiLink - Server-Initiated Synchronization*].
- **Notifier uses character set of remote device** Notifications are now sent to the remote device using the character set of the remote device. Device tracking information is translated before being applied to the consolidated database.
- **Custom confirmation handling** You can now implement a Notifier property in SQL that processes the confirmation of a push request and returns its status.

  See "confirmation_handler property" [*MobiLink - Server-Initiated Synchronization*].
- **Custom error handling** You can now implement a Notifier property in SQL that processes errors such as when a push request is not delivered, not confirmed, or improperly confirmed.

  See "error_handler property" [*MobiLink - Server-Initiated Synchronization*].

Listener enhancements

- **Persistent connections** The Windows Listener now supports persistent connections. By default, the Listener now maintains a persistent connection to the MobiLink server for device tracking, notification, and confirmation. This feature provides significant performance enhancement over previous versions. It can be disabled with the dblsn -pc option.

  See "Listener syntax" [*MobiLink - Server-Initiated Synchronization*].
- **New or changed Windows Listener options** The Listener now supports the following options:

Option	Description
-ni	Stop tracking UDP addresses when -x is used. Previously, this was called -g.
-pc{**+**|**-**}	Enable/disable persistent connection for notifications.
-ns	Disables default SMS listening on Windows Mobile 2003 and up Phone Edition.
-nu	Disable default UDP listening.
-r	Register the remote ID file for use by the $remote_id variable.
-v	When set to 1 or above, the verbosity option now displays and logs command line options.

- **Remote ID file** On the Listener command line, you can now access the new MobiLink remote ID (which by default is a GUID) using a remote ID file. You do this with the new dblsn option -r and new Listener action variable $remote_id.

  See "Listener syntax" [*MobiLink - Server-Initiated Synchronization*] and "Action variables" [*MobiLink - Server-Initiated Synchronization*].

- **New Listener action variables for authentication** There are new action variables that are useful in message handlers: $ml_user and $ml_password.

  See "Action variables" [*MobiLink - Server-Initiated Synchronization*].

- **New Listener action variable for connection parameters** The new $ml_connect action variable expands to the MobiLink connection parameters that were specified with the dblsn -x option.

  See "Action variables" [*MobiLink - Server-Initiated Synchronization*].

- **Listener now uses ISO 8601 datetime format for message timestamps** Timestamps in informational, warning, and error messages now use the unambiguous ISO 8601 datetime format: **{I|W|E}** . *yyyy-mm-dd hh:mm:ss message*.

- **Listener can use TLS** The Listener can now connect to the MobiLink server using all the network choices as other MobiLink clients. This allows you to apply security to device tracking and notification.

  See -x in "Listener syntax" [*MobiLink - Server-Initiated Synchronization*].

Increased device support

- **Support for Treo 600 and 650** The Palm Listener now supports Treo 600 and 650.

- **CE Phone Edition support** The Listener now supports Windows Mobile 2003 Phone Edition for SMS.

Behavior changes and deprecated features

Following is a list of changes to MobiLink introduced in version 10.0.0.

MobiLink server changes

Changes to MobiLink scripts

- **Cursor-based uploads removed** The following scripts were deprecated in version 9.0.0 and are now removed: upload_cursor, new_row_cursor, and old_row_cursor. You should instead use statement-based scripts.

  See "Writing scripts to upload rows" [*MobiLink - Server Administration*].

- **Unrecognized scripts cause the synchronization to fail** If the MobiLink server encounters any unrecognized table-level or connection-level scripts, it will abort the synchronization. In previous versions, unrecognized scripts only resulted in a warning message. This means that the presence of cursor-based upload scripts cause the synchronization to abort.

- **Errors in upload or download scripts cause the synchronization to fail** The synchronization now always aborts if the MobiLink server encounters errors with upload or download scripts. Previously, the MobiLink server did not always abort the synchronization.

- **The handle_error and handle_odbc_error events work in a more restricted fashion** The handle_error and handle_odbc_error scripts are now only called when an ODBC error occurs while MobiLink is processing an insert, update, or delete script during the upload transaction, or is fetching download rows. If an ODBC error occurs at another time, the MobiLink server will call the report_error or report_odbc_error script and abort the synchronization.

- **Authentication scripts committed** If there is no error, the MobiLink server always commits the transaction after invoking an authenticate_user, authenticate_user_hashed, or authenticate_parameters script, even if the authentication fails. Previously, transactions involving failed authentication were rolled back, so there could be no record of failed attempts to authenticate. See:

  - "authenticate_user connection event" [*MobiLink - Server Administration*]
  - "authenticate_user_hashed connection event" [*MobiLink - Server Administration*]
  - "authenticate_parameters connection event" [*MobiLink - Server Administration*]

- **Changes to authenticate_user_hashed script** The authenticate_user_hashed script can now be called more than once during an authentication sequence for a user.

  See "authenticate_user_hashed connection event" [*MobiLink - Server Administration*].

- **When a begin script is called, its end script is called regardless of the success of the synchronization** There are several MobiLink scripts that have a begin and end form, such as begin_connection and end_connection. In the past, the end script was often not executed if the synchronization failed. Now, if the begin script is called, the end script is always called (if it is defined), even if the synchronization has errors.

  See "Synchronization Events" [*MobiLink - Server Administration*].

- **Upload scripts are not called for a table when there is no data to upload** In previous versions, you could use the -us option to prevent the MobiLink server from calling upload scripts when there is no data to upload. The -us option is now removed and by default, the MobiLink server only invokes upload scripts when the upload stream contains data to upload. You can revert to the old behavior using the -zus option.

  See "-zus option" [*MobiLink - Server Administration*].

- **SQL Anywhere 10 and Microsoft SQL Server 2005 consolidated databases should not change the isolation level in the begin_connection script** For SQL Anywhere version 10 and Microsoft SQL Server 2005 and up, the default isolation level for downloads is now snapshot. This means that the isolation level may be changed at the beginning of the download transaction, in which case any setting from the begin_connection script is overridden. Therefore, you should change the isolation level for downloads in the begin_download script or use the new mlsrv10 -dsd option to disable snapshot isolation. Previous documentation recommended changing the isolation level in the begin_connection script, and this is still good practice for consolidated databases that do not use snapshot isolation.

  See "MobiLink isolation levels" [*MobiLink - Server Administration*]

- **example_upload_cursor, example_upload_delete, example_upload_insert, and example_upload_update table events are removed** As a result of removing the -za and -ze MobiLink server options, the example_upload_cursor, example_upload_delete, example_upload_insert, and example_upload_update table events are no longer generated. You can now generate scripts using the Create Synchronization Model wizard.

  See "Create Synchronization Model wizard" [*MobiLink - Getting Started*].

mlsrv10 changes

- **-w and -wu options have changed** The -w and -wu options set the number of database worker threads and maximum number of uploading database worker threads, respectively. In previous versions, these worker threads performed every aspect of synchronization, including reading and writing to the network, unpacking and packing protocol bytes and row data, running scripts, and updating and fetching rows in the consolidated database.

  Now the worker threads affected by -w and -wu are database worker threads. These database worker threads are solely responsible for all database activity, and nothing more. Other threads are responsible for network activity, packing and unpacking, and all other MobiLink server activities.

  The new behavior of the -w and -wu options is independent of network activity. In previous versions, networks with high latency could cause worker threads to block, requiring some deployments to specify a large number of worker threads. The new MobiLink architecture removes this requirement.

  The -w and -wu options are still the simplest way to limit the load that the MobiLink server puts on the consolidated database. Testing -w and -wu values can help you find the best throughput for your synchronization system. See:

  - "-w option" [*MobiLink - Server Administration*]
  - "-wu option" [*MobiLink - Server Administration*]
  - "MobiLink Performance" [*MobiLink - Server Administration*]

- **Options for setting cache size are removed** The following mlsrv10 options have been removed:

- -bc
- -d
- -dd
- -u

These options have been replaced with the mlsrv10 -cm option, which sets the cache for all synchronizations.

See "-cm option" [*MobiLink - Server Administration*].

- **Options for setting timeout are removed** The following mlsrv10 options are no longer required and have been removed:

  - contd_timeout
  - unknown_timeout

  Them mlsrv10 liveness_timeout option has also been removed. It is replaced by the timeout option for synchronization clients.

  See "timeout" [*MobiLink - Client Administration*].

- **Backlog option no longer required** The mlsrv10 backlog option is no longer required and has been removed.

- **Changes to protocol names and options for network security** The following network protocol keywords have been removed: https_fips, rsa_tls, rsa_tls_fips, ecc_tls; as well as the network protocol option security. The protocols are not removed, but you specify them differently now. The mlsrv10 -x syntax has changed as follows:

Old syntax	New syntax in version 10.0.0	Description
-x https_fips	-x https(fips=y;...)	HTTPS with FIPS
-x rsa_tls	-x tls(tls_type=rsa;...)	TCP/IP with TLS using RSA encryption
-x rsa_tls_fips	-x tls (tls_type=rsa;fips=y;...)	TCP/IP with TLS using RSA encryption and FIPS
-x ecc_tls	-x tls(tls_type=ecc;...)	TCP/IP with TLS using ECC encryption
-x tcpip(security=...)	-x tcpip	TCP/IP
-x http(security=...)	-x http	HTTP

  See "-x option" [*MobiLink - Server Administration*].

- **Change to -bn option** The mlsrv10 -bn option compares BLOB bytes during conflict detection. Previously, characters were compared for data of type LONGVARCHAR. Now the units that are compared are always bytes for both binary and LONGVARCHAR BLOBs.

  See "-bn option" [*MobiLink - Server Administration*].

- **Change to verbosity output** The mlsrv10 options -vr, -vt, and -vu all output slightly different information:
  - **-vr** Now, -vr returns only the upload and download row values. Previously, the upload and download script names and contents were also returned.
  - **-vt** Now, -vt returns only the contents of translated scripts. Previously, the original script contents were also returned.
  - **-vu** Now, -vu returns all undefined table scripts when the scripts need to be invoked. This includes statistical scripts.

  See "-v option" [*MobiLink - Server Administration*].
- **MobiLink server options -za and -ze are removed** Automatic script generation provided by the MobiLink server -za option and -ze options has been removed. You can now generate scripts using the Create Synchronization Model wizard.

  See "Create Synchronization Model wizard" [*MobiLink - Getting Started*].
- **-zac and -zec are removed** The MobiLink server options for generating cursor-based scripts, -zac and -zec, were deprecated and are now removed.
- **MobiLink server option -oy is removed** The mlsrv10 -oy option, which showed the year in timestamps, has been removed. The year is now always shown in timestamps in informational, warning, and error messages.

Statistical properties

- **Changes to statistical properties** There are two general changes:
  - The meaning of byte counts for upload and download have changed. The counts now reflect the amount of memory used within the MobiLink server to store the upload and download. Previously, they were the size in bytes of the upload and download as sent to or received from the MobiLink server. The new counts are more useful because they provide a good indication of a synchronization's impact on server memory. Also, the previous counts could be unreliable when HTTP, encryption, or compression were used.
  - In previous versions of the documentation, the property descriptions did not explain that the properties return different values based on whether you are using them in normal upload mode or in forced conflict mode. This has been corrected (see below).

  The following statistical properties have changed:

Statistical property	Description
conflicted_deletes	In normal upload mode, this is always zero. In forced conflict mode, it returns the total number of uploaded deletes that were successfully inserted into the consolidated database using the upload_old_row_insert script. Previously, this returned the number of uploaded deletes for which conflicts were detected.

Statistical property	Description
conflicted_inserts	In normal upload mode, this is always zero. In forced conflict mode, it returns the total number of upload inserts that were successfully inserted into the consolidated database using the upload_new_row_insert script. Previously, this returned the number of uploaded inserts for which conflicts were detected.
conflicted_updates	In normal upload mode, this returns the total number of update rows that caused a conflict. In forced conflict mode, it returns the total number of upload update rows that were successfully applied using upload_new_row_insert or upload_old_row_insert scripts. Previously, this returned the number of uploaded updates for which conflicts were detected.
download_bytes	This returns the amount of memory used within the MobiLink server to store the download. Previously, this returned the number of downloaded bytes.
ignored_deletes	In normal upload mode, this returns the total number of upload delete rows that caused errors while the upload_delete script was invoked, when the handle_error or handle_odbc_error are defined and returned 1000, or when there is no upload_delete script defined for the given table. In forced conflict mode, this returns the total number of upload delete rows that caused errors while the upload_old_row_insert script was invoked, when the handle_error or handle_odbc_error are defined and returned 1000, or when there is no upload_old_row_insert script defined for the given table. Previously, this returned the number of uploaded deletes that were ignored.
ignored_inserts	In normal upload mode, this returns the total number of upload insert rows that caused errors while the upload_insert script was invoked, when the handle_error or handle_odbc_error are defined and returned 1000, or when there is no upload_insert script defined for the given table. In forced conflict mode, this returns the total number of upload insert rows that caused errors while the upload_new_row_insert script was invoked, when the handle_error or handle_odbc_error are defined and returned 1000, or when there is no upload_insert script defined for the given table. Previously, this returned the number of uploaded inserts that were ignored.

Statistical property	Description
ignored_updates	In normal upload mode, this returns the total number of upload update rows that caused errors while the upload_update script was invoked, when the handle_error or handle_odbc_error are defined and returned 1000, or when there is no upload_update script defined for the given table. In forced conflict mode, this returns the total number of upload update rows that caused errors while the upload_new_row_insert or upload_old_row_insert scripts were invoked, or when the handle_error or handle_odbc_error are defined and returned 1000. Previously, this returned the number of uploaded updates that were ignored.
upload_bytes	This returns the amount of memory used within the MobiLink server to store the upload. Previously, this returned the number of uploaded bytes.
upload_deleted_rows	In normal upload mode, this returns the total number of rows that were successfully deleted from the consolidated database. In forced conflict mode, this is always zero. Previously, this returned the number of row deletions that were uploaded from the synchronization client.
upload_inserted_rows	In normal upload mode, this returns the total number of rows that were successfully inserted in the consolidated database. In forced conflict mode, this is always zero. Previously, this returned the number of row insertions that were uploaded from the synchronization client.
upload_updated_rows	In normal upload mode, this returns the total number of rows that were successfully updated in the consolidated database. In forced conflict mode, this is always zero. Previously, this returned the number of row updates that were uploaded from the synchronization client.

See "MobiLink statistical properties" [*MobiLink - Server Administration*].

Other MobiLink server changes

- **Null characters can now be synchronized to and from columns with CHAR or NCHAR data types in the remote database** Previously in MobiLink, VARCHAR and CHAR column values containing null characters could cause a synchronization to fail. Now you can synchronize null characters in remote database columns of data type CHAR, VARCHAR, LONG VARCHAR, NCHAR, NVARCHAR, AND LONG NVARCHAR.

- **New format for logging information, warning, and error messages** Previously, the MobiLink server logged messages in the following format:

  ```
  T.mm/dd hh:mm:ss. thread_id User_name: message
  ```


Now, the MobiLink server logs messages in the following format:

```
T. yyyy-mm-dd hh:mm:ss. synchronization_id: message
```

For each synchronization, the first message in the log shows the remote ID, user name, script version, and client name (UltraLite or SQL Anywhere).

The new format reduces the size of the output log without reducing the information that is provided.

- **New data type in system procedures for Oracle** In MobiLink system procedures that are used to register scripts, the script contents parameter now uses the CLOB data type for Oracle consolidated databases. In the ml_add_property system procedure, the prop_value parameter is now CLOB for Oracle. Previously, these parameters were type VARCHAR.

  See "MobiLink Server System Procedures" [*MobiLink - Server Administration*].

MobiLink client changes

MobiLink user names and remote IDs

MobiLink now generates a unique ID called a remote ID the first time a remote database synchronizes (or when it encounters a NULL value for the remote ID). The MobiLink user name no longer needs to be unique. The MobiLink user name can now be considered a true user name that is used for authentication.

In previous versions, the synchronization progress was stored for the MobiLink user name. Now, the progress is stored for the remote ID and subscription for SQL Anywhere remotes, and the remote ID and publication for UltraLite remotes.

See "ml_subscription" [*MobiLink - Server Administration*].

Previously, you used the MobiLink user name to uniquely identify a remote database. The remote ID is a useful way to identify the remote database when you want a MobiLink user to synchronize multiple remote databases. In UltraLite remote databases, the remote ID is also useful for multiple MobiLink users to synchronize the same remote database.

See "Remote IDs" [*MobiLink - Client Administration*].

UltraLite clients

See "Behavior changes and deprecated features" on page 124.

SQL Anywhere clients

- **Download error hooks deprecated** The following error hooks are deprecated: sp_hook_dbmlsync_download_com_error, sp_hook_dbmlsync_fatal_sql_error, and sp_hook_dbmlsync_sql_error. They have been replaced.

  See "Handling errors and warnings in event hook procedures" [*MobiLink - Client Administration*].

- **sp_hook_dbmlsync_log_rescan only called if dbmlsync expects another synchronization** Previously, the sp_hook_dbmlsync_log_rescan hook was called at the end of every synchronization. This caused a pause to occur after dbmlsync disconnected from the MobiLink server, but before the "synchronization complete" message was displayed in the log. Now, the hook is only called

when dbmlsync expects another synchronization, for example when the dbmlsync -n option is specified more than once in a command line or when scheduling is enabled.

See "sp_hook_dbmlsync_log_rescan" [*MobiLink - Client Administration*].

- **Liveness timeout options simplified** On the client, the liveness_timeout and network_connect_timeout network connection protocol options are removed. Use the timeout connection option instead.

  See "timeout" [*MobiLink - Client Administration*].

- **No compression means no obfuscation** If you set compression to none, data is now completely unobfuscated. If security is an issue, you should use transport-layer security to encrypt your data.

  See "compression" [*MobiLink - Client Administration*].

- **Version 7 syntax and utilities are removed** The following SQL statements and utility were deprecated and are now removed:

  - MobiLink client database extraction utility (mlxtract)
  - CREATE SYNCHRONIZATION SITE statement
  - CREATE SYNCHRONIZATION DEFINITION statement
  - CREATE SYNCHRONIZATION TEMPLATE statement

- **New network protocol options for ActiveSync** ActiveSync users no longer have to specify the ActiveSync protocol when specifying the CommunicationAddress extended option or the ADDRESS clause in SQL statements. Instead, for ActiveSync you just specify the protocol and protocol options you are using for communication between the MobiLink provider for ActiveSync and the MobiLink server.

  See "MobiLink client network protocol options" [*MobiLink - Client Administration*].

- **New way to shut down dbmlsync** The dbmlsync -k option is deprecated and replaced with the -qc option.

  See "-qc option" [*MobiLink - Client Administration*].

Miscellaneous MobiLink behavior changes

Version support

- **Support for clients prior to version 8.0.0 removed** The MobiLink server no longer supports SQL Anywhere clients prior to version 8.0.0. To use older databases with the version 10 MobiLink server, you need to follow upgrade procedures.

  See "Upgrading SQL Anywhere" on page 312.

Name changes

The following utility names have changed:

Old utility name	New utility name
dbmlsrv9	mlsrv10
dbmluser	mluser
dbmlmon	mlmon
dbmlstop	mlstop
dbasinst	mlasinst

The following file names have changed:

Old file name	New file name
dbmlsv9.dll	*mlodbc10.dll*
dbasdesk.dll	*mlasdesk.dll*
dbasdev.dll	*mlasdev.dll*
dbmlsrv.mle	*mlsrv10.mle*
syncasa.sql	*syncsa.sql*

ODBC driver enhancements

MobiLink now uses new drivers for Adaptive Server Enterprise and DB2 consolidated databases.

See: "Changes to ODBC drivers used by MobiLink, QAnywhere, and remote data access" on page 135.

Server-initiated synchronization

- **Windows SDK removed** The SDK for creating support for more Windows devices has been removed. It is replaced by improved support for SMS. The Palm SDK remains.
- **Listener -g option is replaced** The dbsln -g option is replaced with the dblsn -ni option.

Other MobiLink behavior changes

- **Support for Windows Performance Monitor is dropped** MobiLink no longer supports Windows Performance Monitor. You should use the MobiLink Monitor instead.

  See "MobiLink Monitor" [*MobiLink - Server Administration*].

- **Server-initiated synchronization no longer supports Kyocera devices** There is no longer a Palm SDK for Kyocera devices. The Palm Listener continues to support Treo devices.

  See "MobiLink Listener SDK for Palm" [*MobiLink - Server-Initiated Synchronization*].

QAnywhere

The following sections describe the new features, behavior changes, and deprecated features in QAnywhere for version 10.0.0.

New features

Following is a list of additions to QAnywhere introduced in version 10.0.0.

Mobile web services

Mobile web services provide support for mobile-optimized asynchronous web services. This allows mobile applications to make web service requests—even when they are offline—and have those requests queued for transmission later. The requests are delivered as messages using QAnywhere. A web services connector on the server side takes the client request and forwards it to the web service. It then takes the response from the web service and returns it to the client as a message. A WSDL compiler is provided that facilitates the use of mobile web services from your .NET or Java application.

See "Mobile Web Services" [*QAnywhere*].

New QAnywhere plug-in for Sybase Central

Sybase Central now includes a QAnywhere plug-in that provides an easy-to-use graphical interface for creating and administering your QAnywhere applications. With the QAnywhere plug-in, you can:

- Create client and server message stores.
- Create and maintain configuration files for the QAnywhere Agent.
- Browse QAnywhere Agent log files.
- Create or modify destination aliases.
- Create JMS connectors and web service connectors.
- Create and maintain transmission rules files.
- Browse message stores remotely.
- Track messages.

Although QAnywhere is not supported on Unix platforms, you can now use Sybase Central on Unix to track messages.

New QAnywhere client APIs

- **New SQL API** The QAnywhere SQL API is a set of SQL stored procedures that allow SQL developers to easily leverage QAnywhere messaging capabilities. Using this API, stored procedures can send or receive messages using a straightforward approach that complements existing database applications. This can allow for powerful applications that combine database and messaging operations in a single transaction. For example, a stored procedure could insert a row into the database and send a message to another application—and have both actions committed as part of the same transaction.

See "QAnywhere SQL API Reference" [*QAnywhere*].

- **New Java client API** The new QAnywhere client API for Java helps you create messaging client applications in Java. The client API for Java is currently supported on Windows, including Windows CE.

  See "QAnywhere Java API Reference" [*QAnywhere*].

QAnywhere client API enhancements

The following additions have been made to the QAnywhere client APIs:

- **Message selectors** You can now use SQL-like expressions to selectively browse or receive messages from a queue. The syntax for creating message selectors is identical to that used for conditions in transmission rules.

  See "Browsing QAnywhere messages" [*QAnywhere*].

- **New ways to browse messages** You can now browse messages from multiple queues, or browse subsets of messages based on ID or message selector.

  See "Browsing messages using a selector" [*QAnywhere*].

- **Enumerate message store property names** You can now enumerate message store property names.

  See "Enumerating client message store properties" [*QAnywhere*].

- **Undeliverable messages** Using the new message store property ias_MaxDeliveryAttempts, you can set the maximum number of attempts that a QAnywhere client will attempt to receive a message before considering it undeliverable.

  See "Rule variables" [*QAnywhere*].

- **Cancelling messages** You can now cancel messages before they are sent.

  See "Cancelling QAnywhere messages" [*QAnywhere*].

- **Query message status** You can now query the status of a message using new pre-defined message properties: ias_Status and ias_StatusTime. You can also query the originator of a message with ias_Originator, or the number of times the message has been delivered to a receiver with ias_DeliveryCount.

  See "Pre-defined message properties" [*QAnywhere*].

- **New message store property to set upload increments** ias_MaxUploadSize can be used to change the upload increment.

  See "Pre-defined client message store properties" [*QAnywhere*].

QAnywhere Agent new features

- **Multiple agents on a single device** Previously, you could only run one instance of the QAnywhere Agent on a device. This limitation has been removed.

  See "Running the QAnywhere Agent" [*QAnywhere*].

- **More options for setting up failover** There are two new QAnywhere Agent options, -fd and -fr, that help you customize the way failover occurs.

  See "-fd option" [*QAnywhere*] and "-fr option" [*QAnywhere*].

- **Persistent connections** The new option -pc+ has been added to enable persistent connections for message transmission. The new -push option replaces -push_notifications and now allows you to specify whether you want push notifications to use persistent connections.

  See:

  - "-pc option" [*QAnywhere*]
  - "-push option" [*QAnywhere*]

- **New upgrade procedure** The new -sur option can be used to upgrade a client message store from a previous version of SQL Anywhere.

  See "-sur option" [*QAnywhere*].

- **QAnywhere Agent now uses ISO 8601 datetime format for message timestamps** Timestamps in informational, warning, and error messages now use the non-ambiguous ISO 8601 datetime format: **{I|W|E}** *yyyy-mm-dd hh:mm:ss message*.

Other QAnywhere enhancements

- **Destination aliases** You can now define a destination alias that represents a set of QAnywhere destinations. Messages sent to a destination alias are sent to each member of the alias.

  See "Destination aliases" [*QAnywhere*].

- **Server management requests** You can now use server management requests for administration and monitoring activities such as creating destination aliases or monitoring, starting, and stopping JMS connectors. You create server management requests on the client and send them to the server message store for processing.

  See "Server management requests" [*QAnywhere*].

- **Improved maintenance of server transmission rules** You can now change the default server transmission rules and the change will automatically be applied to all clients. Previously, to change the default you had to manually define a transmission rule for each client.

  See "Server transmission rules" [*QAnywhere*].

- **More message properties** Additional pre-defined message properties are set by QAnywhere, giving you more flexibility in processing messages, better information during debugging, and more help with troubleshooting the status of messages.

  See "Message properties" [*QAnywhere*].

- **Ability to embed backslashes in JMS destinations** JMS destinations can now include subcontexts that require backslash delimiters.

  See "Addressing QAnywhere messages meant for JMS" [*QAnywhere*].

- **New transmission rule functions** The following transmission rule functions have been added for improved date handling:

  - DATEADD(datepart, count, datetime)
  - DATEPART(datepart, date)
  - DATETIME(string)
  - LENGTH(string)
  - SUBSTR(string, start, length)

  See "Rule functions" [*QAnywhere*].

- **Prefaces for properties in transmission rules** You can now preface message property names and message store property names when you use them in transmission rules and so bypass the precedence given to transmission rule variables of the same name.

  See "Using properties as rule variables" [*QAnywhere*].

Behavior changes and deprecated features

Following is a list of changes to QAnywhere introduced in version 10.0.0.

QAnywhere client changes

- **Client message store ID has changed** The client message store ID is now a MobiLink remote ID. Previously it was a MobiLink user name. You do not have to register a remote ID with the consolidated database. However, you still need to register a MobiLink user name with the server message store. If you do not specify a MobiLink user name, it defaults to the client message store ID.

  New qaagent options have been provided to manage your MobiLink user names. See:

  - "-mn option" [*QAnywhere*]
  - "-mp option" [*QAnywhere*]
  - "-mu option" [*QAnywhere*]

- **New ODBC drivers** The iAnywhere Solutions ODBC drivers for connecting to Adaptive Server Enterprise and DB2 server message stores have changed.

  See "Changes to ODBC drivers used by MobiLink, QAnywhere, and remote data access" on page 135.

QAnywhere Agent changes

- **qaagent -port is removed** The -port option specified a port number on which QAnywhere Agent listened for communications from the Listener. This option is no longer required and has been removed. A free port is automatically used.

- **qaagent -la_port is replaced** The -la_port option has been replaced by the -lp option.

  See "-lp option" [*QAnywhere*].

- **qaagent -push_notifications is renamed** This option is now called -push. It now allows you to enable push notifications with or without persistent connection.

See "-push option" [*QAnywhere*].

- **Changes to policy defaults** The default policy is now automatic. Previously it was scheduled. The default schedule interval is now 900 seconds (15 minutes). Previously it was 10 seconds.

  See "-policy option" [*QAnywhere*].

- **Transaction log is not used or maintained** The QAnywhere Agent no longer uses a transaction log or manages its size. As a result, for most applications the client message store should be created using the dbinit -n option, which initializes the database with no transaction log.

  See "Setting up the client message store" [*QAnywhere*].

Other QAnywhere changes

- **Server-side property files are deprecated** Instead of storing properties in files, you now store them in the database.
- **getPropertyNames** The getPropertyNames function has been removed from the C++ client API. It has been replaced with beginEnumPropertyNames, nextPropertyName, and endEnumPropertyNames.

  See "QAMessage class" [*QAnywhere*].

- **Date handling in transmission rules** The following transmission rule message store variables have been removed:

  - ias_CurrentDayOfWeek
  - ias_CurrentDayOfMonth
  - ias_CurrentMonth
  - ias_CurrentYear

  In their place, you can use ias_CurrentTimestamp or DATEPART.

  See "Rule variables" [*QAnywhere*].

- **QAnywhere Central replaced** QAnywhere Central has been replaced with the QAnywhere plug-in to Sybase Central. The plug-in provides many enhancements in functionality.

SQL Remote

The following sections describe the new features, behavior changes, and deprecated features in SQL Remote for version 10.0.0.

New features

Following is a list of additions to SQL Remote introduced in version 10.0.0.

- **invalid_extensions option** A new messaging option has been added that allows you to stop SQL Remote from using certain file extensions in FILE and FTP messaging.

  See "SET REMOTE OPTION statement [SQL Remote]" [*SQL Anywhere Server - SQL Reference*].

- **The Message Agent (dbremote) has a graphical user interface on Unix and Linux platforms** See -ux option in "Message Agent" [*SQL Remote*].

- **dbremote now uses ISO 8601 datetime format for message timestamps** Timestamps in informational, warning, and error messages now use the non-ambiguous ISO 8601 datetime format: **{I|W|E}** *yyyy-mm-dd hh:mm:ss message*.

- **New option for dbremote** To close window on completion, use the new -qc option.

  See "Message Agent" [*SQL Remote*].

Behavior changes and deprecated features

Following is a list of changes to SQL Remote introduced in version 10.0.0.

- **Support for Adaptive Server Enterprise databases is removed** SQL Remote no longer supports Adaptive Server Enterprise consolidated databases. This means that ssxtract, ssremote, ssqueue, and all other SQL Remote for Adaptive Server Enterprise utilities and files are removed from the install.

  To synchronize Adaptive Server Enterprise databases, you should use MobiLink.

  For information about upgrading from SQL Remote to MobiLink, see http://www.ianywhere.com/whitepapers/migrate_to_ml.html.

- **Extract Database wizard no longer extracts legacy databases** The Extract Database wizard only works with version 10 databases.

- **Expanded values in #hook_dict** The utilities dbxtract and dbremote expose hooks and pass values as name/value pairs through a temporary table called #hook_dict. In the past, the values in the #hook_dict table were defined as VARCHAR(255). This has been increased to VARCHAR(10240).

- **Changes to Extraction utility** There are several changes to dbxtract:

  - The options -j, -k, and -x are removed.
  - New options -al and-xh are added.

See “Extraction utility” [*SQL Remote*].

- **Message Agent (dbremote) deprecated option** The -k option, which closed the window on completion, is deprecated. To close window on completion, use the new -qc option.

  See “Message Agent” [*SQL Remote*].

UltraLite

The following sections describe the new features, behavior changes, and deprecated features in UltraLite for version 10.0.0.

New features

Following is a list of additions to UltraLite introduced in version 10.0.0.

Main features

UltraLite is now a full-featured relational database management system, designed with ease-of-administration and SQL Anywhere compatibility in mind. Despite the addition of many new and useful features, UltraLite still maintains a small footprint size. See "Data size and object limitations" [*UltraLite - Database Management and Reference*] for a complete list of UltraLite limitations for this release.

Main features of this release include:

- **Increased database limits** The UltraLite database limits have been dramatically increased. In particular, the maximum number of rows in a table has been increased to 16 million. See "Data size and object limitations" [*UltraLite - Database Management and Reference*] for other current database limits.
- **Integrated schema** UltraLite is now a standalone RDBMS and no longer requires a separate schema file to define the logical structure of the database. For this release, the UltraLite schema is fully integrated with the database. See " UltraLite database schema" [*UltraLite - Database Management and Reference*] for details on the internal database schema.
- **Consolidated file formats** File formats have been consolidated in version 10 of UltraLite. This means that most platforms can now share a database file. If you need characters that are not defined by the collation you require, you should now choose to UTF-8 encode your database. See "UltraLite platform requirements for character set encoding" [*UltraLite - Database Management and Reference*] and "UltraLite utf8_encoding property" [*UltraLite - Database Management and Reference*] for details.
- **Increased database performance and data integrity** Overall, the UltraLite database performance and data integrity has been improved with several indexing and database page management improvements.
- **Indexes may utilize hashing** Indexes may now be specified to utilize hashing. The hash size can be specified on a per-index basis. The hash size can improve performance of index lookups and may affect database file size. See "Optimizing UltraLite query performance " [*UltraLite - Database Management and Reference*]
- **Direct database creation** You can now create UltraLite database files directly; a database schema file or reference database file is not required as the source for an UltraLite database. Instead, you can independently create a UltraLite database with Sybase Central or a command line utility, or even programmatically from an application.

For existing UltraLite users, you can no longer create databases in the same manner as previous versions. See "Upgrading UltraLite" on page 336.

- **Direct Windows CE support** With this release, UltraLite applications from the desktop can connect directly to databases deployed to a Windows CE device. You can specify an UltraLite database by specifying the path and name and prefix it with **WCE:**. These direct access is supported by all client applications and administration tools, including Sybase Central and Interactive SQL. See "Windows CE" [*UltraLite - Database Management and Reference*].
- **Embedded SQL as a dynamic SQL programming interface** In previous versions, embedded SQL was a static interface. In this version, it is an interface to UltraLite dynamic SQL and does not require a SQL Anywhere database. Embedded SQL support also supports dynamic ESQL statements and the use of host variable placeholders. Furthermore, ESQL applications can also now run with uleng10. You can achieve this by linking against *ulrtc.lib* instead of *ulrt.lib*.

  As a result of this change, you may notice that simple embedded SQL applications could grow in size, whereas complex applications may become smaller. See "Upgrading UltraLite" on page 336 and "Developing embedded SQL applications" [*UltraLite - C and C++ Programming*].

Platforms and devices

Platform support has been modified. For a list of supported platforms, see "Supported platforms" [*SQL Anywhere 10 - Introduction*].

Important enhancements to note include:

- **Deployment Platforms** Platform enhancements include:
  - **Palm OS** UltraLite support of Palm OS devices has been enhanced with the following changes:
    - Runtime Support for Palm OS v4.x and higher.
    - Development support for CodeWarrior has been increased to version 9. Note that CodeWarrior 8 is no longer supported.
    - Support for multiple databases and generalized file names. You can now specify a database for multiple devices with the DBF connection parameter, ensuring that you set the file name correctly depending on whether you are using record-based or file-based storage. See "UltraLite DBF connection parameter" [*UltraLite - Database Management and Reference*] and "Specifying file paths in an UltraLite connection parameter" [*UltraLite - Database Management and Reference*].
    - Support for both NVFS devices and VFS devices.
  - **Symbian OS** Symbian OS support is new to this version of UltraLite. UltraLite supports versions 7.0 and 8.0 of Symbian OS on UIQ phones (2.0 and 2.1) and Nokia S60 (second edition), and Series 80 devices.
  - **Windows Mobile 2005** If you are using Embedded Visual C++ 3.0 or 4.0, you can continue to use the existing runtimes. However, new runtimes (installed under *\ultralite\ce\arm.50*) are required when using Visual Studio 2005 to build an application.

- **Enhanced development environment support** Development tools and languages have been updated as follows:
  - UltraLite now supports ADO.NET 1.0 development in Visual Studio.NET 2003 and ADO.NET 2.0 development in Visual Studio 2005.
  - UltraLite now supports AppForge Crossfire version 5.6 for Visual Basic and C# development. You can deploy applications for AppForge to Palm OS, Symbian OS, and Windows CE platforms
  - C++ component development.

Security

- **Encryption types** If you are compressing over TLS, UltraLite now supports both ECC and RSA encryption. RSA encryption is no longer separate product. See "Configuring UltraLite clients to use transport-layer security" [*SQL Anywhere Server - Database Administration*].
- **FIPS security** You can now secure MobiLink server communications with FIPS security.
- **Simplified security streams** You can now define encrypted streams as a network protocol or stream type rather than use a separate security parameter. The complete set of supported stream types is: TCP/IP, TLS (for RSA, ECC, and FIPS), HTTP, and HTTPS. See "Stream Type synchronization parameter" [*MobiLink - Client Administration*].

Database management

Important new features and enhancements include:

- **Password changes** All passwords are case sensitive, regardless of the case-sensitivity of the database. New databases are created with a default user ID of **DBA** with the password **sql**. Consequently user IDs, passwords and trusted root certificates are not preserved as you upgrade your database from earlier releases.
- **Improved database properties and connection parameters** Database properties and connection parameters have been enhanced and simplified to allow you describe database and connection behavior more easily. See "UltraLite Database Settings Reference" [*UltraLite - Database Management and Reference*] and "UltraLite Connection String Parameters Reference" [*UltraLite - Database Management and Reference*] for a complete list of database properties and connection parameters you can set for this release of the database.
- **Increased index performance** UltraLite index performance has been enhanced with this release. One of the major improvements is the introduction of index hashing. UltraLite now has a configurable index hash size. By setting the hash size to a value between 1-32 bytes, UltraLite stores part or all of the indexed value in the index page. This reduces the number of row lookups required. See "UltraLite index performance considerations" [*UltraLite - Database Management and Reference*] .
- **Checksum validation** You can now include checksums on database pages to validate data integrity of these pages as they are stored on disk. See "Verifying page integrity with checksums" [*UltraLite -*

Database Management and Reference] and "UltraLite checksum_level property" [*UltraLite - Database Management and Reference*].

- **Extended BLOB support** UltraLite databases now have extended support for BLOBs. UltraLite allows you to update, cast data types and get the length of these BLOBs.

Administration tools

Administration tools have been enhanced with this release. To ensure the correct usage of a tool, ensure you review the documentation for it.

Graphical administration tools

- **Sybase Central** You can now use Sybase Central to create, modify, and administer your UltraLite databases in a graphical user interface. This replaces the ulview schema editing utility.

  The list of wizards included in Sybase Central include:

  - Use the Create Database wizard to build a new UltraLite database. This wizard shares the same functionality as the ulcreate utility.
  - Use the Erase Database wizard to erase an existing UltraLite database. No utility equivalent exists for this wizard.
  - Use the Extract Database wizard to initialize a new UltraLite database from a SQL Anywhere reference database. This wizard shares the same functionality as the ulinit utility.
  - Use the Load Database wizard to load an XML file into an UltraLite database. This wizard shares the same functionality as the ulload utility.
  - Use the Migrate C++ API wizard to migrate C/C++ code created with the removed ulgen utility. No utility equivalent exists for this wizard.
  - Use the Synchronize Database wizard to synchronize an UltraLite database. This wizard shares the same functionality as the ulsync utility.
  - Use the Upgrade Database wizard to upgrade an existing UltraLite database from a previous version. This wizard shares the same functionality as the ulunloadold utility when used with the ulload utility.
  - Use the Unload Database to unload data/schema information from an UltraLite database to XML, SQL, or another database. This wizard shares the same functionality as the ulunload utility with the additional functionality of the ulcreate and ulload utilities.

  See "UltraLite Plug-in Help" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Interactive SQL** You can now use Interactive SQL to develop and test SQL statements with UltraLite databases. Interactive SQL replaces the ulisql utility used in previous versions. See "Interactive SQL utility (dbisql) for UltraLite" [*UltraLite - Database Management and Reference*].

Command line administration tools

The following command line utilities are new to UltraLite:

- **Unload Old Database utility** The new ulunloadold command line utility helps you to unload existing 8.0.2 or 9.x UltraLite databases (schema + data) or schema files to an XML file. With the ulload command line utility, you can then use that output to rebuild an UltraLite version 10 database. See "UltraLite Unload Old Database utility (ulunloadold)" [*UltraLite - Database Management and Reference*].
- **Information utility** The new ulinfo utility displays information about an UltraLite database. It can also change and/or clear database option IDs like global_id or ml_remote_id. See "UltraLite Information utility (ulinfo)" [*UltraLite - Database Management and Reference*].

Also, because existing command line utilities have been enhanced to support the new RDBMS features in UltraLite 10, the options for these utilities have changed from earlier versions. To ensure you are using new utilities correctly, ensure you review the reference documentation before starting. See "UltraLite Utilities Reference" [*UltraLite - Database Management and Reference*] for complete utility reference notes.

- **Enhanced error reporting** UltraLite utilities now report errors consistently with other SQL Anywhere utilities.
- **Extended database creation options** All database creation utilities (for example, ulcreate and ulload) now support the use of extended creation options. These extended options are configured on the command line with -o, and allow you to configure the same set of database properties that you can set with Sybase Central wizards. See "Extended creation-time options" [*UltraLite - Database Management and Reference*] for details on how to use extended creation options correctly.
- **Enhanced unload behavior** You can now use ulunload to output the UltraLite database schema as a sequence of dynamic SQL statements. See "UltraLite Unload Database to XML utility (ulunload)" [*UltraLite - Database Management and Reference*].
- **Enhanced ulsync behavior** ulsync allows you to set network protocol options and extended synchronization parameters directly from this utility. See "UltraLite Synchronization Parameters and Network Protocol options" [*MobiLink - Client Administration*] for a complete list.

  Additionally, ulsync now allows you to name publications, not just the publication mask. The keyword **Publications** takes a comma separated list of publication names. See "UltraLite Synchronization utility (ulsync)" [*UltraLite - Database Management and Reference*] for details.
- **Enhanced conduit installation** The HotSync Conduit Installation utility (ulcond10) now supports conduit extensions, connection strings, and multiple databases. See "UltraLite HotSync Conduit Installation utility for Palm OS (ulcond10)" [*UltraLite - Database Management and Reference*] for details.
- **ulmvbreg** The ulmvbreg utility that registers UltraLite for AppForge has been renamed to ulafreg. This utility is now installed to the *install-dir\win32* directory. See "UltraLite AppForge Registry utility (ulafreg)" [*UltraLite - Database Management and Reference*].

ULSQLCONNECT

Previously, all UltraLite utilities received connection information from the command line. Now, if you want to pass information other than default user IDs and passwords, you can set the ULSQLCONNECT environment variable on your host machine. See "Storing UltraLite parameters with the ULSQLCONNECT environment variable" [*UltraLite - Database Management and Reference*].

SQL

- **SQL Statements** UltraLite supports several new statements. These new statements include:
  - **ALTER TABLE** In addition to creating tables with UltraLite SQL, you can now alter the definition with this statement. See "UltraLite ALTER TABLE statement" [*UltraLite - Database Management and Reference*].
  - **ALTER/CREATE/DROP PUBLICATION** UltraLite now supports the addition, creation, and deletion of publications with these three statements. See "UltraLite ALTER PUBLICATION statement" [*UltraLite - Database Management and Reference*],"UltraLite CREATE PUBLICATION statement" [*UltraLite - Database Management and Reference*] and "UltraLite DROP PUBLICATION statement" [*UltraLite - Database Management and Reference*].
  - **START/STOP SYNCHRONIZATION DELETE** UltraLite SQL includes these statements. Use these statements to control how deletes are logged with MobiLink synchronization. See "UltraLite START SYNCHRONIZATION DELETE statement" [*UltraLite - Database Management and Reference*]and "UltraLite STOP SYNCHRONIZATION DELETE statement" [*UltraLite - Database Management and Reference*].
- **Named constraints** Table constraints can now be named in the ALTER TABLE and CREATE TABLE statements. This permits modification of table and column constraints by changing individual constraints, rather than by modifying an entire table constraint. See "UltraLite ALTER TABLE statement" [*UltraLite - Database Management and Reference*] and "UltraLite CREATE TABLE statement" [*UltraLite - Database Management and Reference*].
- **Other SELECT statement enhancements** The SELECT statement has been extended:
  - SELECT statements can now include START AT as part of the TOP clause. START AT provides additional flexibility in queries that explicitly limit the result set. See "UltraLite SELECT statement" [*UltraLite - Database Management and Reference*].
  - The DISTINCT clause has been enhanced to allow aggregate functions with this clause (for example, SUM, AVERAGE, MAX, and so on). If you use aggregate functions with this clause, you will significantly increase the execution time. See "UltraLite SELECT statement" [*UltraLite - Database Management and Reference*] and "Alphabetical list of functions" [*UltraLite - Database Management and Reference*].
- **UNION operator** The UNION operator allows you to build a single result set from two or more queries into a single result set. By default, the UNION operator removes duplicate rows from the result set. See "Combining sets with the UNION statement" [*SQL Anywhere Server - SQL Usage*].

Synchronization

- **Configurable and increased default cache size for HotSync conduit synchronization** Previously, beyond a certain amount of data synchronized on Palm OS file-based data stores, synchronization speeds were negatively affected. Consequently, the default cache size (on desktop) for the UltraLite conduit has been increased to 4 MB. This increased cache size significantly improves the synchronization time by cutting down unnecessary file I/O operations. However, you can

also configure a different default cache size if you choose. See "UltraLite HotSync Conduit Installation utility for Palm OS (ulcond10)" [*UltraLite - Database Management and Reference*]

- **Predicates on publications** Synchronization publications for UltraLite now allow predicates. If you want to optionally combine conditional expressions with the logical operators AND and OR, you can now define this set of conditions in a WHERE or HAVING clause. As with SQL Anywhere, a predicate that evaluates to UNKNOWN is interpreted as FALSE. "UltraLite CREATE PUBLICATION statement" [*UltraLite - Database Management and Reference*] and "UltraLite ALTER PUBLICATION statement" [*UltraLite - Database Management and Reference*].
- **Improved MobiLink client network layer** Improvements to the client network layer include the following:
  - Synchronization compression is available for all protocols.
  - Persistent connections, so you can synchronize multiple times on the same connection.
  - Introduction of IPv6 support.
  - Improved error detection and debugging.

  For more information on using UltraLite as a client to MobiLink, see "UltraLite Clients" [*MobiLink - Client Administration*].
- **Set table order for synchronization** Synchronization from UltraLite clients now includes the ability to specify table ordering to avoid referential integrity issues during table upload. If you want to specify table order for synchronization, use the table_order synchronization parameter. See either "Table Order synchronization parameter" [*MobiLink - Client Administration*] or any of the following:
  - UltraLite for MobileVB: "ULSyncParms class" [*UltraLite - AppForge Programming*]
  - UltraLite.NET: "ULSyncParms class" [*UltraLite - .NET Programming*]
  - UltraLite C/C++: "ul_synch_info_a struct" [*UltraLite - C and C++ Programming*]
  - UltraLite for M-Business Anywhere: " SyncParms class" [*UltraLite - M-Business Anywhere Programming*]
  - UltraLite for embedded SQL: "ULGetSynchResult function" [*UltraLite - C and C++ Programming*]

Programming interfaces

General improvements

- **Cursor updates** UltraLite applications now support the ability to modify data in the database while processing a cursor. As with SQL Anywhere databases, not all query result sets allow cursor updates and deletes. Ensure you understand the cases in which cursor updates are allowed and executed. See "Fetching data" [*UltraLite - C and C++ Programming*].
- **Simplified connection strings** Because the default user ID of **DBA** and password of **sql** are always provided by UltraLite, you can now connect by specifying only the database in your connection string. Furthermore, most databases can be set with the DBF connection parameter. See "Connecting to an UltraLite Database" [*UltraLite - Database Management and Reference*].

- **Introduction of MLFileTransfer functions** Use the file transfer function to download a file with the MobiLink file transfer utility. The file to be downloaded can be specific to a MobiLink username or a default file. For example, an application may choose to download a pre-configured empty database file to replace the local database (at beginning of month or processing cycle). See "MobiLink file transfer utility [mlfiletransfer]" [*MobiLink - Client Administration*].

  - UltraLite for C/C++: "MLFileTransfer function" [*UltraLite - C and C++ Programming*]
  - UltraLite.NET: "ULFileTransfer class" [*UltraLite - .NET Programming*] and "ULFileTransferProgressData class" [*UltraLite - .NET Programming*]
  - UltraLite for MobileVB: "ULFileTransfer class" [*UltraLite - AppForge Programming*]
  - UltraLite for M-Business Anywhere: Not applicable

- **Database creation** The UltraLite schema is now part of the database rather than in a separate *.usm* file. This means that applications can no longer create a new database in the same way as was supported in earlier versions.

  See any of the following:

  - UltraLite for C/C++: "ULCreateDatabase function" [*UltraLite - C and C++ Programming*]
  - UltraLite .NET: "ULDatabaseManager members" [*UltraLite - .NET Programming*]
  - UltraLite for MobileVB:"ULDatabaseManager class" [*UltraLite - AppForge Programming*]
  - UltraLite for M-Business Anywhere: " createDatabase method" [*UltraLite - M-Business Anywhere Programming*]

UltraLite C/C++

- **Support for Symbian OS** UltraLite C/C++ support is now provided for the Symbian OS platform, using Codewarrior or Carbide C++ development environment.

- **New functions** Various new functions have been added in this release. These functions include:

  - The GetPublicationMask function gets the publication mask for a given publication name. See "IsCaseSensitive function" [*UltraLite - C and C++ Programming*].

  - You must now call the appropriate ULEnable*Synchronization function before synchronizing over a specific network protocol. See "ULEnableHttpSynchronization function" [*UltraLite - C and C++ Programming*], "ULEnableHttpsSynchronization function" [*UltraLite - C and C++ Programming*], "ULEnableTcpipSynchronization function" [*UltraLite - C and C++ Programming*], "ULEnableTlsSynchronization function" [*UltraLite - C and C++ Programming*], "ULEnableZlibSyncCompression function" [*UltraLite - C and C++ Programming*], or "ULEnableEccSyncEncryption function" [*UltraLite - C and C++ Programming*].

- **Improved support for wide and narrow (ASCII) characters** Although UltraLite now has one database file format (narrow characters), applications can still use wide definitions of TCHAR. Wide characters are converted to their MBCS equivalent and vice versa as appropriate.

- **Enhanced functions changes** Enhancements to existing functions include:

  - If your application does not require SQL support, using the ULInitDatabaseManagerNoSQL function instead of ULInitDatabaseManager can significantly reduce the size of the application. See "ULInitDatabaseManagerNoSQL" [*UltraLite - C and C++ Programming*].

- The SetReadPosition function has been enhanced to take a second parameter, offset_in_chars, which indicates if the offset is in bytes or characters. See "SetReadPosition function" [*UltraLite - C and C++ Programming*].
- SetSynchInfo now performs an autocommit so all synchronization information is immediately saved.
- ULStoreDefragInit, ULStoreDefragFini and ULStoreDefragStep are no longer required. UltraLite now internally manages database store defragmentation.
- ULEnableUserAuthentication function is deprecated because user authentication is always enabled. UltraLite now permits the definition of up to four user names that may connect to the database (default is user name "DBA" with password "sql").
- MobiLink synchronization code must now invoke ULEnableTcpipSynchronization before invoking InitSynchInfo. See "InitSynchInfo function" [*UltraLite - C and C++ Programming*].

UltraLite embedded SQL

UltraLite embedded SQL is no longer a static API, and no longer requires a reference database. Instead, the SQL preprocessor requires only the source files. It generates functions that send SQL statements to UltraLite. Some SQL statements that were supported in previous releases are not supported by UltraLite SQL. Version 10 supports dynamic SQL statements which were not supported in previous releases.

- **New functions** Various new functions have been added in this release. These functions include:
  - The ULEnableZlibSyncCompression function enables zlib compression during synchronization. See "ULEnableZlibSyncCompression function" [*UltraLite - C and C++ Programming*] and "MobiLink Client Network Protocol Options" [*MobiLink - Client Administration*].

    Notes
    zlib compression is not supported for Palm OS or Symbian OS.

- **Enhanced functions** Enhancements to existing functions include:
  - GetSQLColumnName was added to UltraLite_RowSchema_iface. Depending on the type of schema, the function returns different results:
    - When used with a UltraLite_TableSchema, this function returns the column name specified by the column_id parameter.

      When used with a UltraLite_ResultSetSchema, this function returns either:
      - An alias name, if one is specified for the result set column in question.
      - The column name, if the result set column represents a column in a table.
      - An empty string in all other cases.

UltraLite.NET

UltraLite now supports ADO.NET 1.0 development in Visual Studio 2003 and ADO.NET 2.0 development in Visual Studio 2005.

- **New methods** Various new functions have been added in this release. These functions include:
  - The ExecuteResultSet method executes a SQL SELECT statement and returns an updatable result set as a ULResultSet class. See "ExecuteResultSet method" [*UltraLite - .NET Programming*].
  - The ULResultSet class includes the following methods: Append*, Set*, Delete, Update. See "ULResultSet class" [*UltraLite - .NET Programming*] for details on these methods.
  - UltraLite.NET now supports TLS during TCP/IP synchronization. See "ULStreamType enumeration" [*UltraLite - .NET Programming*].
  - ConnectionString properties and the ULConnectionParms object have been enhanced to support limited quoting. See "ULConnectionParms class" [*UltraLite - .NET Programming*].
  - The GetPublicationPredicate method returns publication predicate string for the specified publication. If the publication does not exist, SQLE_PUBLICATION_NOT_FOUND is set. See "GetPublicationPredicate method" [*UltraLite - .NET Programming*].
  - The SignalSyncIsComplete method signals the MobiLink provider for ActiveSync that an application has completed synchronization. See "SignalSyncIsComplete method" [*UltraLite - .NET Programming*].
  - The SetDatabaseOption method sets the value for the specified database option. See "SetDatabaseOption method" [*UltraLite - .NET Programming*].
- **Enhanced methods** Enhancements to existing methods include:
  - The ULSyncParms class now take a TableOrder order property to specify the order in which tables should be uploaded to the consolidated database. See "TableOrder property" [*UltraLite - .NET Programming*].
  - The GetSchemaTable method has now returns extended Table metadata. See "GetSchemaTable method" [*UltraLite - .NET Programming*] for a complete list.
  - The UpdateBegin method is now an optional at the ResultSet level when a table is in UL_TABLE_ACCESS_MODE_NONE or UL_TABLE_ACCESS_MODE_FIND_AGAIN. This change was required to make the UltraLite.NET API compatible with the ADO.NET 2.0 result set. See "UpdateBegin method" [*UltraLite - .NET Programming*].
  - The GetDatabaseProperty method now recognizes more properties. See "GetDatabaseProperty method" [*UltraLite - .NET Programming*].
  - The ULSyncProgressData class now includes a Flags property. See "Flags property" [*UltraLite - .NET Programming*].

UltraLite for AppForge Crossfire

UltraLite for AppForge now supports the Symbian OS platform. Support for the UltraLite engine has been added in this release, allowing multiple applications to concurrently access a single database.

- **New method** The OnWaiting method provides a mechanism for the user application to process GUI events and possibly cancel the current operation.

UltraLite for M-Business Anywhere

- **New methods** Various new methods have been added in this release. These functions include:
  - The setMBAServerWithMoreParms method sets proxy server information when using one-button synchronization. This new method enhances the existing setMBAServer method, by adding a new string argument named **additional**.
  - The getPublicationMask method gets the publication mask for a given publication name. See "getPublicationMask method" [*UltraLite - M-Business Anywhere Programming*].
  - The getPublicationPredicate method returns publication predicate string for the specified publication. If the publication does not exist, SQLE_PUBLICATION_NOT_FOUND is set.
- **Enhanced methods** Enhancements to the following existing method includes:
  - The setStream method now supports ECC (Elliptic curve cryptography) for TLS (Transport Layer security). See " SyncParms class" [*UltraLite - M-Business Anywhere Programming*].

> **Note**
> ECC encryption is not available on all platforms. For a list of supported platforms, see "Supported platforms" [*SQL Anywhere 10 - Introduction*].

Behavior changes and deprecated features

Following is a list of changes to UltraLite introduced in version 10.0.0.

Deprecated platforms

- Support for the PocketPC 2000 OS has been deprecated for this release.
- Support for CodeWarrior 8 has been removed. You must use Code Warrior 9 instead.
- Support for Windows CE MIPS processors have been removed.

For other changes to platform support, see the UltraLite Deployment Option for SQL Anywhere table in SQL Anywhere Supported Platforms and Engineering Support Status.

Removed components, modules, namespaces

The following programming interfaces have been dropped from this release:

- **UltraLite for ActiveX** All applications must be rewritten using a supported API.
- **Static Java API** All applications must be rewritten using a supported API.
- **Native UltraLite for Java** All applications must be rewritten using a supported API.
- **Static C++ API and Static embedded SQL** Developers wanting to write C++ applications must program using the dynamic C++ interface. If you have an application written with the static C++ library

from previous versions, UltraLite 10 includes a migration utility to simplify the move to this new library. See "Upgrading UltraLite" on page 336.

- **iAnywhere.UltraLite namespace** In UltraLite.NET, this namespace is no longer supported. You must re-write your applications using the iAnywhere.Data.UltraLite namespace instead.

Removed utilities

- **Schema Painter** Because you no longer need a schema file to create an UltraLite database, the Schema Painter tool has been removed.
- **Database conversion tool** The Database conversion tool (the ulconv utility) is no longer supported. For the ulconv functionality, use the ulcreate, ulload, ulsync, and ulunload utilities.
- **ulxml utility** The ulxml utility that converted schema files to XML is no longer supported. For similar ulxml functionality, use ulload and ulunload to convert databases to XML instead.
- **ulisql** The ulisql utility is no longer supported. Instead, Interactive SQL (dbisql) now supports UltraLite.
- **ulgen** The ulgen utility is no longer supported. For UltraLite deployments that used this utility, you need to upgrade your database and C/C++ applications accordingly. See "Upgrading UltraLite" on page 336.

Removed, deprecated, and modified functions

- **UltraLite for C/C++ API** Changes to functions and macros in the C/C++ API include:
  - The database schema can no longer be connected to nor upgraded dynamically because the *.usm* file no longer exists. All classes and functions relating to this former feature of UltraLite have been removed.
  - ULEnablePalmRecordDB and ULEnableFileDB have been removed in this version.
  - All ULEnableXXXX functions must now be called with an initialized SQLCA.
  - The macro UL_STORE_PARMS has been deprecated in release 10. Connection and creation options are specified in the appropriate parameter when calling OpenConnection or CreateDatabase.
  - ULSecureCerticomTLSStream and ULSecureRSATLSStream are deprecated in this release. In their place, you can use ULEccTlsStream and ULRsaTlsStream.
  - The security and security_parms fields of ul_synch_info are removed. Instead, set the stream field to the appropriate string value: tcpip, http, https or tls. Additionally, combine the security parameters with the other stream parameters. TCPIP is always the underlying transport mechanism and TLS over HTTP is no longer supported. Instead you can use the HTTPS synchronization stream. See "UltraLite Synchronization Parameters and Network Protocol options" [*MobiLink - Client Administration*].
  - ULSocketStream, ULHTTPStream and ULHTTPSStream have been changed to return the appropriate string value that is now required.
  - ULActiveSyncStream is removed from UltraLite. When synchronizing via ActiveSync an application should specify the stream value as with any other type of synchronization.

- **Embedded SQL** Changes to functions in the embedded SQL interface to the C/C++ API include:
  - The database schema can no longer be upgraded dynamically because the *.usm* file no longer exists. All classes and functions relating to this former feature of UltraLite have been removed.
- **UltraLite.NET API** Changes to functions in the UltraLite.NET API include:
  - The database schema can no longer be connected to nor upgraded dynamically because the *.usm* file no longer exists. All classes and methods relating to this former feature of UltraLite have been removed.
  - ParmsUsed property has been renamed ToString in the ULConnectionParms class.
  - GetSQLColumnName has been renamed to GetColumnSQLName.
  - ULStreamType members UNKNOWN and ACTIVE_SYNC are removed from this enumeration. The default is now ULStreamType.TCPIP.
- **UltraLite for MobileVB API** Changes methods in the MobileVB API include:
  - The database schema can no longer be connected to nor upgraded dynamically because the *.usm* file no longer exists. All classes and methods relating to this former feature of UltraLite have been removed.
- **UltraLite for M-Business Anywhere API** Changes to functions in the M-Business Anywhere API include:
  - The database schema can no longer be connected to nor upgraded dynamically because the *.usm* file no longer exists. All classes and methods relating to this former feature of UltraLite have been removed.

Name changes

- **ULUtil** The ULUtil utility for Palm OS has been renamed ULDBUtil.
- **ulmvbreg** ulmvbreg has been renamed ulafreg. This utility is now installed to the *install-dir\win32* directory. See "UltraLite AppForge Registry utility (ulafreg)" [*UltraLite - Database Management and Reference*].

Miscellaneous

- **ulcond.log** Version 10 of the UltraLite HotSync conduit installer (ulcond10) no longer writes messages to this log file. For updated ulcond10 utility usage, see "UltraLite HotSync Conduit Installation utility for Palm OS (ulcond10)" [*UltraLite - Database Management and Reference*].

Sybase Central and Interactive SQL

The following sections describe the new features, behavior changes, and deprecated features in Sybase Central and Interactive SQL for version 10.0.0.

New features

Following is a list of additions to Sybase Central and Interactive SQL introduced in version 10.0.0.

Sybase Central

This section describes new features in Sybase Central. Changes and additions made to the Sybase Central plug-ins are described in the following sections:

- "SQL Anywhere plug-in" on page 127
- "New plug-ins for Sybase Central" on page 128

- **Sybase Central Task list** You can choose to view tasks in the left pane of Sybase Central, instead of a tree structure of the database. The Task list shows common tasks related to the object that is currently selected. The Task list includes common tasks, navigation options, and links to the documentation. See "Panes" [*SQL Anywhere Server - Database Administration*].
- **New Connections menu** In previous releases, you could press F11 to open the New Connection dialog that let you choose the plug-in you wanted to connect with. Sybase Central now provides a Connections menu where you can choose the plug-in you want to use. The New Connection dialog has been removed, but pressing opens the Connections menu where you can choose the plug-in you want to use for your connection.
- **Connection profile enhancements** You can now add descriptions to Sybase Central connection profiles. Connection profiles can also be imported and exported.
- **Plug-in searches** You can now search for objects that contain specified text within the plug-ins and databases in Sybase Central by choosing View ► Search Pane.
- **Context dropdown list** The new Context dropdown list shows you the object that is currently selected in the object tree to make it easier to navigate through plug-ins, especially when the object tree is not open in the left pane.

SQL Anywhere plug-in

- **Deadlocks database tab** When you are connected to a SQL Anywhere database in Sybase Central, you can view information about deadlocks on the Deadlocks tab. See "Viewing deadlocks from Sybase Central" [*SQL Anywhere Server - SQL Usage*].
- **Entity-relationship diagrams** Sybase Central displays entity-relationship diagrams for databases, showing the tables in the database and their foreign key relationships. See "Viewing entity-relationship diagrams from the SQL Anywhere plug-in" [*SQL Anywhere Server - Database Administration*].
- **New Create Schedule wizard and other enhancements to the Events folder** For each scheduled event, the Events folder now displays the next scheduled time when the event will be triggered.

For each conditional event, the folder displays the system event and optionally the trigger conditions that trigger the event. Schedules are created using the new Schedule Creation wizard. When creating a new scheduled event, the Event wizard allows you to create a single schedule, but you can later add additional schedules to an event if required. See "Defining schedules" [*SQL Anywhere Server - Database Administration*].

- **Maintenance plans** You can set up a schedule for validating and backing up a database automatically and have the output log emailed to you. See "Creating a maintenance plan" [*SQL Anywhere Server - Database Administration*].
- **New Restore Database wizard** You can now use the Restore Database wizard to restore a database from an archive backup. See "Restoring an archive backup" [*SQL Anywhere Server - Database Administration*].
- **Editor enhancements for Sybase Central and Interactive SQL** You can choose the font used in the editor windows of Sybase Central and Interactive SQL on the Format tab of the Options dialog.

  A typing completion option has been added to the editor for database object names. See "Using text completion" [*SQL Anywhere Server - Database Administration*].

New plug-ins for Sybase Central

- **QAnywhere plug-in** The QAnywhere plug-in provides an easy-to-use graphical interface for creating and administering your QAnywhere applications.

  See "New QAnywhere plug-in for Sybase Central" on page 107.
- **UltraLite plug-in** The UltraLite plug-in allows you to create, modify, and administer your UltraLite databases in a graphical user interface.

  See "Graphical administration tools" on page 117.
- **MobiLink Create Synchronization Model wizard and Model mode** You can now create a synchronization model using a wizard, and edit your model in the MobiLink plug-in using the new Model mode. You can also set up MobiLink server-initiated synchronization. The old features of the MobiLink plug-in have also been enhanced and are preserved in Admin mode.

  See "Enhancements to the MobiLink plug-in in Sybase Central" on page 86.

Interactive SQL

- **Interactive SQL can connect to UltraLite databases** You can now use Interactive SQL to develop and test SQL statements with UltraLite databases. The ulisql utility has been deprecated. See "Graphical administration tools" on page 117.
- **Interactive SQL integrates with third party source control systems** Interactive SQL can integrate with third party source control systems, allowing you tp perform a number of common source control operations on files from within Interactive SQL, such as checking in, checking out, and comparing against old versions. See "Source control integration" [*SQL Anywhere Server - Database Administration*].
- **New Interactive SQL options** The isql_maximum_displayed_rows option lets you specify the number of rows that appear in the result set in Interactive SQL, while the isql_show_multiple_result_sets

option specifies whether multiple result sets can appear in the Results pane in Interactive SQL. See "isql_maximum_displayed_rows option [Interactive SQL]" [*SQL Anywhere Server - Database Administration*] and "isql_show_multiple_result_sets [Interactive SQL]" [*SQL Anywhere Server - Database Administration*].

- **Text completion** Interactive SQL now includes a typing completion option that can fill in the names of the following object types: tables, views, columns, stored procedures, and system functions. See "Using text completion" [*SQL Anywhere Server - Database Administration*].
- **DESCRIBE statement now supported by Interactive SQL** The DESCRIBE statement enables you to obtain the following information about a specified table or procedure:

  - all columns found in the table
  - all indexes found in the table
  - all parameters used with the stored procedure

  See "DESCRIBE statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].
- **Interactive SQL supports the @data option** When starting Interactive SQL from a command prompt, you can specify the *@data* option to read in options from the specified environment variable or configuration file. See "Interactive SQL utility (dbisql)" [*SQL Anywhere Server - Database Administration*].

SQL Anywhere Console utility

- **SQL Anywhere Console supports the @data option** When starting the SQL Anywhere Console from a command prompt, you can specify the *@data* option to read in options from the specified environment variable or configuration file. See "SQL Anywhere Console utility (dbconsole)" [*SQL Anywhere Server - Database Administration*].

Behavior changes and deprecated features

Following is a list of changes to Sybase Central and Interactive SQL introduced in version 10.0.0.

- **Interactive SQL no longer sets the quoted_identifier option to On** In previous versions of the software, Interactive SQL set the quoted_identifier option to On. It now uses the database's setting for this option (by default, this option is set to On). See "quoted_identifier option [compatibility]" [*SQL Anywhere Server - Database Administration*].
- **isql_plan option no longer supports the NONE parameter** The NONE parameter is no longer supported by the isql_plan option. See "isql_plan option [Interactive SQL]" [*SQL Anywhere Server - Database Administration*].
- **Interactive SQL can return unlimited result sets** In previous versions of the software, if you executed a query that returned multiple result sets, Interactive SQL only displayed a maximum of 10 result sets. Now Interactive SQL displays all result sets returned by the query. See "isql_show_multiple_result_sets [Interactive SQL]" [*SQL Anywhere Server - Database Administration*].

- **Interactive -f option behavior change** When starting Interactive SQL with the -f option, a connection is not made to a database automatically. Previously, a connection was opened automatically.
- **Accessing and saving graphical plans in Interactive SQL**
  - Two new menu choices, Open Plan and Save Plan, are available from the File menu in Interactive SQL for opening and saving graphical plans (previously this was done using the same Open and Save menu items as you used for opening and saving the SQL statements.
  - Previously, graphical plans were saved with an *.xml* file extension. Now, they are saved with the extension *.saplan*. However, the previous *.xml* file extension is still supported for displaying graphical plans that were stored with that extension.
  - In the Options dialog, you can now make Interactive SQL the default editor for both *.sql* and *.saplan* (graphical plan) files.
- **SET OPTION statement PUBLIC keyword deprecated** The PUBLIC keyword is deprecated for setting Interactive SQL options using the SET OPTION statement. See "Interactive SQL options" [*SQL Anywhere Server - Database Administration*].
- **EXIT statement now closes the current Interactive SQL window** In previous releases, executing an EXIT statement from Interactive SQL closed all the Interactive SQL windows. Now, only window where the statement is executed is closed. See "EXIT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].
- **New error code for SQLE_ENGINE_NOT_MULTIUSER** Applications that were programmed to handle SQLE_ENGINE_NOT_MULTIUSER now need to check for a new error code. Previously, if an application attempted a write operation on the database while another thread was sending an upload to MobiLink, the runtime would return SQLE_ENGINE_NOT_MULTIUSER. Now the runtime will return a new, more accurate error code: SQLE_ULTRALITE_WRITE_ACCESS_DENIED. See "ULSQLCode enumeration" [*UltraLite - .NET Programming*].
- **Sybase Central plug-in Utilities tabs removed** The Utilities tabs in the SQL Anywhere, MobiLink, and UltraLite plug-ins have been replaced with a Tools button. You can also access utilities from the Sybase Central Tools menu.

Deprecated and discontinued features

- **jConnect no longer supported for connecting to Sybase Central, Interactive SQL, or the SQL Anywhere Console** Sybase Central, Interactive SQL, and the SQL Anywhere Console utility (dbconsole) no longer support connections to SQL Anywhere databases using jConnect. You can still use the iAnywhere JDBC driver to connect to databases from these applications. As a result of this change, the following features have been removed:
  - The -jconnect and -odbc options for the Interactive SQL utility (dbisql) have been removed.
  - The -jconnect and -odbc options for the SQL Anywhere Console utility (dbconsole) have been removed.
  - The Connect dialog used for connecting to Interactive SQL, the SQL Anywhere Console, and the SQL Anywhere and MobiLink plug-ins in Sybase Central no longer allows you to specify whether jConnect or the iAnywhere JDBC driver is used. The iAnywhere JDBC driver is used for all connections.

- **UltraLite plan now appears on the Plan tab in Interactive SQL** In previous releases, the Interactive SQL Results pane had an UltraLite Plan tab that displayed the UltraLite plan optimization strategy. The UltraLite Plan tab has been removed, so now when you are connected to an UltraLite database from Interactive SQL, the plan appears on the Plan tab.
- **Sybase Central SQL Anywhere plug-in no longer supports version 7 databases** Support for version 7 database servers and databases created with version 7 software has been removed from the SQL Anywhere plug-in. You can still connect to a database created with version 5, 6, or 7 software running on a version 8 or later database server for the purposes of unloading and reloading the database into a reload file, or into a new or existing database. See "Rebuilding version 9 and earlier databases for version 10.0.0" on page 321.
- **isql_log option deprecated** The isql_log option for logging statements executed during an Interactive SQL session is deprecated. Use the START LOGGING and STOP LOGGING statements instead. See "Logging commands" [*SQL Anywhere Server - Database Administration*].
- **Sybase Central file name changes** In addition to file changes mentioned for Sybase Central, the following files have been added:

New name	Old name
asaplugin.jar	*saplugin.jar*

The registry key has also changed to reflect the new version of Sybase Central, and is now:

```
HKLM\SOFTWARE\Sybase\Sybase Central\5.0 (registry entries)
```


Documentation enhancements

The documentation for pre-existing features has been enhanced in several areas, including the following:

- **Context-sensitive help for SQL statements** In Interactive SQL, you can now right-click a SQL statement name to open the reference topic for the statement.
- **Getting Started with MobiLink** A new introductory book has been added that helps new users understand how to develop distributed applications with MobiLink.

  See MobiLink - Getting Started [*MobiLink - Getting Started*].
- **New chapter about SQL Anywhere administration tools in Database Administration Guide** A new chapter has been added that focuses on how to use Sybase Central, Interactive SQL, and the SQL Anywhere Console utility.

  See "SQL Anywhere Administration Tools" [*SQL Anywhere Server - Database Administration*].
- **Supported platform information updated for EBFs** There are now supported platform pages that are installed with the product and that refer to the build you install. These pages are installed to the *docs\en* subdirectory of your SQL Anywhere installation. The pages are updated in EBFs. The documentation links to these pages where required.
- **SQL Anywhere security features moved** The book *SQL Anywhere Studio Security Guide* has been removed. SQL Anywhere security features are now documented in *SQL Anywhere Server - Administration*.
- **ODBC Drivers book removed** The book *ODBC Drivers for MobiLink* has been removed.

Product-wide features

The following sections describe the new features, behavior changes, and deprecated features that affect all components of SQL Anywhere version 10.0.0.

New features

Following is a list of product-wide additions introduced in version 10.0.0.

- **Product name changed to SQL Anywhere 10** SQL Anywhere Studio has been renamed SQL Anywhere 10, and Adaptive Server Anywhere has been renamed SQL Anywhere. Many names of files, directories, services, and executables have consequently changed, mostly to reflect the change from ASA to SA. These changes are detailed in the relevant Behavior Change topics of this chapter.
- **New install for DataWindow.NET** DataWindow.NET is a custom control tool that is useful to database developers using Visual Studio. It is provided as an optional component during your SQL Anywhere installation. Complete documentation is provided in the installation.
- **RSA now included with SQL Anywhere** You no longer have to purchase a separate license to use RSA encryption. See "Transport-Layer Security" [*SQL Anywhere Server - Database Administration*].
- **Feature statistics collection** SQL Anywhere 10 tracks information about the computer running the software, such as the operating system, the options use to start the database server, the SQL Anywhere 10 software build being used, and so on, as well as information about the SQL Anywhere 10 features being used. If a fatal error occurs, the software automatically prompts you to send any information about the problem, as well as the SQL Anywhere feature statistics to iAnywhere. This information can be used to help diagnose the problem, should you open a technical support case. See "Error reporting in SQL Anywhere" [*SQL Anywhere Server - Database Administration*].

  You also have the option of sending the feature statistics at any time using the SQL Anywhere Support utility (dbsupport). The feature statistics information helps iAnywhere understand how the product is being used to help improve the software. See "SQL Anywhere Support utility (dbsupport)" [*SQL Anywhere Server - Database Administration*].

  The SADIAGDIR environment variable specifies the location of the directory where crash reports and feature statistics are stored. See "SADIAGDIR environment variable" [*SQL Anywhere Server - Database Administration*].
- **Error reporting** When an internal error occurs in Sybase Central, Interactive SQL, or the SQL Anywhere Console utility, a log of the error is written to the hard drive and a dialog appears where you can choose to send the error report to iAnywhere.

  In addition, if a fatal error occurs in any of the following: personal server, network server, MobiLink server, dbmlsync, MobiLink Listener, QAnywhere agent, SQL Remote, or Replication Agent, a log of the error is written to the hard drive and a dialog appears where you can choose to send the error report to iAnywhere. The SQL Anywhere Support utility (dbsupport) can be configured to automatically submit these error reports. See SQL Anywhere Support utility (dbsupport).

  If you choose not to submit an error report, the file remains in the diagnostic directory on your hard disk. The SADIAGDIR environment variable specifies the location of the directory where crash reports and

feature statistics are stored. See "SADIAGDIR environment variable" [*SQL Anywhere Server - Database Administration*].

- **Control which features are available in the administration tools** You can now control which features are available for users in the administration tools using an *OEM.ini* file located in the same directory as the tool's *.jar* file.
- **Using SQL Anywhere 10 on Windows Vista** The following known issues exist on Windows Vista:
  - Updating license information with the Server Licensing utility (*dblic.exe*) fails unless you have administrator privileges or write permissions on the directory containing the server executables.
  - There is a known problem with using shared memory when running SQL Anywhere as a service or an unprivileged account. This problem is under investigation. As an alternative, you can use TCP/IP.

Behavior changes

Following is a list of product-wide changes in version 10.0.0.

- **Location of samples directory changed** The samples included with SQL Anywhere 10 are no longer installed under your SQL Anywhere 10 installation directory. As a result of this change, the sample databases are now installed to the following locations:

Sample database	Location
SQL Anywhere sample database	*samples-dir**demo.db*
MobiLink CustDB sample consolidated database application	*samples-dir**MobiLink**CustDB*\
UltraLite CustDB sample database	*samples-dir**UltraLite**CustDB*\

  For a list of the default location of *samples-dir* for each supported operating system, see "Samples directory" [*SQL Anywhere Server - Database Administration*].

- **Unsupported platforms** The following platforms are no longer supported:
  - Windows 95
  - Windows 98
  - Windows Me
  - Windows NT
  - Compaq Tru64

  For other changes to platform support, see "Supported platforms" [*SQL Anywhere 10 - Introduction*].

- **Sample database revised and renamed** The SQL Anywhere sample database is now called *demo.db*. Objects such as tables, columns, views, and indexes now have full-word names to benefit users who use screen readers. See "SQL Anywhere Sample Database" [*SQL Anywhere 10 - Introduction*].
- **Miscellaneous file name changes** In addition to file name changes mentioned for individual products, the following file names have changed:

Old name	New name
asa.cvf	*sqlany.cvf*
asaldap.ini	*saldap.ini*
asasrv.ini	*sasrv.ini*
asa_config.sh	*sa_config.sh*
install-dir/SYBSasa9/lib	*sqlanywhere10/lib32* or *sqlanywhere10/lib64*
install-dir/SYBSasa9/bin	*sqlanywhere10/bin32* or *sqlanywhere10/bin64*

To reflect the new product name, some registry keys have changed. They are now:

```
HKLM\SYSTEM\CurrentControlSet\Services\Eventlog\Application\SQLANY
HKLM\SYSTEM\CurrentControlSet\Services\Eventlog\Application\SQLANY 10.0
HKLM\SYSTEM\CurrentControlSet\Services\Eventlog\Application\SQLANY 10.0
Admin
HKLM\SOFTWARE\Sybase\Sybase Central\5.0 (registry entries)
HKLM\SOFTWARE\Sybase\SQL Anywhere\10.0 (registry entries)
```

In addition to file changes mentioned for individual products, the following file has been added: *ulbase.lib*.

The following service group names have changed:

Description	Old name	New name
Network server	ASANYServer	SQLANYServer
Personal server	ASANYEngine	SQLANYEngine
MobiLink synchronization client	ASANYMLSync	SQLANYMLSync
Replication Agent	ASANYLTM	SQLANYLTM

Changes to ODBC drivers used by MobiLink, QAnywhere, and remote data access

- **Sybase Adaptive Server Enterprise driver** SQL Anywhere no longer includes an iAnywhere Solutions ODBC driver for Adaptive Server Enterprise. Instead, the Adaptive Server Enterprise native driver is tested to work with MobiLink. The iAnywhere Solutions 9 - Adaptive Server Enterprise Wire Protocol driver is no longer supported.

  See http://www.ianywhere.com/developer/technotes/odbc_mobilink.html.

- **IBM UDB DB2 driver** SQL Anywhere no longer includes an iAnywhere Solutions ODBC driver for DB2. Instead, the IBM DB2 8.2 CLI driver is tested to work with MobiLink. This native DB2 driver supports DB2 versions 8.1 and 8.2. The following drivers are no longer supported: IBM DB2 7.2 ODBC driver and iAnywhere Solutions 9 - DB2 Wire Protocol driver.

See http://www.ianywhere.com/developer/technotes/odbc_mobilink.html.

- **Oracle driver** The iAnywhere Solutions 10 - Oracle Wire Protocol driver is available by separate download.

  See http://www.ianywhere.com/developer/technotes/odbc_mobilink.html.

CHAPTER 3

What's New in Version 9.0.2

Contents

New features in version 9.0.2

This section lists the new features introduced in components of SQL Anywhere Studio version 9.0.2.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 9.0.2. It provides an exhaustive listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

SQL enhancements

- **UNIQUEIDENTIFIER native data type** The UNIQUEIDENTIFIER data type is now a native data type rather than a domain defined on BINARY(16). As a result, Adaptive Server Anywhere automatically carries out type conversions as needed, so that the STRTOUUID and UUIDTOSTR conversion functions are not needed to handle UNIQUEIDENTIFIER values.

  To use the UNIQUEIDENTIFIER data type in databases created before this release, you must upgrade the database file format by unloading and reloading the database.

  See "UNIQUEIDENTIFIER data type" [*SQL Anywhere Server - SQL Reference*].

- **Conflict function for RESOLVE UPDATE triggers** The CONFLICT function can be used in conflict resolution triggers to determine if a particular column is a source of conflict for an UPDATE being performed on a SQL Remote consolidated database.

  See "CONFLICT function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

- **Procedure profiling enhancements** Profiling information can now be filtered per user and per connection using the sa_server_option stored procedure.

  See "Enabling profiling using sa_server_option" [*SQL Anywhere Server - SQL Usage*] and "sa_server_option system procedure" [*SQL Anywhere Server - SQL Reference*].

- **Remote servers can be tested before they are created or modified** The Create Remote Server wizard in Sybase Central has a Test Connection button that allows you to test whether the connection information supplied in the remote server definition allows you to connect successfully before the remote server is created.

  The Remote Server property sheet in Sybase Central also has a Test Connection button that allows you to test whether you can successfully connect to a remote server if its properties are changed.

  See "Creating remote servers using Sybase Central" [*SQL Anywhere Server - SQL Usage*].

- **INPUT and OUTPUT statements accept the ESCAPES clause** The ESCAPES clause allows you to specify that characters are recognized and interpreted as special characters by the database server.

  See "INPUT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*] and "OUTPUT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].

- **WAITFOR can wake up when it receives a message from another connection** The WAITFOR statement can now wake up when it receives a message from another connection using the MESSAGE statement.

  See "WAITFOR statement" [*SQL Anywhere Server - SQL Reference*].

- **Derived tables appear in query plans** Derived tables now appear as nodes in query execution plans.

- **ALTER DOMAIN statement** The ALTER DOMAIN statement allows you to rename user-defined domains and data types.

  See "ALTER DOMAIN statement" [*SQL Anywhere Server - SQL Reference*].

- **NO RESULT SET clause for procedures** Declaring a stored procedure NO RESULT SET can be used when external environments need to know that the stored procedure does not return a result set.

  See "CREATE PROCEDURE statement" [*SQL Anywhere Server - SQL Reference*].

- **Column statistics updated during index creation** The CREATE INDEX statement now has the side effect that column statistics are updated for the indexed columns.

  See "CREATE INDEX statement" [*SQL Anywhere Server - SQL Reference*].

Programming interface enhancements

- **PHP module** The SQL Anywhere PHP module allows access to Adaptive Server Anywhere databases from the PHP scripting language.

  See "SQL Anywhere PHP API" [*SQL Anywhere Server - Programming*].

- **Web service clients** In addition to acting as a web-service provider, Adaptive Server Anywhere can now act as a web-service client, making it possible to create stored procedures and stored functions that access Adaptive Server Anywhere web services, as well as standard web services available over the internet.

  See "SQL Anywhere Web Services" [*SQL Anywhere Server - Programming*].

- **Multiple web service formats supported** The format of the WSDL file provided by a DISH service, as well as that of data payloads returned of part of SOAP responses, can now be selected to best suit the needs of the client applications. You can now choose between DNET for Microsoft .NET, CONCRETE for clients that automatically generate interfaces, and a general-purpose XML format.

  See "Creating SOAP and DISH web services" [*SQL Anywhere Server - Programming*].

- **odbc_describe_binary_as_varbinary option** This option allows you to choose whether you want all BINARY and VARBINARY columns to be described to your application as BINARY or VARBINARY.

  See "odbc_describe_binary_as_varbinary [database]" [*SQL Anywhere Server - Database Administration*].

- **New prefetch option value** The prefetch option now has an additional value of Always. This value means that cursor results are prefetched even for SENSITIVE cursor types and cursors that involve a proxy table.

See "prefetch option [database]" [*SQL Anywhere Server - Database Administration*].

- **db_locate_servers_ex function** This function provides programmatic access to the information displayed by the dblocate -n option, listing all the Adaptive Server Anywhere database servers on a specific host.

  See "db_locate_servers_ex function" [*SQL Anywhere Server - Programming*].

Administrative enhancements

- **SNMP Agent** Adaptive Server Anywhere can now be monitored from Simple Network Management Protocol (SNMP) applications.

  See "The SQL Anywhere SNMP Extension Agent" [*SQL Anywhere Server - Database Administration*].

- **Deadlock reporting** You can now obtain information about connections involved in deadlock using a new database option, log_deadlocks, and a new system stored procedure, sa_report_deadlocks. When you turn on the log_deadlocks option, the database server records information about deadlocks in an internal buffer. You can obtain deadlock information from this internal buffer by calling sa_report_deadlocks.

  See "Determining who is blocked" [*SQL Anywhere Server - SQL Usage*].

- **New collations** The following collations have been added in this release:

  - **1252SWEFIN** has been added to support Swedish and Finnish. On Swedish and Finnish systems, the database server will choose 1252SWEFIN as the default collation for a new database if no collation is specified.

  - **1255HEB** has been added to support Hebrew. On Hebrew Windows systems, the database server will choose 1255HEB as the default collation for a new database if no collation is specified.

  - **1256ARA** has been added to support Arabic. On Arabic Windows systems, the database server will choose 1256ARA as the default collation for a new database if no collation is specified.

  - **950ZHO_HK and 950ZHO_TW** have been added to support Chinese. 950ZHO_HK provides support for the Windows Traditional Chinese character set cp950 plus the Hong Kong Supplementary Character Set (HKSCS). The 950ZHO_TW collation provides support for the Windows Traditional Chinese character set cp950, but doesn't support HKSCS. Ordering is based on a byte-by-byte ordering of the Traditional Chinese characters. These collations supercede the deprecated 950TWN collation.

  - **1252SPA** has been added to support Spanish. On Spanish Windows systems, the database server will choose 1252SPA as the default collation for a new database if a collation is not specified.

  - **874THAIBIN** has been added to support Thai. This is the recommended collation for Thai on both Windows and UNIX systems.

  See "Supported and alternate collations" [*SQL Anywhere Server - Database Administration*].

- **New Service utility (dbsvc) options** The Service utility (dbsvc) supports the following new options:

  - **-cm option** This option displays the command used to create the specified service. This may be useful for deploying services, or for restoring them to their original state.

- **-sd option** This option allows you to provide a description of the service, which appears in the Windows Service Manager.
- **-sn option** This option allows you to provide a name for the service, which appears in the Windows Service Manager.

See "Service utility (dbsvc) for Windows" [*SQL Anywhere Server - Database Administration*].

- **New Data Source (dbdsn) utility options** The Data Source utility (dbdsn) supports the following new options:
  - **-cm option** This option displays the command used to create the specified data source. This may be useful for deploying data sources, or for restoring them to their original state.
  - **Driver connection parameter** You can use the Driver connection parameter to specify a driver for an ODBC data source when creating data sources using the Data Source utility (dbdsn) on Windows. On UNIX, if you do not specify the Driver connection parameter, the Data Source utility automatically adds a Driver entry with the full path of the Adaptive Server Anywhere ODBC driver based on the setting of the ASANY9 environment variable.

  See "Data Source utility (dbdsn)" [*SQL Anywhere Server - Database Administration*].
- **Disk full callback support** The -fc database server option allows you to specify a DLL containing a callback function that can be used to notify users, and possibly take corrective action, when a file system full condition is encountered.

  See "-fc server option" [*SQL Anywhere Server - Database Administration*].
- **Validate Database wizard enhancements** When you validate a database using the Validate Database wizard in Sybase Central, the wizard indicates the current table being validated, as well as the overall progress of the validation operation. In addition, for databases with checksums enabled, you can validate both tables and checksums at the same time.

  See "Validating a database" [*SQL Anywhere Server - Database Administration*].
- **Unloading table data in Sybase Central** You can now unload data from one or more tables in Sybase Central in one step using the Unload Data dialog.

  See "Using the Unload Data dialog" [*SQL Anywhere Server - SQL Usage*].
- **New columns added to sa_index_density and sa_index_levels** Three new columns have been added to the result sets returned by the sa_index_density and sa_index_levels stored procedures: TableId, IndexId, and IndexType. If you want to revert to the old behavior of these stored procedures, you can drop the stored procedure and recreate it with the columns that were included in the result set in previous versions of the software.

  See "sa_index_density system procedure" [*SQL Anywhere Server - SQL Reference*] and "sa_index_levels system procedure" [*SQL Anywhere Server - SQL Reference*].
- **HISTORY option for BACKUP and RESTORE DATABASE statements** The HISTORY option allows you to control whether BACKUP and RESTORE DATABASE operations are recorded in the *backup.syb* file.

See "BACKUP statement" [*SQL Anywhere Server - SQL Reference*] and "RESUME statement" [*SQL Anywhere Server - SQL Reference*].

- **Support for integrated logins using Windows user groups** In addition to creating integrated logins for individual users on Windows NT/2000/XP, you can now create integrated login mappings to user groups on Windows NT/2000/XP. It is recommended that you upgrade your database before using this feature.

  See "Creating integrated logins for Windows user groups" [*SQL Anywhere Server - Database Administration*].

- **Managing the size of the request log** The -zn database server option allows you to specify how many request log files should be retained.

  See "-zn server option" [*SQL Anywhere Server - Database Administration*].

- **Free pages at the end of the transaction log are removed when the file is renamed by a backup** Transaction log files are grown in fixed-size increments for better performance. When the transaction log is renamed as part of a backup, the free pages at the end of the log are removed, which helps free up disk space.

- **Remote server connections can now be explicitly closed** In previous releases, connections from Adaptive Server Anywhere to remote servers were disconnected only when a user disconnected from Adaptive Server Anywhere. You can now explicitly disconnect Adaptive Server Anywhere from a remote server using the new CONNECTION CLOSE clause of the ALTER SERVER statement.

  See "ALTER SERVER statement" [*SQL Anywhere Server - SQL Reference*].

Security enhancements

- **Initialization files can be obfuscated with dbfhide** The File Hiding utility (dbfhide) can now be used to obfuscate the contents of .ini files used by Adaptive Server Anywhere and its utilities.

  See "File Hiding utility (dbfhide)" [*SQL Anywhere Server - Database Administration*].

- **FIPS-certified security** On all supported Windows platforms except Windows CE, you can now use secure communication with FIPS 140-2 certified software from Certicom.

  See "Starting the database server with transport-layer security" [*SQL Anywhere Server - Database Administration*].

  Strong database encryption using FIPS140-2 certified software from Certicom is also available on supported 32-bit Windows platforms.

  See "Encrypting a database" [*SQL Anywhere Server - Database Administration*].

Miscellaneous enhancements

- **New connection properties** The following connection properties have been added:
  - ClientPort
  - LoginTime
  - ServerPort

See "Connection-level properties" [*SQL Anywhere Server - Database Administration*].

- **Proper formatting Event Viewer messages** When deploying Adaptive Server Anywhere databases, you should set a registry entry that controls the formatting of messages in the event viewer.

  See "Deploying database servers" [*SQL Anywhere Server - Programming*].

- **log_deadlocks option** This option allows you to control whether the database server logs information about deadlocks in an internal buffer. This option can be used with the sa_report_deadlocks procedure to obtain information about deadlock.

  See "log_deadlocks option [database]" [*SQL Anywhere Server - Database Administration*].

- **rollback_on_deadlock option** This option allows you to control whether a transaction is automatically rolled back if it encounters a deadlock.

  See "rollback_on_deadlock [database]" [*SQL Anywhere Server - Database Administration*].

- **temp_space_limit_check option** This option allows you to control what happens when a connection requests more than its quota of temporary file space.

  See "temp_space_limit_check option [database]" [*SQL Anywhere Server - Database Administration*].

- **New system stored procedures** Several new system stored procedures have been added:

  - **sa_rowgenerator procedure** The sa_rowgenerator system procedure is provided as an alternative to the RowGenerator table for returning a result set with rows between a specified start and end value.

    You can use this procedure for such tasks as generating a result set with rows for every value in a range or generating test data for a known number of rows in a result set.

    See "sa_rowgenerator system procedure" [*SQL Anywhere Server - SQL Reference*].

  - **sa_send_udp stored procedure** This procedure sends a UDP packet to the specified address and can be used with MobiLink server-initiated synchronization to wake up the Listener utility (*dblsn.exe*).

    See "sa_send_udp system procedure" [*SQL Anywhere Server - SQL Reference*].

  - **sa_verify_password stored procedure** This procedure is used by the sp_password stored procedure to verify the current user's password.

    See "sa_verify_password system procedure" [*SQL Anywhere Server - SQL Reference*].

    See "sa_verify_password system procedure" [*SQL Anywhere Server - SQL Reference*].

- **Maximum cache size on Windows CE** In previous releases of SQL Anywhere Studio, the maximum cache size on Windows CE was 32 MB. This limit has been removed and the cache size is now limited by the amount of available memory on the device.

- **New database server options for UNIX** The following database server options have been added for UNIX:

  - **-uc** starts the database server in console mode on UNIX.

See "-uc server option" [*SQL Anywhere Server - Database Administration*].

- **-ui** attempts to display the Server Startup Options dialog and Server Messages window when you start a database server on Linux and Solaris with X window support. If the server cannot find a usable display, the server starts in console mode.

  See "-ui server option" [*SQL Anywhere Server - Database Administration*].

- **-ux** displays the Server Startup Options dialog and Server Messages window when you start a database server on Linux and Solaris with X window support.

  See "-ux server option" [*SQL Anywhere Server - Database Administration*].

MobiLink new features

Following is a list of changes and additions to the software introduced in version 9.0.2.

- **New Redirectors**
  - There is a new native Redirector for Apache, available on Windows, Solaris and Linux.
  - There is now an M-Business Anywhere Redirector, available on Windows, Solaris and Linux.

    See "M-Business Anywhere Redirector" [*MobiLink - Server Administration*].
  - The NSAPI Redirector is now available on Solaris. Previously it was only available on Windows.

    See "NSAPI Redirector for Netscape/Sun web servers on Windows" [*MobiLink - Server Administration*].
- **Protocols can now be configured to ignore specified hosts** A new option, ignore, can be used to specify hosts that should be ignored by the MobiLink server when they connect.

  See **ignore** in "-x option" [*MobiLink - Server Administration*].
- **Prevent clients from waiting to synchronize when the MobiLink server is busy** You can now prevent clients from waiting to synchronize when the server is busy.

  See **backlog** in "-x option" [*MobiLink - Server Administration*]
- **Version stored in the consolidated database** The SQL Anywhere Studio version and build numbers are now stored in the MobiLink system table ml_property. For these entries, the component_name is **ML**, the property_set_name is **server_info**, the property_name is **release_version**, and the property_value is of the form *version.build*; for example, `9.0.2.1234`.

  For more information about the MobiLink system table, see "ml_property" [*MobiLink - Server Administration*].
- **MobiLink server supports the new uniqueidentifier data type** The UNIQUEIDENTIFIER data type is now a native data type rather than a domain defined on BINARY(16). As a result, MobiLink remote databases now automatically carry out type conversions as needed, so that the String to UUID and UUID to String conversion functions are not needed to handle UNIQUEIDENTIFIER values.

For information about the mapping of this data type to the supported consolidated databases, see "MobiLink Data Mappings Between Remote and Consolidated Databases" [*MobiLink - Server Administration*].

Security enhancements

- **FIPS-certified security streams** On Windows devices, you can now use secure communication with FIPS 140-2 certified software from Certicom.

  See "Starting the MobiLink server with transport-layer security" [*SQL Anywhere Server - Database Administration*].

- **Connection options now shown in output log** MobiLink now displays the connection string and options in the output log, with passwords replaced with asterisks.

- **Deprecated security features** See "MobiLink behavior changes" on page 156.

MobiLink client enhancements

- **New synchronization setup tool for UltraLite** The UltraLite Schema Painter can now generate MobiLink synchronization scripts, as well as database tables and triggers for Adaptive Server Anywhere consolidated databases.

- **Now easier to delete a remote database and recreate it** The first synchronization of an Adaptive Server Anywhere client subscription now always works.

  See "Progress offsets" [*MobiLink - Client Administration*].

- **New dbmlsync hook is called when connections to MobiLink fail** A new event hook has been added, sp_hook_dbmlsync_connect_failed, that allows you to program ways to recover from failed synchronization connections.

  See "sp_hook_dbmlsync_ml_connect_failed" [*MobiLink - Client Administration*].

- **Improved integration of MobiLink clients into HTTP infrastructure** You can now synchronize using HTTP when a proxy and/or web server requires RFC 2617 Basic or Digest authentication.

  See:

  - "http_password" [*MobiLink - Client Administration*]
  - "http_userid" [*MobiLink - Client Administration*]
  - "http_proxy_password" [*MobiLink - Client Administration*]
  - "http_proxy_userid" [*MobiLink - Client Administration*]

  In addition, two new client connection parameters allow you to specify custom HTTP headers and custom cookies. In order to respect session cookies, HTTP clients now recognize all Set-Cookie and Set-Cookie2 HTTP headers that they receive in server replies and will send these cookies back up with all future HTTP requests. If the name of a cookie matches an existing cookie, the client will replace its old value with the new one. Cookies are not remembered between synchronizations: they are discarded at the end of the synchronization.

See "custom_header" [*MobiLink - Client Administration*] and "set_cookie" [*MobiLink - Client Administration*].

- **Assistance in detecting connection errors** MobiLink clients now issue a warning message when invalid connection parameters are specified.
- **Mirror log location** When dbmlsync is run on a different computer from the remote database, or when mirror logs are located in a different directory from mirror transaction logs, dbmlsync is now able to automatically delete old log files when you specify the location of old mirror logs using this new extended option.

  See "MirrorLogDirectory (mld) extended option" [*MobiLink - Client Administration*].

Server-initiated synchronization enhancements

- **Enhanced functionality for connection-initiated synchronization** In addition to _BEST_IP_CHANGED_, Windows Listeners now also generate the internal message _IP_CHANGED_ to help you initiate synchronization when there is a change in connectivity.

  See "Connection-initiated synchronization" [*MobiLink - Server-Initiated Synchronization*].
- **Listener post action enhancements** When you specify Listener post actions, you can now optionally use a Windows message ID to specify the window message, and can optionally use the window title instead of the window class. You can also use single quotes around the window class name or message if your message or title include non-alphanumeric characters such as spaces or punctuation marks.

  See **post** in "Listener syntax" [*MobiLink - Server-Initiated Synchronization*].
- **New action variables** There are several new action variables:
  - $request_id
  - $best_ip
  - $best_adapter_name
  - $best_adapter_mac
  - $best_network_name

  See "Action variables" [*MobiLink - Server-Initiated Synchronization*].
- **More device support** The Palm Listener now supports Kyocera 7135 and Treo 600 smartphones.

  See "Listeners for Palm Devices" [*MobiLink - Server-Initiated Synchronization*].

SQL Remote new features

Following is a list of changes and additions to the software introduced in version 9.0.2.

- **Mirror log location** When dbremote is run on a different computer from the remote database, or when mirror logs are located in a different directory from mirror transaction logs, dbremote can automatically delete old log files if you specify the location of old mirror logs using the new -ml option.

See "Message Agent" [*SQL Remote*].

- **Conflict function for RESOLVE UPDATE triggers** The CONFLICT function can be used in conflict resolution triggers to determine if a particular column is a source of conflict for an UPDATE being performed on a SQL Remote consolidated database.

  See "CONFLICT function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

UltraLite new features

Following is a list of changes and additions to the software introduced in version 9.0.2.

Component new features

- **ADO.NET interface in UltraLite.NET** UltraLite.NET now supports the ADO.NET programming interface in the new namespace iAnywhere.Data.UltraLite. ADO.NET provides an industry-standard interface to UltraLite, and also provides an easy migration path to Adaptive Server Anywhere for large applications.

  The ADO.NET interface is recommended over the previous UltraLite.NET interface (iAnywhere.UltraLite namespace), which is now deprecated.

  See "Tutorial: Build an UltraLite.NET Application" [*UltraLite - .NET Programming*] and "UltraLite .NET 1.0 API Reference" [*UltraLite - .NET Programming*].

- **UltraLite for MobileVB enhancements** UltraLite for MobileVB now supports Visual Basic .NET programming using AppForge Crossfire.

  See UltraLite - AppForge Programming [*UltraLite - AppForge Programming*].

- **UltraLite for M-Business Anywhere enhancements** The following enhancements have been made to UltraLite for M-Business Anywhere:

  - UltraLite for M-Business Anywhere now supports the client/server UltraLite engine. Your application can use the DatabaseManager.runtimeType property to inspect whether the engine or the runtime library is being used.
  - UltraLite for M-Business Anywhere applications can now synchronize both data and web content with a single operation.

    See "One-button synchronization" [*UltraLite - M-Business Anywhere Programming*].
  - You can use a MobiLink Redirector to synchronize both data and web content through a single M-Business Anywhere server. For synchronization from outside firewalls, this reduces the number of ports that need to be accessible.

    See "Synchronizing data via M-Business Anywhere" [*UltraLite - M-Business Anywhere Programming*] and "M-Business Anywhere Redirector" [*MobiLink - Server Administration*].
  - M-Business Anywhere 5.5 on Windows XP is now a supported platform. The connection parameters databaseOnDesktop and schemaOnDesktop support this environment.

- Additional methods have been added to the API that enable you to gather information about data using the column ID rather than the column name.

  See " ResultSetSchema class" [*UltraLite - M-Business Anywhere Programming*] and " TableSchema class" [*UltraLite - M-Business Anywhere Programming*].

See UltraLite - M-Business Anywhere Programming [*UltraLite - M-Business Anywhere Programming*].

- **Native UltraLite for Java enhancements** The following enhancements have been made to Native UltraLite for Java:
  - Column schema info accessible by columnID instead of just name.
  - New SyncProgressData ErrorMessage property and improved sync error reporting.
  - PreparedStatement.[get]Plan added.
  - ResultSet, ResultSetSchema keep PreparedStatement alive while in use.
- **UltraLite.NET component enhancements** The following functions are supported by UltraLite.NET. It is recommended that these functions be used as part of the ADO.NET interface (iAnywhere.Data.UltraLite namespace).
  - New ULCursorSchema.Name, ULResultSetSchema.Name read-only properties.
  - New ULSyncProgressData ErrorMessage property and improved sync error reporting.
  - ULCommand.Plan read-only property.

  See "UltraLite .NET 1.0 API Reference" [*UltraLite - .NET Programming*].
- **Palm developers can now use a version-independent prefix file** In previous releases, the UltraLite prefix file depended on the version of Palm OS for which you were developing. You can now use *ulpalmos.h* for any version of Palm OS.

  See "Using the UltraLite plug-in for CodeWarrior" [*UltraLite - C and C++ Programming*].
- **Palm developers can now use expanded mode** CodeWarrior supports a code generation mode called **expanded mode**, which improves memory use for global data. You can now use an expanded mode version of the UltraLite runtime library.

  See "Building Expanded Mode applications" [*UltraLite - C and C++ Programming*].
- **Trusted certificates can be retrieved from permanent storage** In previous releases of the software, the trusted certificate for secure synchronization was embedded in the database schema. On Windows and Windows CE platforms, it can now be stored externally and accessed via the trusted_certificates option.

  See "trusted_certificates" [*MobiLink - Client Administration*].

SQL and runtime enhancements

- **Dynamic SQL enhancements** The following enhancements have been made to the UltraLite dynamic SQL support:

- **Query optimization improvement** In previous versions of the software, the order in which tables were accessed was the order in which they appeared in the query. In this version, UltraLite optimizes the query to find an efficient order in which to access tables. As long as you have defined appropriate indexes in the database, the optimizer helps to improve query execution performance.
- **Query plan viewing** Query access plans now include the index name instead of an index number, for clarity. Access plans can be seen, for example, from the new UltraLite Interactive SQL utility.
- **IF and CASE expressions** The range of expressions supported by UltraLite has been extended by adding the IF and CASE conditional expressions.

  See "IF expressions" [*UltraLite - Database Management and Reference*] and "CASE expressions" [*UltraLite - Database Management and Reference*].
- **Table names can have owner names** UltraLite tables do not have owners. Support has been added for *owner.table-name* as a convenience for existing SQL and for programmatically-generated SQL. UltraLite accepts but ignores *owner*.

- **UNIQUEIDENTIFIER data type introduced** The UNIQUEIDENTIFIER data type is now a native data type rather than a domain defined on BINARY(16). As a result, UltraLite automatically carries out type conversions as needed, so that the String to UUID and UUID to String conversion functions are not needed to handle UNIQUEIDENTIFIER values.

  See "UNIQUEIDENTIFIER data type" [*SQL Anywhere Server - SQL Reference*].
- **UltraLite query plan descriptions enhanced** UltraLite query plan descriptions, which can be viewed in UltraLite Interactive SQL, have been enhanced to be easier to read for better diagnosis of performance issues.

Administration enhancements

- **UltraLite Interactive SQL utility** An UltraLite Interactive SQL utility is now provided for testing SQL statements against UltraLite databases and for modifying UltraLite data. It also displays query plans so that you can diagnose performance problems.
- **Command line utilities for database management** A set of command line utilities makes database management tasks easier for UltraLite files on Windows computers. These utilities are particularly useful during application development.

  Each of the new utilities carries out a subset of the tasks that the ulconv utility provides. In future versions of the software, the ulconv utility will be replaced by these newer single-task utilities.

  See:

  - "UltraLite Create Database utility (ulcreate)" [*UltraLite - Database Management and Reference*]
  - "UltraLite Load XML to Database utility (ulload)" [*UltraLite - Database Management and Reference*]
  - "UltraLite Synchronization utility (ulsync)" [*UltraLite - Database Management and Reference*]
  - "UltraLite Unload Database to XML utility (ulunload)" [*UltraLite - Database Management and Reference*]

Synchronization enhancements

- **Improved integration of MobiLink clients into HTTP infrastructure** Two new client connection parameters allow you to specify custom headers and custom cookies.

  See "custom_header" [*MobiLink - Client Administration*] and "set_cookie" [*MobiLink - Client Administration*].

- **Synchronization script generation from the Schema Painter** The UltraLite Schema Painter now provides the ability to generate synchronization scripts for Adaptive Server Anywhere consolidated databases. This capability makes it easier to extend UltraLite applications to a synchronized architecture.

- **Synchronization notifications on referential integrity violations** Support synchronization callback functions to report referential integrity violations - currently, rows that fail RI are silently deleted.

QAnywhere new features

- **Failover servers** The QAnywhere agent now can take a list of MobiLink server connection protocol options rather than just one.

  See "Setting up a failover mechanism" [*QAnywhere*].

- **Emulator support** QAnywhere client applications on the Pocket PC 2002 and Pocket PC 2003 now support x86 emulators. Only "scheduled" policy for the QAnywhere Agent is supported on these emulators.

- **New RDBMSs supported as server message stores** All supported MobiLink consolidated databases can now be used in QAnywhere applications as server message stores: Adaptive Server Anywhere, Adaptive Server Enterprise, Microsoft SQL Server, Oracle, and DB2.

- **QAnywhere .NET client library for the .NET Compact Framework now supports message listeners.** QAnywhere .NET client library for the .NET Compact Framework now supports message listeners.

Transmission rule enhancements

- **Remote message store properties now synchronized** When you set remote message store properties, those properties are now synchronized to the server message store so that they can be used in transmission rules.

- **Enhanced message store properties** The ias_Network property now contains fields you can use to access detailed network information.

  See "Client message store properties" [*QAnywhere*].

  In addition, you can now create customized message store properties.

- **Rules for deleting messages** You can now specify transmission rules for the persistence of messages in the message stores. You can delete messages on the client side and server side.

  See "Message transmission rules" [*QAnywhere*].

QAnywhere Agent enhancements

- **Connection string** To start the local message store, you can now specify a connection string with the qaagent -c option. This allows you to use Adaptive Server Anywhere connection string parameters.

  See "-c option" [*QAnywhere*].

- **Quiet mode** The QAnywhere Agent now supports two flavors of quiet mode, which can avoid problems on some Windows CE devices.

  See "-q option" [*QAnywhere*] and "-qi option" [*QAnywhere*].

- **QAstop utility** When you start the QAnywhere Agent in quiet mode with the -qi option, you must use the new qastop utility to stop it.

  See "-qi option" [*QAnywhere*].

- **Enhanced verbosity** You can now specify output log file names with the -o or -ot option, and regulate the size of the output files with the -os and -ot options. In addition, the -v option replaces the old -verbose option. With -v, you have greater control over logging output.

  See:

  - "-o option" [*QAnywhere*]
  - "-ot option" [*QAnywhere*]
  - "-on option" [*QAnywhere*]
  - "-os option" [*QAnywhere*]
  - "-v option" [*QAnywhere*]

- **Initialize database for use as a remote message store** You can use the new qaagent -si option to set up a remote message store. See "-si option" [*QAnywhere*].

- **Upgrade from version 9.0.1** The QAnywhere Agent has a new option, -su, that upgrades a remote message store from version 9.0.1 to 9.0.2.

  See "-su option" [*QAnywhere*].

QAnywhere MobiLink system tables

All QAnywhere MobiLink system tables are now owned by ml_qa_user_group. Previously, they were owned by DBO.

Two new MobiLink system tables have been added. See:

- "ml_qa_delivery" [*MobiLink - Server Administration*]
- "ml_qa_delivery_client" [*MobiLink - Server Administration*]

There are changes to the schema of several MobiLink system tables. See:

- "ml_qa_global_props" [*MobiLink - Server Administration*]
- "ml_qa_global_props_client" [*MobiLink - Server Administration*]
- "ml_qa_repository" [*MobiLink - Server Administration*]

- "ml_qa_repository_client" [*MobiLink - Server Administration*]
- "ml_qa_repository_props" [*MobiLink - Server Administration*]
- "ml_qa_repository_client" [*MobiLink - Server Administration*]

The following MobiLink system tables are not generated for 9.0.2 clients:

- ml_qa_repository_staging_client
- ml_qa_status_staging_client

The following MobiLink system table is not generated for 9.0.2 servers:

- ml_qa_repository_content

Documentation enhancements

This section introduces enhancements made to the appearance, organization, or navigation of the Adaptive Server Anywhere documentation for version 9.0.2. It provides an exhaustive listing of major changes.

New documentation

The documentation for existing features has been enhanced in several areas, including the following:

- **SNMP Agent documentation** A new book has been added that describes the Adaptive Server Anywhere SNMP Agent.

  See "The SQL Anywhere SNMP Extension Agent" [*SQL Anywhere Server - Database Administration*].

- **Windows CE starting points** A chapter containing starting points for Windows CE users has been added.

  See "SQL Anywhere for Windows CE" [*SQL Anywhere Server - Database Administration*].

- **DBTools interface to the MobiLink synchronization client** A sample and other information about how to use dbmlsync from DBTools has been added.

  See "DBTools Interface for dbmlsync" [*MobiLink - Client Administration*].

- **QAnywhere enhancements** The QAnywhere documentation has been expanded, with new information about how to integrate messaging with JMS messaging systems and MobiLink data synchronization, and enhanced information about setting up QAnywhere applications.

  See QAnywhere [*QAnywhere*].

- **Server-initiated synchronization SDKs** The documentation for the SDKs has been expanded, and a new section on the Palm Listener SDK has been added.

  See "MobiLink Listener SDK for Palm" [*MobiLink - Server-Initiated Synchronization*].

Documentation enhancements

- **MobiLink reorganization** The MobiLink books have been reorganized so that there is now a client guide, an administration guide, and a book of tutorials. As well as covering Adaptive Server Anywhere clients, the client guide includes synchronization parameters and synchronization connection parameters for UltraLite clients, which were previously in the UltraLite Database User's Guide.
- **UltraLite API and QAnywhere API references** The UltraLite.NET, UltraLite C++ API, QAnywhere .NET, and QAnywhere C++ API material is now available in the same form as the remainder of the documentation. As a result, it is available as PDF as well as in the HTML-based documentation.

Behavior changes in version 9.0.2

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 9.0.2. It also lists deprecated features, which are supported in the current software but will not be supported in the next major release of SQL Anywhere Studio.

Deprecated feature lists subject to change
As with all forward-looking statements, the lists of deprecated features are not guaranteed to be complete and are subject to change.

Adaptive Server Anywhere behavior changes

Deprecated and discontinued features

The following is a list of features that are no longer supported or are deprecated, and that may impact existing applications.

- **min_table_size_for_histogram option removed** The database server no longer uses the min_table_size_for_histogram option. In previous versions of the software, this option allowed you to specify the minimum table size for which histograms were created. Now Adaptive Server Anywhere automatically creates histograms for all tables with five or more rows. You can create histograms for all tables, regardless of size, using the CREATE STATISTICS statement.

  See "Updating column statistics" [*SQL Anywhere Server - SQL Usage*].

- **Deprecated database options** The following database options are no longer supported:
  - truncate_date_values
  - assume_distinct_servers
- **Old database formats deprecated** In the next major release of SQL Anywhere Studio, databases created under old versions of the software will not be supported. Migration tools will be provided.
- **Non-threaded DBTools library for UNIX deprecated** The non-threaded DBTools library for UNIX (*libdbtool9.so*) is deprecated: it is fully supported in the current software but will not be supported in the next major release of SQL Anywhere Studio.
- **950TWN collation no longer supported** The 950TWN has been superceded by the following collations: 950ZHO_HK and 950ZHO_TW.

  See "Supported and alternate collations" [*SQL Anywhere Server - Database Administration*].

Other behavior changes

The following is a list of behavior changes from previous versions of the software.

- **Restrictions on the Transaction Log utility (dblog) when removing the transaction log** When removing a transaction log using the -n option, you must also specify the corresponding

ignore transaction log offset option (-il for the Log Transfer Manager, -ir for SQL Remote, or -is for dbmlsync).

For information, see "Transaction Log utility (dblog)" [*SQL Anywhere Server - Database Administration*].

- **Database utilities running in quiet mode** When performing any of the following operations with the –q option (quiet mode) specified, you must also specify the –y option:
  - modifying or deleting a service with the Service Creation (dbsvc) utility
  - modifying or deleting a datasource with the Data Source (dbdsn) utility
  - erasing a file with the Erase (dberase) utility
  - translating a transaction log with the Log Translation (dbtran) utility
- **Certificate name and password must be supplied when using ECC_TLS or RSA encryption** The default values for the certificate, certificate_password, and trusted_certificates parameters have been removed. These defaults utilized the sample certificates that are provided in the *win32* directory of your SQL Anywhere Studio installation. The sample certificates are useful only for testing and development purposes and do not provide security.

  In addition, the -ec **all** server option is no longer supported.

  See "-ec server option" [*SQL Anywhere Server - Database Administration*].
- **-xs server option change** The -xs **all** server option is no longer supported to listen for web requests on both HTTP and HTTPS ports.

  See "-xs server option" [*SQL Anywhere Server - Database Administration*].
- **TCP/IP port number must be specified for network database servers on Mac OS X, HP-UX, and Tru64 when the default port is not in use** If you are starting a database server on Mac OS X, HP-UX, or Tru64, you must specify a port number using the ServerPort [PORT] protocol option if the default port (2638) is already in use or if you do not want to use the default port.

  See "ServerPort protocol option [PORT]" [*SQL Anywhere Server - Database Administration*].
- **Dbspace file names are changed for databases unloaded and reloaded with the Unload utility (dbunload)** When a database is unloaded and reloaded using the -an option of the Unload utility (dbunload), the dbspace file names for the new database have an **R** appended to the end of the file name. This is done to prevent naming conflicts when the new dbspace files are placed in the same directory as the original dbspace files. Dbspace file names also have an R appended to the file name when you unload and reload data using the Unload Database wizard in Sybase Central.

  See "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].
- **Property functions now return LONG VARCHAR values** Previously, the following functions returned a VARCHAR(254) value. They now return a VARCHAR(*maxpropsize*) value, where *maxpropsize* is based on the maximum page size specified for the server.
  - CONNECTION_PROPERTY
  - DB_EXTENDED_PROPERTY

- DB_PROPERTY
- EVENT_PARAMETER
- PROPERTY

- **STRTOUUID function change** In previous releases, if STRTOUUID was passed an invalid UUID value it returned NULL. It now returns a conversion error unless the conversion_error option is set to OFF, in which case it returns NULL.

MobiLink behavior changes

The following is a list of behavior changes from previous versions of the software.

Security behavior changes

- **HTTP+TLS security deprecated in favor of HTTPS** Transport-layer security is deprecated for clients connecting over HTTP. To use transport-layer security over HTTP, you should use HTTPS.

  For information about server-side security, see "Starting the MobiLink server with transport-layer security" [*SQL Anywhere Server - Database Administration*].

  For information about client-side security, see "Configuring MobiLink clients to use transport-layer security" [*SQL Anywhere Server - Database Administration*].

- **Certificate name and password must be supplied when using ECC_TLS or RSA encryption with MobiLink** The default values for the certificate, certificate_password, and trusted_certificates synchronization parameters have been removed. These defaults utilized the sample certificates that are provided in the *win32* directory of your SQL Anywhere Studio installation. The sample certificates are useful only for testing and development purposes and do not provide security.

  See "-x option" [*MobiLink - Server Administration*].

Other MobiLink behavior changes

- **No polling interval for UDP listening** On the Listener, there is now no polling interval for UDP connections. The Listener processes messages immediately.

  See **-I option** in "Listener Utility" [*MobiLink - Server-Initiated Synchronization*].

- **Support for MobiLink Palm Listener on Treo 180 and Kyocera 6035 smartphones deprecated** For information about supported devices for the Palm Listener, see "Listeners for Palm Devices" [*MobiLink - Server-Initiated Synchronization*].

SQL Remote behavior changes

Deprecated and discontinued features

The following is a list of features that are no longer supported or are deprecated, and that may impact existing applications.

- **SQL Remote for Adaptive Server Enterprise deprecated** In the next major release of SQL Anywhere Studio, SQL Remote for Adaptive Server Enterprise will not be present. MobiLink provides a more flexible and scalable solution for data synchronization between Adaptive Server Enterprise and Adaptive Server Anywhere databases.

Other behavior changes

The following is a list of behavior changes from previous versions of the software.

- **The Extraction (dbxtract) utility** When extracting a remote database with dbxtract, if the –q option (quiet mode) is specified, you should also specify the –y option so that dbxtract will automatically replace the existing command file without confirmation.

  See "Extraction utility" [*SQL Remote*].

- **IPM_Receive message control parameter** The default value for the MAPI IPM_Receive message control parameter has been changed to YES. Setting this value to YES ensures that both IPC and IPM messages are picked up by SQL Remote.

  See "The MAPI message system" [*SQL Remote*].

UltraLite behavior changes

The next major release of UltraLite will enhance development using industry standard APIs and will enhance development using the component model as opposed to the original static interfaces. These changes will have several benefits for users, including making it easier to develop applications using UltraLite.

As a result of these plans, several UltraLite APIs are deprecated with this release, meaning that they continue to be fully supported in the current software but will not be supported in the next major release. Assistance in migrating applications that use deprecated interfaces will be provided in the next major release.

As with all forward-looking statements, the list of deprecated and discontinued features provided here is subject to change.

Deprecated and discontinued features

The following features are deprecated or discontinued.

- **Static interfaces deprecated** The next major release of SQL Anywhere Studio will not support the static C++ API or the static Java API. An embedded SQL interface will be available, but not through the current generated code mechanism.
- **UltraLite.NET component interface to be superseded by ADO.NET** In this release, UltraLite.NET supports ADO.NET development in the new iAnywhere.Data.UltraLite namespace. ADO.NET provides the benefits of an industry standard interface and of an easy migration path to Adaptive Server Anywhere for large applications. The UltraLite.NET component API (iAnywhere.UltraLite namespace) is deprecated in this release and will not be provided in the next major release.
- **Native UltraLite for Java component interface to be superseded by JDBC** The current Native UltraLite for Java interface is scheduled to be superseded by a JDBC interface.

Other behavior changes

The following is a list of behavior changes from previous versions of the software.

- **New warning for referential integrity deletes during download** UltraLite automatically deletes rows as needed to maintain referential integrity during download. It now raises a warning for each row deleted in this way.

  See "Referential integrity and synchronization" [*MobiLink - Getting Started*].

- **Native UltraLite for Java behavior changes** Cursor.getRowCount() method has been changed to return an int. No application changes are required.

- **UltraLite.NET component behavior changes** Cursor.getRowCount() method has been changed to return an int. No application changes are required.

- **Handling invalid synchronization parameters** In previous releases, the UltraLite runtime ignored all invalid synchronization parameters. Misspelled parameters were therefore ignored and a default value used instead.

  In this release, if the runtime encounters an invalid parameter, synchronization fails and the SQL code SQLE_UNRECOGNIZED_OPTION is set. If an error callback has been provided, it will be called once for each invalid parameter. Duplicates continue to be ignored.

- **New libraries for secure synchronization** The security options for synchronization have been moved into separate libraries. If you use either of the ULSecureCerticomTLSStream or ULSecureRSATLSStream security options for encrypted synchronization, you must now link separately against a corresponding static library, or ship a separate DLL.

- **UltraLite for MobileVB integration with Crossfire** If you have existing projects that use the UltraLite for MobileVB integration with Crossfire from an earlier version of the software, you must change the reference to Interop.UltraLiteAFLib.dll to iAnywhere.UltraLiteForAppForge.dll.

  See "Tutorial: A Sample Application for AppForge Crossfire" [*UltraLite - AppForge Programming*].

QAnywhere behavior changes

Deprecated and discontinued features

- **QAnywhere Agent options** The following QAnywhere Agent (qaagent) options have been deprecated and replaced.

Deprecated qaagent option...	Replaced with qaagent option...
-agent_id *id*	**-id** *id*
-dbauser *user*	**-c "UID=***user***"**
-dbeng *name*	**-c "ENG=***name***"**
-dbfile *filename*	**-c "DBF=***filename***"**

Deprecated qaagent option...	Replaced with qaagent option...
-dbname *name*	**-c "DBN=***name***"**
-ek *key*	**-c "DBKEY=***key***"**
-password *password*	**-c "PWD=***password***"**
-sv	**-c "Start={ dbeng9 | dbsrv9 }"**
-verbose	**-v**[*levels*]

In addition, the following qaagent options are no longer required and have been deprecated:

- **-e**
- **-rb**

See "qaagent syntax" [*QAnywhere*].

- **QAnywhere Agent no longer creates the client message store** You must now create the message store database yourself before running qaagent. There is a new option, -si, that initializes the database with system objects that are required by QAnywhere.

  See "Setting up the client message store" [*QAnywhere*].

- **QAnywhere messages with an InReplyToID** The QAnywhere built-in header InReplyToID is no longer mapped to the JMS property ias_ReplyToAddress. This means that it is no longer copied to JMSCorrelationID.

  See "Mapping QAnywhere messages on to JMS messages" [*QAnywhere*].

Other behavior changes

- **QAnywhere client library message overhead is reduced** The ias_MessageType property is no longer set for regular messages. It is still set for network status and other system messages that are sent to the system queue.

CHAPTER 4

What's New in Version 9.0.1

Contents

New features in version 9.0.1

This section lists the new features introduced in components of SQL Anywhere Studio version 9.0.1.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 9.0.1. It provides an exhaustive listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

OLAP enhancements

- **OLAP query extensions** A set of online analytical processing (OLAP) features enable more detailed analysis of the data in your database. The enhancements include the ability to add subtotal rows into result sets in a flexible way using CUBE and using GROUPING SETS, as well as window functions that provide rolling averages and other advanced features.

  Support for these OLAP features is built in to the Query Editor, which lets you build queries that use ROLLUP, CUBE, and GROUPING SETS operations.

  See:

  - "OLAP Support" [*SQL Anywhere Server - SQL Usage*]
  - "Using ROLLUP" [*SQL Anywhere Server - SQL Usage*]
  - "Using CUBE" [*SQL Anywhere Server - SQL Usage*]
  - "GROUP BY GROUPING SETS" [*SQL Anywhere Server - SQL Usage*]
  - "Window aggregate functions" [*SQL Anywhere Server - SQL Usage*]

- **New statistical functions** Several statistical functions have been added.

  See:

  - "COS function [Numeric]" [*SQL Anywhere Server - SQL Reference*]
  - "COVAR_POP function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "COVAR_SAMP function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "CUME_DIST function [Ranking]" [*SQL Anywhere Server - SQL Reference*]
  - "DENSE_RANK function [Ranking]" [*SQL Anywhere Server - SQL Reference*]
  - "PERCENT_RANK function [Ranking]" [*SQL Anywhere Server - SQL Reference*]
  - "RANK function [Ranking]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_AVGX function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_AVGY function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_COUNT function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_INTERCEPT function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_R2 function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_SLOPE function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_SXX function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_SXY function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "REGR_SYY function [Aggregate]" [*SQL Anywhere Server - SQL Reference*]
  - "ROW_NUMBER function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*]

- **New string functions** The following string functions have been added:
  - "BASE64_DECODE function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "BASE64_ENCODE function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "COMPRESS function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "DECOMPRESS function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "DECRYPT function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "ENCRYPT function [String]" [*SQL Anywhere Server - SQL Reference*]
  - "HASH function [String]" [*SQL Anywhere Server - SQL Reference*]

Statement enhancements

- **LOAD TABLE enhancements** The LOAD TABLE statement now has a clause that allows you to limit the statistics that are created, allowing faster table loading. It also has a SKIP option that allows you to ignore the first few lines of a file.

  See "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **SELECT ... INTO *base-table*** This new SELECT syntax creates a base table and fills that table with data from a query.

  See "SELECT statement" [*SQL Anywhere Server - SQL Reference*].

- **Extended support for variables in SQL statements** Several statements have been made more flexible by permitting variables as well as constants in some locations. This is especially useful in stored procedures and batches, where variables can be declared and used. It provides functionality previously only available, in more cumbersome form, in EXECUTE IMMEDIATE.

  The following statements have this extended support for variables:

  - The TOP clause of the SELECT statement can now reference integer variables as well as constants. See "SELECT statement" [*SQL Anywhere Server - SQL Reference*].
  - BACKUP statement *backup-directory* and *archive-root*. See "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].
  - RESTORE statement *filename*, *archive-root*, and new *dbspace-name*. See "RESTORE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
  - LOAD TABLE statement *filename*. See "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].
  - UNLOAD statement and UNLOAD TABLE statement *filename*. See "UNLOAD statement" [*SQL Anywhere Server - SQL Reference*] and "UNLOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **SET statement enhancement** The SET statement now accepts the option ansi_nulls (equivalent to the ansinull option) for compatibility with Microsoft SQL Server.

  For information, see "SET statement [T-SQL]" [*SQL Anywhere Server - SQL Reference*].

- **ALTER TABLE statement enhancement** ALTER TABLE can now add a NOT NULL column with a default value to a non-empty table. This feature provides increased flexibility when modifying existing tables.

See "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **ALTER VIEW statement enhancements** The ALTER VIEW statement now supports a RECOMPILE clause that allows you to re-create view definitions when the columns in the underlying tables are modified.

  See "ALTER VIEW statement" [*SQL Anywhere Server - SQL Reference*].

- **MESSAGE statement enhancements** A FOR CONNECTION clause has been added to the MESSAGE statement.

  Also, a DEBUG ONLY clause has been added to the MESSAGE statement. When the debug_messages option is set to ON, debugging messages appear for all stored procedures and triggers that contain a MESSAGE statement that includes the DEBUG ONLY clause.

  See "MESSAGE statement" [*SQL Anywhere Server - SQL Reference*] and "debug_messages option [database]" [*SQL Anywhere Server - Database Administration*].

Security enhancements

- **Database page checksums** Database page checksums are used to detect whether a database page has been modified on disk. When a database is created with checksums enabled, a checksum is calculated for each page before it is written to disk. When a page is read from disk, its checksum is calculated again and compared to the stored checksum. If the values are different, the page has been modified or otherwise corrupted while on disk. Existing databases must be unloaded and reloaded into a database with checksums enabled to use this feature. You can check whether checksums are enabled for a database using the Checksum property.

  For more information about creating databases with checksums, see "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*], "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*], and "Database-level properties" [*SQL Anywhere Server - Database Administration*].

  Checksums can also be used to validate a database. See "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*], "Validation utility (dbvalid)" [*SQL Anywhere Server - Database Administration*], and "sa_validate system procedure" [*SQL Anywhere Server - SQL Reference*].

Performance enhancements

Many enhancements have been made to provide better performance for a wide range of tasks, including complex queries. Some of these enhancements are purely internal. Others are listed here:

- **Parallel index scans** On volumes with multiple disk spindles, such as hardware or software RAID arrays, the query optimizer can now scan tables using an index in parallel.

  See "Parallel index scans" [*SQL Anywhere Server - SQL Usage*].

- **Clustered Hash Group By algorithm** For better performance, the Adaptive Server Anywhere query optimizer can use a new algorithm that is particularly useful for certain classes of GROUP BY queries where the HAVING clause returns a small proportion of rows.

  See "Clustered Hash Group By algorithm" [*SQL Anywhere Server - SQL Usage*] and "optimization_workload option [database]" [*SQL Anywhere Server - Database Administration*].

- **Database server cache warming** Three new database server command line options have been added to support cache warming. Cache warming is designed to help reduce the execution times of the initial queries executed against a database by pre-loading the database server's cache with database pages that were referenced the last time the database was started. Using cache warming can improve performance when the same queries are executed against the database each time it is started.

  See "-cc server option" [*SQL Anywhere Server - Database Administration*], "-cr server option" [*SQL Anywhere Server - Database Administration*], "-cv server option" [*SQL Anywhere Server - Database Administration*], and "Using cache warming" [*SQL Anywhere Server - SQL Usage*].

- **Optimizer hints** WITH (XLOCK) is a new table hint feature in the FROM clause. XLOCK indicates that rows processed by the statement from the hinted table are to be locked exclusively. The affected rows remain locked until the end of the transaction. It works at all isolation levels.

  The WITH INDEX hint forces the optimizer to use a specified index during query optimization. This is an advanced feature that may lead to poor performance if used incorrectly, and so should be used by experienced users only.

  See "FROM clause" [*SQL Anywhere Server - SQL Reference*] and "Use indexes for frequently-searched columns" [*SQL Anywhere Server - SQL Usage*].

- **Increased default stack size for internal execution threads on NetWare** The default stack size for internal execution threads on NetWare has been increased to 128 KB.

  See "-gss server option" [*SQL Anywhere Server - Database Administration*].

Programming interface enhancements

- **Perl interface** The Perl new DBD::ASAny driver for the Perl DBI module allows you to access and modify Adaptive Server Anywhere databases from Perl scripts.

- **InstallShield projects** SQL Anywhere studio now includes InstallShield Merge Module Projects and Object Projects. These projects allow InstallShield to generate Merge Modules and Objects with which you can redeploy the software currently installed on your computer. Previous versions of SQL Anywhere included the Merge Modules and Objects. These allowed you to redeploy the original software, but provided no convenient means of deploying after you had applied an EBF.

Administration enhancements

- **BACKUP enhancements** The BACKUP statement now includes an ON EXISTING ERROR clause for image backups. When this clause is specified, an error occurs if any of the files to be created during the backup already exist.

  The archive backup form of the BACKUP statement has been extended to support options previously available only with image backups.

  See "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

  The Backup utility can now create a backup on the server computer. Previously, the utility could only create backups on the client computer.

  See "Backup utility (dbbackup)" [*SQL Anywhere Server - Database Administration*].

- **Unload utility (dbunload) enhancements** The Unload utility now automatically handles view dependencies when unloading databases. The -j option that was used in previous versions of the software to output view definitions multiple times to the *reload.sql* file has been deprecated. Now, the Unload utility automatically handles unloading view definitions that depend on other views.

  The Unload utility also allows you to change the database page size when unloading into a new database.

  See "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].

- **Server Enumeration utility (dblocate) enhancements** The Server Enumeration utility (dblocate) now allows you to supply a host name or IP address to limit the search for database servers to a specific computer. As well, it supports a -n option that specifies that IP addresses are not to be resolved into computer names, which results in better performance.

  See "Server Enumeration utility (dblocate)" [*SQL Anywhere Server - Database Administration*].

- **Adaptive Server Anywhere Console utility supports integrated logins** When you connect to the Adaptive Server Anywhere Console (dbconsole) utility on Windows NT/2000/XP, the Connect dialog allows you to use an integrated login to connect to the database.

  See "Connect dialog: Identification tab (SQL Anywhere)" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **The request log file size can be changed without restarting the database server** On starting the database server, you can specify the size of the request log file with the -zs server option. You can use the sa_server_option system procedure to change the size of the request log file without restarting the database server.

  See "sa_server_option system procedure" [*SQL Anywhere Server - SQL Reference*].

- **Additional information added for profiling system triggers** The sa_procedure_profile system procedure and sa_procedure_profile_summary system procedure now return extra information about system triggers when procedure profiling is turned on in the database.

  See "sa_procedure_profile system procedure" [*SQL Anywhere Server - SQL Reference*] and "sa_procedure_profile_summary system procedure" [*SQL Anywhere Server - SQL Reference*].

- **New system table** A new system table has been added that maintains information about the different versions of the software and platforms a database has been started with.

  See "ISYSHISTORY system table" [*SQL Anywhere Server - SQL Reference*].

- **New collations** There are two new collations available: one to support Lithuanian (1257LIT, ANSI Code Page 1257) and one to support Turkish (1254TRKALT). This Turkish collation considers I-dot and I-no-dot equal.

  See "Supported and alternate collations" [*SQL Anywhere Server - Database Administration*] and "Alternative Turkish collation 1254TRKALT" [*SQL Anywhere Server - Database Administration*].

- **dedicated_task option** When specified, a request handling task is dedicated to handling requests from a single connection. This pre-established connection allows you to gather information about the state of the database server if it becomes otherwise unresponsive.

  See "dedicated_task option [database]" [*SQL Anywhere Server - Database Administration*].

Interactive SQL enhancements

- **Interactive SQL allows you to specify the encoding used to read and write files** The Interactive SQL READ, INPUT, and OUTPUT statements now support an optional encoding clause that allows you to specify the character encoding that is used to read or write the file. The default_isql_encoding option has been added to allow you to specify the character encoding that is used for subsequent READ, INPUT, and OUTPUT statements.

  See "default_isql_encoding option [Interactive SQL]" [*SQL Anywhere Server - Database Administration*], "READ statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*], "INPUT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*], and "OUTPUT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].

  You can also specify the character encoding used to read or write the file when using the Interactive SQL import and export wizards.

  See "Importing and Exporting Data" [*SQL Anywhere Server - SQL Usage*] and "Export dialog" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Interactive SQL supports integrated logins** When you connect to Interactive SQL on Windows NT/2000/XP, the Connect dialog allows you to use an integrated login to connect to the database.

  See "Connect dialog: Identification tab (SQL Anywhere)" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Interactive SQL allows you to configure the font used for displaying result sets** You can choose the font, font style, and point size for data that appears in the Results pane in Interactive SQL.

  For information about configuring the Results pane in Interactive SQL, see "Options dialog: Results tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Interactive SQL allows you to specify the initial folder used for file browsing** When browsing for files in Interactive SQL, you can specify whether Interactive SQL uses the current directory (as defined by the operating system) for the initial directory, or the last folder where a file was opened.

  See "Options dialog: General tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

Sybase Central enhancements

- **Sybase Central allows you to configure the font used for displaying result sets** You can choose the font, font style, and point size for data that appears on the Data tab in Sybase Central when a table is selected.

  For information about configuring the Data tab in Sybase Central, see "Plug-in Preferences dialog: Table Data tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Create Remote Server wizard now supports creating external login for current user** The Create Remote Server wizard now allows you to create an external login for the current user so that you do not have to create an external login before you create the remote server.

  See "Creating remote servers using Sybase Central" [*SQL Anywhere Server - SQL Usage*].

- **Sybase Central supports integrated logins** When you connect to Sybase Central on Windows NT/2000/XP, the Connect dialog allows you to use an integrated login to connect to the database.

See "Connect dialog: Identification tab (SQL Anywhere)" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Columns can be sorted using the View menu in Sybase Central** The Sybase Central View menu has a Sort item that allows you to sort columns in the right pane as an alternative to clicking the column headings in the right pane.
- **Foreign key settings can be modified from the foreign key property sheet** You can change foreign key settings in Sybase Central from the Foreign Key property sheet.

  See "Change Settings dialog" [*SQL Anywhere 10 - Context-Sensitive Help*].
- **Proxy Table wizard now displays primary key column information** Previously, when creating a proxy table using the Proxy Table wizard, there was no way to determine which columns belonged to the remote table's primary key. Now, the columns in the primary key are identified in the wizard.
- **Utility wizards can be canceled** The Upgrade Database wizard, Backup Database wizard, Restore Database wizard, Validate Database wizard, Compress Database wizard, Uncompress Database wizard, and the Create Backup Images wizard can be canceled. They also include a messages dialog that displays status information about whether the operation has succeeded or failed.
- **Sybase Central supports account names of the form domain\user when creating and editing services** The Create Service wizard and Service property sheet now allow you to enter account names of the form ***domain\user*** when creating and editing services. You can enter the account name in the Other Account field on the Account tab of the Service property sheet or in the Create Service wizard.

Miscellaneous enhancements

- **Database server uses asynchronous I/O on Linux platforms** When running the database server on Linux, the database server uses asynchronous I/O by default when possible. The -ua database server option allows you to turn off the use of asynchronous I/O.

  See "-ua server option" [*SQL Anywhere Server - Database Administration*].
- **openxml supports equality predicates** The openxml function allows you to use equality predicates in the XPath expression. This feature allows you to locate nodes within the XML document using attribute values.

  See "openxml system procedure" [*SQL Anywhere Server - SQL Reference*].
- **TransactionStartTime connection property** This property returns the time the database was first modified after a COMMIT or ROLLBACK.

  See "Connection-level properties" [*SQL Anywhere Server - Database Administration*].
- **UserAppInfo property** This property returns the portion of a connection string specified with the AppInfo connection parameter.

  See "Connection-level properties" [*SQL Anywhere Server - Database Administration*].
- **ConsoleLogFile server property** This property returns the name of the file where messages from the Server Messages window are logged when the -o server option is specified.

See "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **DriveType database property for UNIX platforms** The DriveType database property has been extended to UNIX platforms.

  See "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **Connection IDs start at 1 and are incremented for each new connection to the database server** When the database server is started, each connection to the server is assigned a connection ID, starting with 1, and the connection number is incremented with each new connection to the server. The connection IDs are logged in the -z server output and the LogFile connection parameter output. They are also used by the CONNECTION_PROPERTY, NEXT_CONNECTION, NEXT_DATABASE, and DROP CONNECTION functions, and by request logging.

  See "CONNECTION_PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*], "NEXT_CONNECTION function [System]" [*SQL Anywhere Server - SQL Reference*], "NEXT_DATABASE function [System]" [*SQL Anywhere Server - SQL Reference*], and "Request logging" [*SQL Anywhere Server - SQL Usage*].

- **Improved cache management on NetWare and UNIX** When the cache size specified with -c is greater than the amount of available memory on UNIX or NetWare, the database server now calculates the maximum cache size based on available memory.

  For more information about how the database server calculates the maximum cache size in these circumstances, see "-c server option" [*SQL Anywhere Server - Database Administration*].

- **odbc_distinguish_char_and_varchar option** The odbc_distinguish_char_and_varchar option controls how the Adaptive Server Anywhere ODBC driver describes CHAR columns.

  See "odbc_distinguish_char_and_varchar option [database]" [*SQL Anywhere Server - Database Administration*].

MobiLink new features

Following is a list of changes and additions to the software introduced in version 9.0.1.

- **QAnywhere messaging** MobiLink QAnywhere provides application-to-application messaging capabilities. It allows you to write applications that exchange messages with remote applications located on a variety of devices running on Windows or Windows CE operating systems.

  See QAnywhere [*QAnywhere*].

- **External authentication** MobiLink user authentication has been enhanced so that you can easily authenticate users using LDAP servers and other external sources such as POP3 email servers.

  See "Authenticating to external servers" [*MobiLink - Client Administration*].

- **New MobiLink system tables** There are several new MobiLink system tables. The existence of new MobiLink system tables means that you need to upgrade your Adaptive Server Anywhere databases and run upgrade scripts for other consolidated databases.

  See "MobiLink Server System Tables" [*MobiLink - Server Administration*].

- **Configurable script versions** You can use the new ml_property MobiLink system table to store properties for script versions.

  See "ml_property" [*MobiLink - Server Administration*] and "ml_add_property" [*MobiLink - Server Administration*].

- **iAnywhere ODBC drivers** There is now an iAnywhere ODBC driver for DB2 available on Windows. This is a wire protocol driver, so DB2 client software is not required.

- **IBM DB2 setup scripts have version numbers** Multiple versions of the MobiLink server can now use the same DB2 server instance. This is possible because the two Java class files that MobiLink uses for DB2 stored procedures now include the SQL Anywhere Studio version number. For the 9.0.1 release they are called *SyncDB2_901.class* and *SyncDB2Long_901.class*.

  See "IBM DB2 UDB consolidated database" [*MobiLink - Server Administration*].

- **New -us server option** A new server option improves performance by preventing MobiLink from invoking unnecessary table scripts.

- **ActiveSync provider now generates an activity log file** The ActiveSync provider can now generate a log of its activities.

  See "ActiveSync provider installation utility [mlasinst]" [*MobiLink - Client Administration*].

Adaptive Server Anywhere client enhancements

- **Improved application integration for Adaptive Server Anywhere clients** A new integration component for dbmlsync provides an easier and more customizable way to create applications with Adaptive Server Anywhere remote databases on Windows platforms.

  See "Dbmlsync Integration Component" [*MobiLink - Client Administration*].

- **Resuming failed downloads** You can now avoid lengthy retransmission of data when downloads fail for both Adaptive Server Anywhere and UltraLite remote databases. After a partial transmission of a download, failed downloads may be resumed.

  See "Resuming failed downloads" [*MobiLink - Server Administration*].

- **Transaction-level uploads for Adaptive Server Anywhere clients** You can now choose to preserve transactions on the remote database in your upload, and you can do this per synchronization.

  See "-tu option" [*MobiLink - Client Administration*].

- **New way to specify extended options** You can use the new hook sp_hook_dbmlsync_set_extended_options to programmatically customize the behavior of an upcoming synchronization.

  See "sp_hook_dbmlsync_set_extended_options" [*MobiLink - Client Administration*].

Server-initiated synchronization

- **Automatic device tracking** Automated device tracking simplifies the Notification process.

  See "Device tracking" [*MobiLink - Server-Initiated Synchronization*].

- **Sybase Central configuration** You can now configure notification using the Sybase Central MobiLink plug-in.

  See "Setting properties" [*MobiLink - Server-Initiated Synchronization*].

- **Optional delivery confirmation** You can now configure your notification so that a confirmation is automatically sent to the consolidated database when a message is received.

  See "Listener syntax" [*MobiLink - Server-Initiated Synchronization*].

- **New Listener options** The Listener has several new command line options, including the ability to listen on more than one channel at a time.

  See "Listener Utility" [*MobiLink - Server-Initiated Synchronization*].

- **Palm configuration** There is now a Palm Listener configuration utility (dblsncfg) that simplifies configuration of Palm devices.

  See "Listeners for Palm Devices" [*MobiLink - Server-Initiated Synchronization*].

MobiLink Monitor

- **Exporting Monitor data** Monitor data can now be exported to a relational database or Excel file.
- **Enhanced information in Monitor** You can now customize which columns are shown in the table. In addition, there are new columns containing information that was previously available only from synchronization property sheets, and a new column to uniquely identify synchronizations for a Monitor session.
- **Improved sorting** Sorting for the Monitor table has been improved. The sort order is now maintained when data is added or updated.
- **Enhanced user interface** There are new menus and tool bar buttons to zoom in, zoom out, or zoom to selection in the chart. In addition, pausing now controls whether the chart automatically scrolls.

See "MobiLink Monitor" [*MobiLink - Server Administration*].

New web server support

- **Redirector supports Apache web servers** There is a new native Redirector for Apache web servers. Tomcat is no longer a requirement if you want to use an Apache web server.

  See "Synchronizing Through a Web Server with the Redirector" [*MobiLink - Server Administration*].

UltraLite new features

UltraLite 9.0.1 introduces several new features:

- **UltraLite.NET controls** A set of controls are added to your Visual Studio.NET 2003 toolbox to make it easier to specify connection parameters and to monitor synchronization from UltraLite.NET applications.

  See "Tutorial: Build an UltraLite.NET Application" [*UltraLite - .NET Programming*].

- **UltraLite for M-Business Anywhere.** A new component is available for iAnywhere M-Business Anywhere, previously known as AvantGo M-Business Server.

  See UltraLite - M-Business Anywhere Programming [*UltraLite - M-Business Anywhere Programming*].

- **CREATE and DROP statements in dynamic SQL** CREATE/DROP TABLE and CREATE/DROP INDEX statements are now available in dynamic SQL. For users of UltraLite components, these statements provide a way of changing the schema of an UltraLite database.

  See "UltraLite CREATE INDEX statement" [*UltraLite - Database Management and Reference*], and "UltraLite CREATE TABLE statement" [*UltraLite - Database Management and Reference*].

- **Transaction control from dynamic SQL** COMMIT and ROLLBACK statements are now available in dynamic SQL. For users of UltraLite components, these statements provide a way of using SQL statements to control transactions. They provide an alternative to the commit and rollback methods on the connection object.

  See "UltraLite COMMIT statement" [*UltraLite - Database Management and Reference*], and "UltraLite ROLLBACK statement" [*UltraLite - Database Management and Reference*].

- **Dynamic SQL SELECT enhancements** Subqueries can be used in search conditions in the WHERE clause or the HAVING clause. They can also be used as derived tables in the FROM clause.

  See "UltraLite SELECT statement" [*UltraLite - Database Management and Reference*] and "Search conditions in UltraLite" [*UltraLite - Database Management and Reference*].

  The HAVING clause is now supported. See "UltraLite SELECT statement" [*UltraLite - Database Management and Reference*].

- **ODBC interface to UltraLite** UltraLite now supports a subset of the ODBC programming interface.

- **Mixing C++ interfaces** The UltraLite C/C++ based interfaces (embedded SQL, the static C++ API, and the C++ Component) may be used in the same application.

  Of particular interest is adding C++ Component dynamic SQL to an existing embedded SQL or static C++ API application, or using embedded SQL to execute general SQL in a primarily C++ Component-based application.

  The new functions include "db_start_database function" [*UltraLite - C and C++ Programming*] (embedded SQL) and StartDatabase method.

- **CodeWarrior stationery for UltraLite C++ component** The stationery **Palm OS UltraLite C++ Component App** is provided as part of the UltraLite plug-in for CodeWarrior. It assists in building C++ Component applications using CodeWarrior for Palm OS.

  The files for the UltraLite plug-in for CodeWarrior are placed on your disk during UltraLite installation, but the plug-in is not available for use without an additional installation step.

  See "Developing UltraLite applications with Metrowerks CodeWarrior" [*UltraLite - C and C++ Programming*].

- **Improved UltraLite C/C++ error handling** An error callback is now supported for all UltraLite C/C++ interfaces. The callback allows the application to be notified of all errors, and so provides developers with invaluable information during development.

See "ULRegisterErrorCallback function" [*UltraLite - C and C++ Programming*] and "Callback function for ULRegisterErrorCallback" [*UltraLite - C and C++ Programming*].

- **UltraLite components can use the engine** The UltraLite database engine, which can accept connections from more than one application, is now available to UltraLite components as an alternative deployment option.

  This option is not available to UltraLite for MobileVB or UltraLite ActiveX.

- **Database conversion tool** The ulconv utility is a command line tool for carrying out numerous operations on UltraLite databases, including unloading databases to XML files, loading new databases from XML files, and converting database formats.

- **Additional synchronization progress event** An additional event is available to the synchronization observer, when an error has occurred and the downloaded changes are being rolled back.

  See the ULSyncState structure or object for the API you are using.

- **Schema upgrade monitoring** Schema upgrades can be a long operation. New schema upgrade events provides a mechanism for applications to monitor the progress of a schema upgrade.

- **Restartable downloads** UltraLite can now restart downloads that fail due to communications errors or user cancellation through the synchronization observer.

  See "Resuming failed downloads" [*MobiLink - Server Administration*].

- **New Windows CE platform support** UltraLite now supports the Smartphone 2002 platform. ActiveSync synchronization is not supported on this platform.

  UltraLite also supports Windows CE 4.1 on ARM chips in V4T ("thumb") mode.

- **Multi-database support** UltraLite components can address multiple databases from a single application by issuing multiple connection requests specifying different database filenames or creator IDs.

  There are some extensions to the connection parameters as a result of this feature.

  See "UltraLite DBN connection parameter" [*UltraLite - Database Management and Reference*].

- **ULPalmLaunch and ULPalmExit no longer required** UltraLite now supports additional connection-related primitives that provide easier support for maintaining state when an application is closed. As a result of these new features, Palm OS applications no longer require special Palm-specific primitives, including ULPalmLaunch and ULPalmExit.

  See "Maintaining state in UltraLite Palm applications" [*UltraLite - C and C++ Programming*], "Maintaining state in UltraLite Palm applications" [*UltraLite - AppForge Programming*] and "Connecting to a database" [*UltraLite - C and C++ Programming*].

- **UltraLite database properties** Properties of the UltraLite database are now available to UltraLite component applications. The case sensitivity, collation, and database ID used for global autoincrement values are all available as properties or methods of the Connection object, depending on the API.

Documentation enhancements

This section introduces enhancements made to the appearance, organization, or navigation of the Adaptive Server Anywhere documentation for version 9.0.1. It provides an exhaustive listing of major changes.

New documentation

- **MobiLink Server-Initiated Synchronization** The MobiLink server-initiated synchronization feature has been moved into its own book.

  See MobiLink - Server-Initiated Synchronization [*MobiLink - Server-Initiated Synchronization*].

- **QAnywhere Messaging** There is now a book describing the new MobiLink messaging application, QAnywhere.

  See QAnywhere [*QAnywhere*]

- **New MobiLink tutorials** There are new tutorials describing how to use Java and .NET scripting logic with Adaptive Server Anywhere remote databases.

  See "Tutorial: Using Java Synchronization Logic" [*MobiLink - Getting Started*] and "Tutorial: Using .NET Synchronization Logic" [*MobiLink - Getting Started*].

- **New chapter describing the dbmlsync integration component** See "Dbmlsync Integration Component" [*MobiLink - Client Administration*].

- **Combined UltraLite C/C++ books** The documentation for UltraLite C/C++ interfaces (embedded SQL, Static C++ API, and the C++ Component) has been combined into a single book, together with the new ODBC interface.

  See UltraLite - C and C++ Programming [*UltraLite - C and C++ Programming*].

- **UltraLite for M-Business Anywhere** The new UltraLite for M-Business Anywhere component has its own book.

  See UltraLite - M-Business Anywhere Programming [*UltraLite - M-Business Anywhere Programming*].

Documentation enhancements

- **Adaptive Server Anywhere Getting Started and Introducing SQL Anywhere Studio books merged** The Adaptive Server Anywhere Getting Started and Introducing SQL Anywhere Studio books have been merged into one book. The new book is called Introducing SQL Anywhere Studio.

- **Enhanced PDF books** Some people find PDF to be a useful alternative to HTML-based online books, particularly for conceptual material. The PDF version of the online books is now installed by default, and can be accessed from the Windows start menu or from the online books by clicking the PDF item at the top of each topic.

  The PDF files feature clickable links not only within a book, but to other books and to material on web sites. The behavior of these features depends on whether you read the files from within a browser plugin or directly from Acrobat Reader. For the best experience, use Acrobat Reader directly.

- **Help on help** A new section describes the differences between the online books in Windows HTML Help format, and the online books in PDF format. It also describes how to use the various help features to navigate the documentation and access the information you are looking for.

Behavior changes in version 9.0.1

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 9.0.1.

Adaptive Server Anywhere behavior changes

Deprecated and discontinued features

This list includes features that are no longer supported or are deprecated, and that may impact existing applications.

- **MDSR encryption discontinued** Previously, both MDSR and AES strong encryption were supported in Adaptive Server Anywhere. Currently, the only type of strong encryption now supported is AES encryption. This change means that the **-ea** option is no longer required when using encryption with the Initialization utility, the Extract utility, or the Unload utility. It also removes the *algorithm* parameter from both the Create Database statement and the Create Encrypted File statement.
- **Write files deprecated** The use of write files is deprecated with this release.
- **Compressed database files deprecated** The use of compressed database files is deprecated with this release.
- **Unload utility (dbunload) -j option deprecated** As a result of enhancements to the Unload utility, the -j Unload utility option is no longer supported.
- **Language Selection utility (dblang) -d option deprecated** The -d option for the Language Selection utility, which was used to change the Adaptive Server Anywhere registry setting, is no longer supported.

Other behavior changes

The following is a list of behavior changes from previous versions of the software.

- **CURRENT_TIMESTAMP and CURRENT_USER special values added** The CURRENT_TIMESTAMP (equivalent to CURRENT TIMESTAMP) and CURRENT_USER (equivalent to CURRENT USER) special values have been added for compatibility with Microsoft SQL Server.

  See "CURRENT TIMESTAMP special value" [*SQL Anywhere Server - SQL Reference*] and "CURRENT USER special value" [*SQL Anywhere Server - SQL Reference*].

- **db_start_engine returns SQLCODE 0 if database server is already running** db_start_engine now returns non-zero and sets the SQLCODE to 0 if the database server is already running. Previously, db_start_engine returned non-zero, but set the SQLCODE to SQLE_ENGINE_ALREADY_RUNNING.

  See "db_start_engine function" [*SQL Anywhere Server - Programming*].

- **db_start_database returns non-zero and SQLCODE 0 if database is already running** db_start_database now returns non-zero and set the SQLCODE to 0 if the database is already

running. Previously, db_start_database returned 0 (indicating failure) and set the SQLCODE to SQLE_ALIAS_CLASH.

See "db_start_database function" [*SQL Anywhere Server - Programming*] and "db_start_database function" [*UltraLite - C and C++ Programming*].

- **Default algorithm changed for the validation utility** The Validation utility (dbvalid) now uses the express check -fx option) algorithm by default. The express check algorithm performs significantly faster for large tables that have several indexes where the table does not completely fit in the server's cache. You can specify the -fn option if you want to use the validation algorithm that was used in previous versions of Adaptive Server Anywhere.

  See "Validation utility (dbvalid)" [*SQL Anywhere Server - Database Administration*].

- **Entering multibyte characters in the Connect dialog** In order to conform to Windows security practices, you can no longer use an Input Method Editor (IME) to type Japanese and other Asian language multibyte characters in the Password field of the Connect dialog used in Sybase Central, Interactive SQL, and the Adaptive Server Anywhere Console utility.

  If you have an existing database that includes these characters in passwords, you can type your password in the Additional Connection Parameters field on the Advanced tab of both the Connect dialog and the ODBC Configuration dialog. However, you should note that when the password is typed on the Advanced tab, it is not obscured and is visible in plain text. When upgrading your database, it is recommended that you change your passwords so they do not include multibyte characters.

- **Owner name cannot be specified in DECLARE LOCAL TEMPORARY TABLE statements** In previous versions of the software, if an owner name was specified in DECLARE LOCAL TEMPORARY TABLE and the owner was not the same as the current user, it was possible to create more than one temporary table with the same name. A syntax error now occurs if an owner name is specified.

- **min_table_size_for_histogram option default setting changed** The min_table_size_for_histogram option specifies the minimum table size for which histograms are created. The default value has been changed to 100 rows. In previous versions of the software, the default value was 1000 rows. This setting can be changed in databases created with earlier versions of the software using the SET OPTION statement.

- **NULL constants data type conversion change** In previous versions, when converting a NULL constant to a CHAR, VARCHAR, LONG VARCHAR, BINARY, VARBINARY, or LONG BINARY type, the size of the column would be initialized to 32767 if no length was provided. Now, the size is initialized to 0.

  For example, the following queries previously returned a column described as length 32767:

```
SELECT CAST( NULL AS CHAR )
-- This now returns a CHAR(0) column

SELECT 'abc'
UNION ALL
SELECT NULL
-- This now returns a CHAR(3) column

SELECT ''
UNION ALL
```



```
SELECT NULL
-- This now returns a CHAR(0) column

SELECT IF 1=1 THEN 'abc' ELSE NULL ENDIF
-- This now returns a CHAR(3) column
```

- **UPDATE statements and errors when ORDER BY clauses use ordinal values** UPDATE statements containing an ORDER BY clause that uses ordinal values now return a syntax error.
- **Restrictions on identifiers** You can no longer use double backslashes or double quotes in identifiers. Backslashes are permitted in identifiers only if used as an escape character.

  See "Identifiers" [*SQL Anywhere Server - SQL Reference*].
- **EXECUTE IMMEDIATE statement default setting WITH RESULT SET clause** The EXECUTE IMMEDIATE statement can return a result set when you specify the WITH RESULT SET ON clause. The default setting is WITH RESULT SET OFF.

  See "EXECUTE IMMEDIATE statement [SP]" [*SQL Anywhere Server - SQL Reference*].

MobiLink behavior changes

The following is a list of behavior changes from previous versions of the software.

- **Change in the order hooks are called** The order in which event hooks are called has been changed. This means that incremental uploads are now more efficient, as the upload events are the only part of the synchronization sequence that is repeated for each incremental update.

  See "Synchronization event hook sequence" [*MobiLink - Client Administration*].
- **Fix to row-wise partitioning for publications for Adaptive Server Anywhere clients** Publications containing a WHERE clause now only replicate rows that meet the WHERE condition. From versions 8.0.0 through 9.0.0, a bug existed that caused rows to be replicated when the WHERE clause evaluated to an unknown value. For example, if a publication WHERE clause had "WHERE val = 1", rows where val was NULL would also be replicated. This bug affected both SQL Remote and Adaptive Server Anywhere MobiLink clients.

UltraLite behavior changes

The following is a list of behavior changes from previous versions of the software.

- **Palm OS state management** For Palm OS applications using embedded SQL or the static C++ API, the ULPalmExit (ULData::PalmExit) and ULPalmLaunch (ULData::PalmLaunch) functions are no longer needed to manage state and synchronization information, and are now deprecated. The ULData and ULConnection Reopen methods are also deprecated.

  Applications on Palm OS now use the same sequence of initialization, connection, and closing functions as other applications. The ULSetSynchInfo method controls HotSync synchronization.

  See "Adding HotSync synchronization to Palm applications" [*UltraLite - C and C++ Programming*].

- **Palm OS 3.0 no longer supported** The earliest version of supported in this release is Palm OS 3.5.
- **ULEnableGenericSchema function deprecated** UltraLite C/C++ applications that require schema upgrades no longer need to call ULEnableGenericSchema. Instead, use the function ULRegisterSchemaUpgradeObserver.
- **UltraLite components Table API** The Delete method of the Table object no longer automatically refreshes the row after deleting. To maintain previous behavior, refetch the row using Relative(0) after the Delete operation.
- **Native UltraLite for Java casting of column IDs and parameter IDs no longer required** All methods that accepted column IDs and parameter IDs, and some methods that accepted other short-typed parameters have been changed to accept integers. This eliminates the need for casting numeric constants in your code. For example, instead of `table.getString( (short)1 );` you can now use `table.getString( 1 );`.

  As a result of this change, Native UltraLite for Java applications must be recompiled to work with 9.0.1 software. No code changes are required.

CHAPTER 5

What's New in Version 9.0.0

Contents

New features in version 9.0.0

This section lists the new features introduced in components of SQL Anywhere Studio version 9.0.0.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 9.0.0. It provides an exhaustive listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

Highlighted new features

- **XML support** Adaptive Server Anywhere 9.0.0 includes a broad range of support for XML, including storing XML documents, exporting relational data as XML, importing XML, and returning XML from queries on relational data.
  - **FOR XML clause** The SELECT statement supports a FOR XML clause with three modes, RAW, AUTO, and EXPLICIT, that allow you to obtain query results as an XML document. Each mode allows you a different level of control over the format of the XML that is generated.

    See "Obtaining query results as XML" [*SQL Anywhere Server - SQL Usage*] and "SELECT statement" [*SQL Anywhere Server - SQL Reference*].
  - **for_xml_null_treatment option** You can use the for_xml_null_treatment option to control how NULL values are returned by a query that includes the FOR XML clause.

    See "for_xml_null_treatment option [database]" [*SQL Anywhere Server - Database Administration*].
  - **openxml procedure** See "openxml system procedure" [*SQL Anywhere Server - SQL Reference*].
  - **SQL/XML support** SQL/XML is a draft standard that describes the ways SQL can be used in conjunction with XML. As part of its SQL/XML support, Adaptive Server Anywhere includes an XML data type that can be used to store XML documents in the database.

    See "XML data type" [*SQL Anywhere Server - SQL Reference*].

    Adaptive Server Anywhere also supports the following SQL/XML functions that provide an alternative method to the FOR XML clause for generating XML documents from your relational data:
    - **XMLAGG function** This aggregate function generates a forest of XML elements from a collection of XML elements.

      See "XMLAGG function [Aggregate]" [*SQL Anywhere Server - SQL Reference*].
    - **XMLCONCAT function** This function generates a forest of XML elements by concatenating together the XML values that are passed in to it.

      See "XMLCONCAT function [String]" [*SQL Anywhere Server - SQL Reference*].
    - **XMLELEMENT function** This function generates an XML element for which you can optionally specify element content, attributes, and attribute content.

See "XMLELEMENT function [String]" [*SQL Anywhere Server - SQL Reference*].

- **XMLFOREST function** This function generates a forest of XML elements.

  See "XMLFOREST function [String]" [*SQL Anywhere Server - SQL Reference*].

- **XMLGEN function** This function generates an XML value based on an XQuery Constructor.

  See "XMLGEN function [String]" [*SQL Anywhere Server - SQL Reference*].

- **HTTP server in the database** Adaptive Server Anywhere database servers can now act as web servers, allowing you to write and run web-based applications using only an Adaptive Server Anywhere database and a web browser of your choice.

  This feature allows the database server to handle standard HTTP and HTTPS requests, as well as standard SOAP requests. Service types available are HTTP, HTTPS, XML, RAW, SOAP, and DISH. DISH is a SOAP service handler.

  To gain the benefits of this enhancement on databases created before this release, you must upgrade the database using the Upgrade utility.

  See "SQL Anywhere Web Services" [*SQL Anywhere Server - Programming*].

- **Index Consultant** The Index Consultant is a tool to assist you in proper selection of indexes. It analyzes either a single query or a set of operations, and recommends indexes to add to your database and to remove from the database.

  To gain the benefits of this enhancement on databases created before this release, you must upgrade the database using the Upgrade utility.

  See "Index Consultant" [*SQL Anywhere Server - SQL Usage*].

- **64-bit version available** A full 64-bit version of the software is available for Windows Server 2003 on Itanium II chips. A deployment release is available on 64-bit Linux and HP-UX operating systems.

SQL enhancements

- **The WITH clause can now be used before a select to specify common table expressions** Common table expressions are temporary view definitions that exist only within the scope of a SELECT statement. They can be recursive, or non-recursive. They sometimes let you write queries in a more elegant manner. They also permit you to perform multiple levels of aggregation within a single query. They can be used only within a top-level SELECT statement, within the top-level SELECT statement within a view definition, or within the top-level statement within an INSERT statement.

  See "Common Table Expressions" [*SQL Anywhere Server - SQL Usage*].

- **Recursive union can now be performed using a common table expression of a particular form** Recursive common table expressions allow you to write recursive queries. These are particularly useful when querying tables that represent hierarchical data structures or directed graphs. Each recursive common table expression contains an initial subquery, which is executed first, and a recursive subquery. The A reference to the view, which must appear within the FROM clause of the recursive subquery, references the rows added to the view during the previous iteration. You must be particularly careful to provide conditions that stop the recursion if the data structure you are querying may contain cycles.

See "Recursive common table expressions" [*SQL Anywhere Server - SQL Usage*].

- **INTERSECT and EXCEPT statements are now supported** These statements compute the intersection and difference between two or more result sets. They complement the UNION statement.

  For more information, see the following:

  - "Using EXCEPT and INTERSECT" [*SQL Anywhere Server - SQL Usage*]
  - "Set operators and NULL" [*SQL Anywhere Server - SQL Usage*]
  - "EXCEPT statement" [*SQL Anywhere Server - SQL Reference*]
  - "INTERSECT statement" [*SQL Anywhere Server - SQL Reference*]

- **SELECT statements can operate on stored procedure result sets** In SELECT statements, a stored procedure call can now appear anywhere a base table or view is allowed.

  If you want statistics on stored procedure calls to be stored, you must upgrade the database using the Upgrade utility. Without statistics, you may get bad plans if you try to join the result of a stored procedure call.

  See "FROM clause" [*SQL Anywhere Server - SQL Reference*].

- **Online analytical processing features added** Several OLAP features have been added to the allowed SQL language:

  - **ROLLUP operation** For queries with a GROUP BY clause, the ROLLUP operation adds subtotal rows into the result set. Each subtotal row provides an aggregate over a set of rows in the GROUP BY result set.

    See "Using ROLLUP" [*SQL Anywhere Server - SQL Usage*]

  - **The LIST function can include ordered lists** The LIST function has been extended to provide sorted lists of items.

    See "LIST function [Aggregate]" [*SQL Anywhere Server - SQL Reference*].

  - **Additional aggregate functions** Functions have been added to compute sample-based and population-based standard deviations and variances.

    See "Aggregate functions" [*SQL Anywhere Server - SQL Reference*].

- **The CREATE INDEX statement permits an index to be created on a built-in function** This feature is a convenience method that adds a new computed column to a table, and creates an index on that column.

  See "CREATE INDEX statement" [*SQL Anywhere Server - SQL Reference*], and "Creating indexes" [*SQL Anywhere Server - SQL Usage*].

- **ORDER BY clause allowed in all contexts** In previous releases, many SELECT statements in view definitions, in subqueries, or in UNION statements were not allowed to use an ORDER BY clause. This restriction has now been removed.

In some cases, particularly when combined with the FIRST or TOP clause, using a SELECT with an ORDER BY clause does affect the results of a view definition or a set operation. In other contexts, the ORDER BY clause is allowed but makes no difference to the operation.

- **SELECT statements can now include START AT as part of the TOP clause** START AT provides additional flexibility in queries that explicitly limit the result set.

  See "SELECT statement" [*SQL Anywhere Server - SQL Reference*].

- **Constraints can now be named** Check constraints, unique constraints, and referential integrity constraints can now be assigned names. This permits modification of table and column constraints by changing individual constraints, rather than by modifying an entire table constraint.

  To gain the benefits of this enhancement on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

  See "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*], "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*], and "Using table and column constraints" [*SQL Anywhere Server - SQL Usage*].

- **Lateral derived tables permit outer references in the FROM clause** Outer references can now be made from derived tables and from stored procedures in the FROM clause. To indicate that an outer reference is being made, the LATERAL keyword is used.

  See "FROM clause" [*SQL Anywhere Server - SQL Reference*].

- **EXECUTE IMMEDIATE allows more flexible escape character processing** A new option WITH ESCAPES OFF allows escape character processing to be suppressed. This feature makes it easier to construct dynamic statements that include file paths.

  See "EXECUTE IMMEDIATE statement [SP]" [*SQL Anywhere Server - SQL Reference*].

- **EXECUTE IMMEDIATE supports queries that return result sets** This new feature allows more dynamic construction of statements inside stored procedures.

  See "Using the EXECUTE IMMEDIATE statement in procedures" [*SQL Anywhere Server - SQL Usage*] and "EXECUTE IMMEDIATE statement [SP]" [*SQL Anywhere Server - SQL Reference*].

- **CREATE FUNCTION and ALTER FUNCTION now permit Transact-SQL syntax** You can now create user-defined functions in the Transact-SQL dialect that return a scalar value to the calling environment.

  See "CREATE FUNCTION statement" [*SQL Anywhere Server - SQL Reference*].

- **Values of autoincrement columns are now available when inserting multiple rows** When inserting rows through a value-sensitive (keyset driven) cursor, the newly inserted rows appear at the end of the cursor result set.

  A consequence of this change is that the value of an autoincrement column for the most recent row inserted can be found by selecting the last row in the cursor. For example, in embedded SQL the value could be obtained using `FETCH ABSOLUTE -1` *cursor-name*.

  See "Modifying rows through a cursor" [*SQL Anywhere Server - Programming*].

- **Remote Data Access now handles UUID/GUID columns** Remote Data Access can now manage Microsoft SQL Server unique identifier columns.

  See "Data type conversions: Microsoft SQL Server" [*SQL Anywhere Server - SQL Usage*] and "UNIQUEIDENTIFIERSTR data type" [*SQL Anywhere Server - SQL Reference*].

- **Remote Data Access now names remote connections** Remote Data Access connections made via ODBC are now given names, so that they can be dropped.

  See "Managing remote data access connections via ODBC" [*SQL Anywhere Server - SQL Usage*].

- **New function returns data type of an expression** The EXPRTYPE function returns the data type of an expression.

  Ssee "EXPRTYPE function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

- **EXIT statement enhanced** The Interactive SQL EXIT statement can now set an exit code for Interactive SQL.

  See "EXIT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].

- **OUTPUT statement accepts ASIS keyword** When ASIS is specified, values are written to the file without any escaping.

  See "OUTPUT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].

- **Indexes and foreign keys can be altered** The ALTER INDEX statement allows indexes and foreign keys to be renamed. It also allows an index type to be changed to clustered or nonclustered for user-created indexes as well as primary or foreign key indexes.

  To gain the benefits of clustered indexes on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

  See "ALTER INDEX statement" [*SQL Anywhere Server - SQL Reference*].

- **Multiple distinct aggregates permitted in queries** Aggregate functions can take `DISTINCT` *column-name* as an argument. In previous versions of the software, only one aggregate function with a DISTINCT argument could be included in a query. Now, multiple such functions can be used. The following query is permitted in version 9, but not in earlier versions of the software:

  ```
  SELECT count( DISTINCT first_name ),
         count( DISTINCT last_name )
  FROM contact
  ```

- **Full length and abbreviated day names are recognized in all supported languages for event schedules** When creating events, the database server recognizes both full-length and abbreviated day names in any of the languages supported by Adaptive Server Anywhere. Previously, schedules in non-English languages required full day names.

  See "CREATE EVENT statement" [*SQL Anywhere Server - SQL Reference*].

- **Hide procedure text to keep your logic confidential** You can obscure the logic contained in stored procedures, functions, triggers and views using the SET HIDDEN option. This allows applications and databases to be distributed without revealing the logic in stored procedures, functions, triggers, and views.

To gain the benefits of this enhancement on databases created before this release, you must upgrade the database using the Upgrade utility.

See "Hiding the contents of procedures, functions, triggers and views" [*SQL Anywhere Server - SQL Usage*].

Administration and scalability enhancements

- **The Validation utility gives more detailed return codes** The Validation utility (dbvalid) gives more specific return codes to indicate the reason a failure occurs.

  See "Validation utility (dbvalid)" [*SQL Anywhere Server - Database Administration*].

- **Two new server properties** Two new server properties have been added. CommandLine gives you the line that was used to start the server, and CompactPlatformVer gives a condensed version of the PlatformVer server property.

  See "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **New sp_remote_primary_keys stored procedure** In order to obtain primary key information about remote tables using remote data access, a new stored procedure called sp_remote_primary_keys has been added.

  To gain the benefits of this enhancement on databases created before this release, you must upgrade the database using the Upgrade utility.

  See "sp_remote_primary_keys system procedure" [*SQL Anywhere Server - SQL Reference*].

- **New connection_property returns the name of the communication link for the connection** The new CommNetworkLink connection property returns the name of the communication link for the connection.

  See "Connection-level properties" [*SQL Anywhere Server - Database Administration*].

- **NetWare now supports full character set conversion** In 8.x, NetWare supported single-byte-to-single-byte character set conversion, but in 9.0, all character sets supported by the other platforms are also supported on NetWare.

- **Unload utility can unload column lists** The Unload utility (dbunload) can now unload the column list for the LOAD TABLE statements that it generates in the reload.sql file, facilitating easier reordering of the columns in a table

  See "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].

- **Database server registers with LDAP** The database server can now register itself with an LDAP server, so that clients and the Locate Utility (dblocate) can query the LDAP server to find it. This allows clients running over a WAN or through a firewall to find servers without specifying the IP address to find such servers. LDAP is only used with TCP/IP, and only on network servers.

  See "Connecting using an LDAP server" [*SQL Anywhere Server - Database Administration*] or "LDAP protocol option [LDAP]" [*SQL Anywhere Server - Database Administration*].

- **Improved handling of a large number of connections** The liveness timeout value now increases automatically when there are more than 200 connections in an effort to better handle a large number of connections.

  See "-tl server option" [*SQL Anywhere Server - Database Administration*] and "LivenessTimeout connection parameter [LTO]" [*SQL Anywhere Server - Database Administration*].

- **Request log filtering, host variable support** Output to the request log can now be filtered to include only requests from a specific connection or for a specific database. As well, host variable values can now be output to a request log.

  See "sa_server_option system procedure" [*SQL Anywhere Server - SQL Reference*], "Monitoring and Improving Performance" [*SQL Anywhere Server - SQL Usage*], "sa_get_request_times system procedure" [*SQL Anywhere Server - SQL Reference*], and "-zr server option" [*SQL Anywhere Server - Database Administration*].

- **BACKUP statement and dbbackup allow renaming of log copy** You can use the BACKUP statement and the Backup utility (dbbackup) to rename the log copy.

  See "Backup utility (dbbackup)" [*SQL Anywhere Server - Database Administration*] and the "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

- **START DATABASE statement allows log truncation on checkpoint and read-only mode** The START DATABASE statement now allows a database to be started either with log truncation on checkpoint enabled, or in read-only mode.

  See "START DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

- **Adaptive Server Anywhere supports different auditing options** In previous versions of Adaptive Server Anywhere, you could choose to turn auditing on or off. Now you can specify which options you want to audit.

  See "sa_disable_auditing_type system procedure" [*SQL Anywhere Server - SQL Reference*] or "sa_enable_auditing_type system procedure" [*SQL Anywhere Server - SQL Reference*].

- **Three new values can be passed to the event_parameter function** Three new values can be passed to the event_parameter function. ScheduleName returns the name of the schedule which fired the event. AppInfo returns the value of the connection_property('AppInfo') for the connection which caused the event. DisconnectReason returns a string indicating why the connection terminated.

  See "EVENT_PARAMETER function [System]" [*SQL Anywhere Server - SQL Reference*].

- **New server property specifies how many concurrent users are connected to the network server** The new LicensesInUse property determines the numbers of concurrent users currently connected to the network server. Each concurrent user is determined by the number of unique client network addresses connected to the server, not the number of connections. For example, if three client computers are connected to a server, and each client computer has two connections, select property ('LicensesInUse') is '3'.

  For more information, see "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **The Service Creation [dbsvc] utility can now start and stop services** Two new options have been added to the Service Creation [dbsvc] utility. **Dbsvc -u** *service_name* starts the service named service_name, and *dbsvc -x service_name* stops the service named service_name.

  See "Service utility (dbsvc) for Windows" [*SQL Anywhere Server - Database Administration*].

- **The network server supports the LocalOnly protocol option [LOCAL]** You can use the LocalOnly protocol option [LOCAL] with the server. Running a server with the LocalOnly protocol option set to YES allows the network server to run as a personal server without experiencing connection or CPU limits.

  See "LocalOnly protocol option [LOCAL]" [*SQL Anywhere Server - Database Administration*].

- **New minimum database server cache size when using Address Windowing Extensions** The minimum size of the database server cache when using Address Windowing Extensions (AWE) on Windows 2000, Windows XP, and Windows Server 2003 is now 2 MB. In previous releases, the minimum cache size when using AWE was 3 GB-256 MB.

  See "-cw server option" [*SQL Anywhere Server - Database Administration*].

- **New database property specifies drive type** The new DriveType database property provides information about the drive on which the database file is located.

  See "Understanding database properties" [*SQL Anywhere Server - Database Administration*].

- **Adaptive Server Anywhere NetWare now faster** The Adaptive Server Anywhere server for NetWare now uses LibC rather than CLIB. LibC is a C runtime library that allows better interaction with the new kernel of the NetWare operating system than the legacy CLIB library. All client-side software for NetWare (including dblib, dbisql, dbconsole, and dbremote) still uses CLIB. This has the benefit of increasing the maximum file size on NetWare to the same as NTFS, allowing multiple CPUs if available, and allowing TCP and SPX to use Winsock, which is faster than previous versions.

  See "Physical Limitations" [*SQL Anywhere Server - Database Administration*] and "Behavior changes in version 9.0" on page 198.

- **External function enhancements on NetWare** External functions or external stored procedures on NetWare can now use multiple NLMs without naming conflicts.

  For more information, see "External function prototypes" [*SQL Anywhere Server - SQL Usage*].

- **Connections can specify language of error messages** Each connection to the database server can now request the language in which the database server reports error messages and various other strings. The language used by the connection is independent of the language used by the server. The database server also uses the language requested by the connection to interpret date strings.

- **Two new server properties identify processor type** Two new server-level properties have been added. ProcessorArchitecture identifies the processor type, and on platforms where a processor can be emulated NativeProcessorArchitecture identifies the native processor type.

  See "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **Database password case sensitivity is independent of database case sensitivity** The CREATE DATABASE statement, Initialization [dbinit] utility, and Create Database wizard allow you to

specify whether passwords are to be case sensitive or case insensitive. The case sensitivity setting for passwords is independent of the database case sensitivity setting used for string comparisons. The new CaseSensitivePasswords database property allows you to check the password case sensitivity setting for a database.

See "CREATE DATABASE statement" [*SQL Anywhere Server - SQL Reference*] and "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*].

Performance enhancements (Query optimization)

The new features listed here are query optimization enhancements that require no user action to use. They take effect without user intervention. If you study query execution plans, you may see the effect of these optimizations.

The optimization enhancements do not require a database upgrade, but they do operate most effectively on a database created using version 9 software.

- **Cost-based subquery optimization** The optimizer has greatly extended the scope of optimizations that are available for subqueries. In previous releases, subqueries were either rewritten as joins during semantic query optimization or were optimized separately from the remainder of a query. Now subqueries that are too complex to be rewritten as joins can still be optimized as an integral part of the query.
- **Buffered row fetching improves performance of sequential scans** When reading rows from a database page for a sequential table scan, Adaptive Server Anywhere can now copy rows into a buffer before returning them to the consumer. Depending on the complexity of the query, this can provide significant time savings.
- **Top N queries executed more efficiently** A new algorithm for executing queries that use the TOP N clause permits faster execution.

  See "Sort Top N algorithm" [*SQL Anywhere Server - SQL Usage*].
- **New algorithm for determining which frequencies are kept in histograms** Previously, column histograms created singleton buckets for values with selectivity > 1%. Now, the condition for singleton buckets is relaxed, and instead the histogram tries to keep a minimum number of singleton buckets.

  See "Optimizer estimates and column statistics" [*SQL Anywhere Server - SQL Usage*].
- **Property QueryCachedPlans shows how many query plans are currently cached** The new property, QueryCachedPlans, shows how many query execution plans are currently cached for a given connection, or across all connections. It can be used in combination with QueryCachePages, QueryOptimized, QueryBypassed, and QueryReused to determine the best setting for the max_plans_cached option.

  See "Connection-level properties" [*SQL Anywhere Server - Database Administration*] and "Understanding database properties" [*SQL Anywhere Server - Database Administration*].
- **Plans are cached faster for procedure statements** The scope of statements for which access plans are cached has been extended to include queries within stored procedures whose result sets are returned by the procedure to the calling environment. This enhancement eliminates the need to re-optimize some statements.

See "Plan caching" [*SQL Anywhere Server - SQL Usage*].

- **Index statistics maintained as each index is updated** Statistics are maintained for all indexes, including those on catalog tables, as each index is updated, providing accurate statistics to the optimizer at virtually no performance cost. Statistics persist in SYSATTRIBUTE in the form of one row for each statistic for an index.

  To gain the benefits of this enhancement on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

  See "ISYSATTRIBUTE system table" [*SQL Anywhere Server - SQL Reference*].

Performance enhancements (Server operation)

- **New performance monitor statistics** Two new performance monitor statistics, Comm: Licenses in Use, and Connection Count, have been added to allow users to track the number of connections in use.

  See "Communications statistics" [*SQL Anywhere Server - SQL Usage*] and "Miscellaneous statistics" [*SQL Anywhere Server - SQL Usage*].

- **The option APPEND { ON | OFF } has been added to the UNLOAD and UNLOAD TABLE statements** A new APPEND option allows unloaded data to be appended to the end of the specified file.

  See "UNLOAD statement" [*SQL Anywhere Server - SQL Reference*] or "UNLOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **Temporary tables can now be declared as NOT TRANSACTIONAL** When NOT TRANSACTIONAL is used, the table is not affected by COMMIT or ROLLBACK. This extension is useful when procedures that access the table are called repeatedly without a COMMIT.

  See "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*] and "DECLARE LOCAL TEMPORARY TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **Persistent index statistics** Maintaining accurate statistics about the physical properties of candidate indexes facilitates the optimizer's cost based decisions about which indexes to use. Statistics now persist in SYSATTRIBUTE, and are maintained as each index is updated. Additionally, the VALIDATE statement verifies that the statistics on the specified index(es) are accurate and generates an error if they are not. This provides accurate statistics to the optimizer at virtually no performance cost.

  To gain the benefits of this enhancement on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

  See "ISYSATTRIBUTE system table" [*SQL Anywhere Server - SQL Reference*] and the "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*]

- **New optimistic_wait_for_commit option added** This option is meant to mimic 5.x locking behavior when transactions add foreign rows before primary rows. While it is not intended for general use, it can be helpful when migrating 5.x applications to version 8.x or later.

  See "wait_for_commit option [database]" [*SQL Anywhere Server - Database Administration*].

- **New extended property function added** The new DB_EXTENDED_PROPERTY function is similar to DB_PROPERTY except that it also allows an optional property-specific string parameter to be specified.

  See "DB_EXTENDED_PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*].

- **Two new properties added** Two new properties have been added: FileSize and FreePages. Each of these properties can take an optional argument which specifies the dbspace for which the property is being requested.

  See "Understanding database properties" [*SQL Anywhere Server - Database Administration*].

- **Server's quiet mode enhanced** The server's quiet mode and error logging options have been enhanced to allow the server to suppress a variety of messages. Additionally, the -qw option has replaced the -q option, and the -qi option has replaced the -Q option.

Development and administration tools

- **Adaptive Server Anywhere plug-in changes** The Adaptive Server Anywhere plug-in for Sybase Central has been reorganized. Much of the information that was previously available in property sheets, dialog boxes, and folders in the left pane is now available on tabs in the right pane. For example, to view information about a foreign key, you now select the table that has the foreign key in the left pane and then select the Foreign Keys tab in the right pane. In previous versions, there was a separate Foreign Keys folder in the left pane.

  Several other changes have been made to the plug-in, including the following:

  - The Table Editor is no longer a separate window. Now you edit tables directly in the right pane of Sybase Central.
  - You can edit stored procedures, functions, triggers, and events in the right pane of Sybase Central or in a separate Code Editor window if you want to have multiple windows open at one time.
  - The toolbar buttons now change to include options specific to the object selected.
  - The SQL Statements log and server messages (the same information that appears in the Server Messages window) can now be viewed directly in the Sybase Central main window. To view this information, in Sybase Central choose File ► Server Messages and Executed SQL. The Server Messages and Executed SQL pane appears at the bottom of the main Sybase Central window.
  - The Adaptive Server Anywhere plug-in provides several new wizards to guide you through tasks, including creating tables, unique constraints, and web services.

- **Enhanced clipboard support in the Adaptive Server Anywhere plug-in** Clipboard support has been enhanced in the Adaptive Server Anywhere plug-in so you can copy and paste most objects within Sybase Central into other applications, such as Interactive SQL or a text editor. When you copy objects into other applications, depending on the object you select, either the object name or the SQL for the object appears. For example, if you copy an index in Sybase Central and paste it into a text editor, the CREATE INDEX statement for that index appears.

  See "Copying database objects in the SQL Anywhere plug-in" [*SQL Anywhere Server - Database Administration*].

- **Debugger changes** The debugger that lets you debug both stored procedures and Java classes has been integrated into Sybase Central. The user interface has been redesigned.

  See "Debugging Procedures, Functions, Triggers, and Events" [*SQL Anywhere Server - SQL Usage*].

- **Sybase Central, Interactive SQL, and the Adaptive Server Anywhere Console utility include an option to automatically check for software updates** Sybase Central, Interactive SQL, and the Adaptive Server Anywhere Console utility can be configured to automatically check for software updates. This option can be set from the Options dialog in Interactive SQL and the Adaptive Server Anywhere Console utility, and can be set from the Help menu in Sybase Central when the Adaptive Server Anywhere plug-in is loaded. In previous releases, you had to go to a web site to obtain this information.

  See "Options dialog: Check for Updates tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Enhancements made to the Adaptive Server Anywhere Console utility** There have been a number of enhancements to the Adaptive Server Anywhere Console utility, including changes to the interface, support for multiple connections, sorting, and drag and drop.

- **Fast launching of Sybase Central and Interactive SQL** On Windows, Sybase Central and Interactive SQL include a fast launcher that is designed to reduce application startup time when you start Sybase Central or Interactive SQL. Running Adaptive Server Anywhere 9.0.0 starts two background processes, an instance of *dbisqlg.exe* and an instance of *scjview.exe*, which are the fast launcher processes for Interactive SQL and Sybase Central, respectively. Both of these executables are started when the user logs in.

  See "Using the fast launchers" [*SQL Anywhere Server - Database Administration*].

- **Syntax highlighting editor in Interactive SQL** You can configure the appearance of syntax typed in the SQL Statements pane of Interactive SQL using the Interactive SQL Options dialog.

  See "Options dialog: Editor tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Printing from Interactive SQL** You can print the contents of the SQL Statements pane and of the graphical plan in Interactive SQL.

  See "Interactive SQL main window description" [*SQL Anywhere Server - Database Administration*].

- **Graphical plan enhancements** The graphical query access plan display has been enhanced in several ways:

  - The number of rows that passes from one operator to another is indicated by varying line thickness.
  - Slow operations are highlighted by a red border.
  - The statistics display has been extended and reorganized.
  - You can now print the access plan.

- **Database utilities accept @filename parameters** All of the database administration utilities except Interactive SQL (dbisql), the Language Selection utility (dblang), and the Adaptive Server Anywhere Console utility (dbconsole) now accept parameters contained within a file using the @file syntax. The file name can occur at any point in the configuration line, and parameters contained in the

file are inserted at that point. Multiple files can be specified, and the file specifier can be used with command line switches. Note that the @file syntax is not recursive.

See "@data server option" [*SQL Anywhere Server - Database Administration*].

- **Row numbers can appear beside results in Interactive SQL** Interactive SQL has an option to display row numbers beside results. This option can be set on the Results tab of the Interactive SQL options dialog.

  See "Options dialog: Results tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Interactive SQL can be set as the default editor for .SQL files** On Windows platforms, you can create a file association for *.SQL* files so that when you double-click the file, Interactive SQL is used to open the file.

  See "Interactive SQL utility (dbisql)" [*SQL Anywhere Server - Database Administration*].

- **Interactive SQL Command History dialog enhancements** You can now copy and delete commands from the Command History dialog in Interactive SQL, as well as select multiple commands in the window. The command history now persists between Interactive SQL sessions.

  See "Printing SQL statements" [*SQL Anywhere Server - Database Administration*].

- **Warning messages now have W prefix** Prior to version 9.0, all warning and error messages had a prefix of I or E. Warning messages now have a prefix of W. This change affects dbmlsrv9, dbmlsync, dbremote, ssremote, dbltm, and ssqueue.

MobiLink new features

Following is a list of changes and additions to the software introduced in version 9.0.0.

- **Server-initiated synchronization** Server-initiated synchronization allows you to initiate MobiLink synchronization from the consolidated database. This means you can push data updates to remote databases. The MobiLink component (the Notifier) provides programmable options for determining what changes in the consolidated database will initiate synchronization and how remotes are chosen to receive update messages. The remote component (the Listener) determines how remotes respond.

  See "Introducing Server-Initiated Synchronization" [*MobiLink - Server-Initiated Synchronization*].

- **File-based downloads** Downloads can now be processed as a file that can be distributed in any way that files are distributed, such as email, ftp, disk, or multicast file distribution. For this release, this feature can be used only with Adaptive Server Anywhere remote databases.

  See "MobiLink File-Based Download" [*MobiLink - Server Administration*].

Enhancements to the MobiLink server

- **New connection scripts begin_publication and end_publication** Two new scripts have been added. One of their uses is implementing file-based downloads.

  See "begin_publication connection event" [*MobiLink - Server Administration*] and "end_publication connection event" [*MobiLink - Server Administration*].

- **New connection script authenticate_parameters** A new script has been added that allows custom authentication. The new script is invoked during authentication, before the begin_synchronization script.

  See "authenticate_parameters connection event" [*MobiLink - Server Administration*].

- **New option removes blank padding of strings** For columns of type VARCHAR or LONG VARCHAR, the dbmlsrv9 -b option removes trailing blanks from strings during synchronization.

  See "-b option" [*MobiLink - Server Administration*].

- **Option starts new log file with .old extension** The dbmlsrv9 -on option allows you to set a hard limit on the amount of disk space used by the MobiLink server log.

  See "-on option" [*MobiLink - Server Administration*].

- **Log progress offsets** The MobiLink server can now report progress offsets, last upload time, and last download time. To obtain this information, use the dbmlsrv9 options -vp or -v+.

  See "-v option" [*MobiLink - Server Administration*].

- **Handling errors and warnings in .NET and Java synchronization logic** You can now add logic to deal with errors and warnings at the MobiLink server.

  See "Handling MobiLink server errors in Java" [*MobiLink - Server Administration*] and "Handling MobiLink server errors with .NET" [*MobiLink - Server Administration*].

- **Additions to MobiLink system tables** Two new columns have been added to both the ml_user and ml_subscription tables. They are last_upload_time and last_download_time. The default is NOT NULL with a default time of January 1, 1900 00:00:00.

  In addition, a subscription_id column has been added to ml_subscription. The publication_name column now contains the publication name.

  See "ml_user" [*MobiLink - Server Administration*] and "ml_subscription" [*MobiLink - Server Administration*].

Enhancements for Adaptive Server Anywhere clients

- **Upload-only synchronization** You can now choose to perform an upload-only synchronization.

  See the dbmlsync "-uo option" [*MobiLink - Client Administration*].

- **Download-only synchronization** You can now choose to perform a download-only synchronization.

  See "-ds option" [*MobiLink - Client Administration*] and "DownloadOnly (ds) extended option" [*MobiLink - Client Administration*].

- **Window messages can initiate synchronization** You can now wake up dbmlsync and perform a synchronization by registering a window message as dbas_synchronize and sending it to the dbmlsync top level window.

- **Load dlls on startup (for Windows CE)** The new dbmlsync option -pd specifies DLLs that should be loaded on startup. This option should be used by everyone using dbmlsync on Windows CE.

See "-pd option" [*MobiLink - Client Administration*].

- **New way to upgrade or revise schema** The hook sp_hook_dbmlsync_schema_upgrade stored procedure has been added to replace the dbmlsync option -i and extended option SiteScriptName (sn).

  See "sp_hook_dbmlsync_schema_upgrade" [*MobiLink - Client Administration*].

- **MobiLink exit codes** To help you track and log the success and failure of your synchronizations, especially when you have multiple synchronizations in a dbmlsync session, there is a new client event hook procedure, sp_hook_dbmlsync_process_exit_code. In addition, a new value, exit code, is set in the #hook_dict table for the sp_hook_dbmlsync_abort hook.

  See "sp_hook_dbmlsync_process_exit_code" [*MobiLink - Client Administration*] and "sp_hook_dbmlsync_abort" [*MobiLink - Client Administration*].

- **Enhancements to scheduling** When scheduling is specified, you can reduce the amount of time spent scanning the log by using the new extended option HoverRescanThreshold (hrt) or the new hook sp_hook_dbmlsync_log_rescan.

  See "HoverRescanThreshold (hrt) extended option" [*MobiLink - Client Administration*] and "sp_hook_dbmlsync_log_rescan" [*MobiLink - Client Administration*].

  Languages other than English now support the use of abbreviated day names in schedules. Previously, schedules in non-English languages required full day names.

  Two new keywords have been added to scheduling syntax: **INFINITE** instructs dbmlsync to wait indefinitely to be signalled for the next synchronization, and **0** as a day of the month specifies the last day of the month.

  See "Schedule (sch) extended option" [*MobiLink - Client Administration*].

Enhancements for UltraLite clients

- **Additional troubleshooting assistance for HotSync conduit** You can configure the HotSync conduit to record troubleshooting information in the HotSync log.

Performance and monitoring enhancements

- **Better dbmlsync performance when there are no schema changes** Dbmlsync no longer loads schema information before every synchronization by default. This typically speeds up synchronization on slower handheld devices by 20 seconds.

  See "-sc option" [*MobiLink - Client Administration*].

- **Better dbmlsync performance on Windows CE** Dbmlsync no longer uses dbtool9.dll on Windows CE. This means that it uses less memory.

- **MobiLink Monitor command line options** The MobiLink Monitor can now be started from the command line with a variety of options.

  See "Starting the MobiLink Monitor" [*MobiLink - Server Administration*].

- **Enhancements to Redirector** A new parameter, LOG_LEVEL, has been added to allow you to control the verbosity level.

See "Configuring Redirector properties (for Redirectors that support server groups)" [*MobiLink - Server Administration*].

- **Improved liveness** When connecting over TCP/IP, dropped connections are detected more quickly. This frees up MobiLink worker threads more quickly when a connection is dropped, improving throughput.

Miscellaneous

- **Warning messages now have W prefix** Prior to version 9.0, all warning and error messages had a prefix of I or E. Warning messages now have a prefix of W. This change affects dbmlsrv9, dbmlsync, dbremote, ssremote, dbltm, and ssqueue.

SQL Remote new features

SQL Remote version 9.0.0 includes the following new features.

- **Warning messages now have W prefix** Prior to version 9.0, all warning and error messages had a prefix of I or E. Warning messages now have a prefix of W. This change affects dbmlsrv9, dbmlsync, dbremote, ssremote, dbltm, and ssqueue.

UltraLite new features

UltraLite development is possible using two kinds of programming interface:

- **UltraLite components** UltraLite components bring UltraLite database and synchronization features to users of rapid application development tools. They provide a familiar interface for each supported development tool. UltraLite components provide a simple table-based data access interface and also dynamic SQL for more complex queries.

  The UltraLite components were introduced in version 8.0.2.

- **Static development models** Embedded SQL, the static C++ API, and the static Java API are still available. These are now referred to in the documentation as static interfaces to distinguish them from the components.

In particular, note the following:

- **Native UltraLite for Java** is an UltraLite component, which uses a C/C++ UltraLite runtime. The UltraLite **static Java API** is a pure Java solution, available in previous releases, in which queries must be specified at compile time.
- **UltraLite for C++** is a component interface. The UltraLite **static C++ API** is a static interface, available in previous releases, in which queries must be specified at compile time.
- **Embedded SQL** is a static interface, in which queries must be specified at compile time.

Following is a list of changes and additions to the software introduced in version 9.0.

- **New components** In addition to the components for AppForge MobileVB, eMbedded Visual Basic, and Java, the following components have been introduced:
  - **UltraLite .NET** A component for development using the Visual Studio .NET environment. Applications built with this component can be deployed to devices that support the .NET Compact Framework (version 1.05.0000 or later).

    See "Introduction to UltraLite.NET" [*UltraLite - .NET Programming*].
  - **C++ component** A component for development using C++ compilers.

    See "Introduction to UltraLite for C/C++ Developers" [*UltraLite - C and C++ Programming*].
- **Pocket IE support** The eMbedded Visual Basic component has been upgraded to an ActiveX component. Support has been added for development using JScript, for applications that run from Pocket IE on Windows CE devices.
- **Dynamic SQL** In addition to the table-based data access interface provided in version 8.0.2, the UltraLite components can now use Dynamic SQL for more complex queries, including multi-table joins.
- **Connection parameters** Connection parameters for the UltraLite components (except C++) are now exposed as individual properties rather than as a single string. This design makes debugging connection issues easier and makes connection management more straightforward.

  See "UltraLite Connection String Parameters Reference" [*UltraLite - Database Management and Reference*].
- **Drag and drop MobileVB component** The MobileVB component can now be dragged on to a form. The properties of the component can be set in the design environment as well as in code.

  See "UltraLite for AppForge architecture" [*UltraLite - AppForge Programming*].
- **Multi-process access** The C++ component supports access from more than one process. To develop an application using this model, a separate UltraLite database engine and the application must be linked against a different UltraLite runtime library.

  See "Compiling and linking your application" [*UltraLite - C and C++ Programming*].
- **Concurrent synchronization** In previous releases, all access to data was prevented during synchronization. Full access to the data is now provided during the download phase of synchronization. Read-only access is provided during the upload phase.

  See "Concurrency in UltraLite" [*UltraLite - Database Management and Reference*].
- **Palm OS enhancements** On the Palm OS the structure of the UltraLite code has been reorganized to make better use of Palm database segments.
- **Extended error information** More error information is available to applications built using the UltraLite components.
- **Unicode library available on Windows NT/2000/XP** A Unicode version of the UltraLite runtime library is provided for embedded SQL and static C++ API applications. This version is used by the UltraLite components. When using this library, UltraLite database files are compatible between Windows CE and desktop operating systems.

- **Windows XP supported as a deployment platform** UltraLite application deployment is now supported on Windows XP.

Behavior changes in version 9.0

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 9.0.

Adaptive Server Anywhere behavior changes

The following is a list of behavior changes from previous versions of the software.

- **Java objects in the database not supported** Support has been removed for storing data as Java objects. Support is maintained for Java stored procedures.

  See "Java in the Database" [*SQL Anywhere Server - Programming*].

- **New Greek collation for Windows environment** Greek collations for OEM/DOS character sets existed in previous versions, however, a new Greek collation, 1253ELL, has been added for Windows. When creating a new database in a Greek Windows environment, 1253ELL will be selected automatically if a collation is not specified.

  See "Supported and alternate collations" [*SQL Anywhere Server - Database Administration*].

- **New connection limit** The database server now allows one extra DBA connection above the connection limit, to allow a DBA to connect and drop other connections in case of an intentional or accidental denial-of-service.

  See "-gm server option" [*SQL Anywhere Server - Database Administration*].

- **Personal database server limited to a single processor** In previous versions of the software, the personal database server used a maximum of two CPUs for request processing. Now, the personal server is limited to a single processor.

- **References to table expressions preceding in the FROM clause may now be used in ON clauses of nested outer joins.** In previous releases, outer references in the ON phrase were permitted. Such outer references must now be indicated by use of the LATERAL keyword. The restriction enforces clarity and conforms to the SQL/99 standard.

  The following query is an example of one that is no longer valid, as it contains an outer reference (highlighted) without use of the LATERAL keyword:

  ```
  SELECT *
  FROM T1,
     T2 LEFT OUTER JOIN
                          ( T3 LEFT OUTER JOIN T4 ON T1.col1 = T2.col2 )
     ON T1.col2 = T2.col2
  ```

  See "FROM clause" [*SQL Anywhere Server - SQL Reference*].

- **Unqualified table references with multiple matches are reported as syntax errors** In previous releases, if a query contained a reference to a table without an owner name specified (an unqualified table reference) and if more than one match was possible on that table, the first match found was used. Unqualified table references now cause an error.

  See "Table name '%1' is ambiguous" [*SQL Anywhere 10 - Error Messages*].

- **LIKE operator with NULL escape character now evaluates to NULL** LIKE predicates containing a NULL escape character now evaluate to NULL. Previously, a LIKE predicate with a NULL escape character was evaluated as if there were no escape character. The new behavior matches the ISO/ANSI specification.
- **Properties and statistics removed** The ServerIdleWaits database property, and the TaskSwitch and CurrTaskSwitch connection properties have been removed, along with their corresponding performance monitor statistics: Context Switches, Server Idle Waits/sec, Request Queue Waits/sec.
- **Column statistics are updated on INSERT/UPDATE/DELETE** Statistics are now updated when executing an INSERT, UPDATE, or DELETE statement results in changing a significant amount of data.
- **Statistics no longer updated during recovery** The server no longer updates statistics during recovery or when executing simple DELETE and UPDATE statements. Simple statements are those that are not optimized and executed directly by the server.
- **Histogram ranges displayed as the correct data type** The sa_get_histogram() system procedure and the histogram [dbhist] utility previously displayed outputted ranges in hash values. Now, outputted histogram ranges match the data in the corresponding column, and are displayed as the correct data type.

  See "Histogram utility (dbhist)" [*SQL Anywhere Server - Database Administration*] and "sa_get_histogram system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Only one consolidated user permitted per remote database** It is no longer possible to define multiple consolidated users on the same remote database.

  See "GRANT CONSOLIDATE statement [SQL Remote]" [*SQL Anywhere Server - SQL Reference*] or "REVOKE CONSOLIDATE statement [SQL Remote]" [*SQL Anywhere Server - SQL Reference*].
- **CommLinks connection parameter uses shared memory if not explicitly specified** Now, connections that do not specify a CommLinks connection parameter always attempt to connect over shared memory.

  See "CommLinks connection parameter [LINKS]" [*SQL Anywhere Server - Database Administration*].
- **CommLinks connection parameter always attempts shared memory protocol first** When you specify CommLinks=all, Adaptive Server Anywhere always attempts to connect using the shared memory protocol before attempting to connect using other protocols.

  See "CommLinks connection parameter [LINKS]" [*SQL Anywhere Server - Database Administration*].
- **Connection errors abort process** Previously, connection protocols listed in the CommLinks connection parameter were attempted one by one until a connection occurred. Now, if a connection error occurs during the process, it aborts the connection process immediately, regardless of whether or not all the listed protocols were tried.

  See "CommLinks connection parameter [LINKS]" [*SQL Anywhere Server - Database Administration*].
- **Default value for prevent_article_pkey_update changed** The default value for the prevent_article_pkey_update database option has been changed to On to reflect the fact that updating primary key values should be avoided. The new default setting disallows primary key updates on primary keys that are part of a publication. You can override this feature by setting the value to OFF.

See "prevent_article_pkey_update option [database] [MobiLink client]" [*SQL Anywhere Server - Database Administration*].

- **Some functions treated as non-deterministic** The RAND, NEWID, and GET_IDENTITY functions are treated as non-deterministic. A consequence is that these functions are not cached during query execution.

  For more information, see "Function caching" [*SQL Anywhere Server - SQL Usage*].

- **Performance messages now display database name** The engine performance advice messages now display the database name. This is especially helpful when running more than one database. As well, messages starting with the word *Note* indicate that they are advice messages.

- **NetWare clients using Adaptive Server Anywhere versions prior to 9.0.0 require upgrade** As a result of enhancements to NetWare support in Adaptive Server Anywhere, NetWare clients using Adaptive Server Anywhere versions prior to 9.0.0 cannot connect to 9.0.0 servers using shared memory unless they have a specific EBF installed. The build numbers are: 7.0.4.3400, 8.0.0.2358, 8.0.1.3088, and 8.0.2.4095. Clients with build numbers before these will simply not find the 9.x server.

- **Change in syntax for ALTER DATABASE CALIBRATE** The syntax for ALTER DATABASE CALIBRATE TEMPORARY DBSPACE has been changed to ALTER DATABASE CALIBRATE DBSPACE TEMPORARY to make the syntax consistent with other, similar statements.

  See "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

- **Dynamic cache sizing more aggressive** Dynamic cache sizing is now more aggressive at resizing the cache after a new database is started or when a file grows significantly. Prior to this change, statistics were sampled and the cache was resized at most once per minute. Now, after a database is started or a file grows significantly, statistics are sampled and the cache may be resized every five seconds for thirty seconds.

  See "Use the cache to improve performance" [*SQL Anywhere Server - SQL Usage*].

- **Determining the language for interfaces and messages** Two new environment variables, ASLANG and ASCHARSET, control languages used in interfaces (such as Sybase Central or Interactive SQL) and messages. ASLANG specifies the language, and ASCHARSET specifies the character set.

  See "SALANG environment variable" [*SQL Anywhere Server - Database Administration*] or "SACHARSET environment variable" [*SQL Anywhere Server - Database Administration*].

- **Rowcount setting now limits the rows returned** The rowcount setting now limits the rows returned by a cursor from the top. It is no longer possible to position to the beginning of the results using an absolute fetch.

  You can use the new feature, TOP N / START AT to emulate this behavior if it is needed.

  See "Sort Top N algorithm" [*SQL Anywhere Server - SQL Usage*].

Deprecated and unsupported features

Adaptive Server Anywhere -d server option no longer supported As a result of enhancements to NetWare support in Adaptive Server Anywhere, the -d server option is no longer supported.

NetWare 4.x no longer supported As a result of enhancements to NetWare support in Adaptive Server Anywhere, Adaptive Server Anywhere will only run on NetWare version 5.1 SP6 or higher, or version 6.0 SP3 or higher. The correct service packs must be installed or the Adaptive Server Anywhere server will display an error message.

SQLLOCALE environment variable no longer supported SQLLOCALE environment variable has been replaced by two new environment variables, ASLANG and ASCHARSET.

See "Behavior changes in version 9.0" on page 198.

MobiLink behavior changes

The following is a list of behavior changes from previous versions of the software.

- **dbmlsync option -i and extended option SiteScriptName are no longer supported** dbmlsync -i and dbmlsync -e sc are no longer supported. They are replaced with a new hook called sp_hook_dbmlsync_schema_upgrade.

  See "sp_hook_dbmlsync_schema_upgrade" [*MobiLink - Client Administration*].

- **Download acknowledgement is now OFF by default** For Adaptive Server Anywhere remotes, the SendDownloadAck extended option now defaults to OFF. For UltraLite remotes, the send_download_ack field of the ul_synch_info struct now defaults to ul_false.

  When you upgrade to version 9, you must explicitly set this option On if the application depends on knowing that the remote has applied a download before the commit of the download transaction. See:

  - "SendDownloadACK (sa) extended option" [*MobiLink - Client Administration*]
  - "Send Download Acknowledgment synchronization parameter" [*MobiLink - Client Administration*]

- **Some dbmlsync hooks may not work by default on Windows CE devices** The dbmlsync extended option LockTables has been modified to allow you to specify whether tables are locked in shared mode or exclusive mode. The default setting for LockTables, ON, continues to lock tables in shared mode for all platforms other than Windows CE. However, on Windows CE devices, ON now means that tables are locked in exclusive mode. This change provides significant performance enhancements for Windows CE applications.

  The dbmlsync event hooks sp_hook_dbmlsync_download_com_error, sp_hook_dbmlsync_download_fatal_sql_error, and sp_hook_dbmlsync_download_log_ri_violation are all executed on separate connections. They will not be able to execute correctly if they attempt to access any synchronization tables that are locked in exclusive mode. If your deployment uses any of these hooks on Windows CE, you may need to set LockTables to SHARE. See:

  - "LockTables (lt) extended option" [*MobiLink - Client Administration*]
  - "sp_hook_dbmlsync_download_com_error (deprecated)" [*MobiLink - Client Administration*]
  - "sp_hook_dbmlsync_download_fatal_sql_error (deprecated)" [*MobiLink - Client Administration*]
  - "sp_hook_dbmlsync_download_log_ri_violation" [*MobiLink - Client Administration*]

- **MobiLink server error codes** The MobiLink server now provides more information about errors. All MobiLink server error codes are less than -10000, starting at -10001. For dbmlsync, the error appears in the GUI and the output file. For UltraLite, the error is available as a string in the ul_synch_info struct.

  See "MobiLink Server Error Messages" [*SQL Anywhere 10 - Error Messages*].

- **Upload cursors deprecated** The following scripts are deprecated: upload_cursor, new_row_cursor, and old_row_cursor. You should use statement-based scripts for the upload stream.

  See "Writing scripts to upload rows" [*MobiLink - Server Administration*].

- **-zac and -zec deprecated** The MobiLink server options for generating cursor-based scripts, -zac and -zec, have been deprecated.

- **-zd removed** The MobiLink server option -zd, which caused the last_download timestamp to be passed last, has been removed. This parameter is now always passed first.

- **mlxtract deprecated** The mlxtract utility is deprecated.

  See "Creating a remote database" [*MobiLink - Client Administration*].

- **end_synchronization scripts always called** Prior to version 9.0, the end_synchronization script might not be called if synchronization failed. Now, the script is always called if a begin_synchronization script is called. This means that any cleanup activities you have placed in the end_synchronization script will be performed regardless of whether the synchronization was successful.

  In addition, end_synchronization scripts have a new parameter, sync_ok, that indicates whether the synchronization was successful (1), or failed (0).

  See "end_synchronization connection event" [*MobiLink - Server Administration*] and "end_synchronization table event" [*MobiLink - Server Administration*].

- **Stream dlls and shared objects renamed** The names of stream dlls and shared objects have been changed to improve consistency with Adaptive Server Anywhere. The following table details the changes:

Old name	New name
dbhttp9	dbmlhttp9
dbhttps9	dbmlhttps9
dbjrsa9	dbmljrsa9
dbjtls9	dbmljtls9
dbrsa9	dbmlrsa9
dbsock9	dbmlsock9
dbtls9	dbmltls9

  See "Deploying MobiLink Applications" [*MobiLink - Server Administration*].

- **ScoutSync no longer supported** ScoutSync is no longer supported.

- **Schema information no longer reloaded at each synchronization** Prior to version 9.0, dbmlsync reloaded schema information from the database before each synchronization. It now reloads schema information only at dbmlsync startup. You can revert to the old behavior using the dbmlsync -sc option. If you do not use -sc, dbmlsync should be shut down before any schema changes are made to remote databases. Making schema changes without shutting down dbmlsync could lead to synchronization errors or other unexpected behavior.

  See "-sc option" [*MobiLink - Client Administration*].

- **Synchronization now aborts if key scripts are missing** Prior to version 9.0, synchronization would continue even if certain scripts were missing that might result in the loss of data. MobiLink now aborts in this instance. You can use the dbmlsrv9 -fr option to cause an error to be generated instead of failure.

  See "-fr option" [*MobiLink - Server Administration*].

- **keep_alive synchronization parameter is removed** The keep_alive synchronization parameter for TCP/IP and HTTP protocols is no longer valid; in effect it is now always set to ON. This was previously the default setting. To control liveness for TCP/IP connections, you can use the liveness_timeout parameter.

  See the liveness_timeout parameter in "CommunicationAddress (adr) extended option" [*MobiLink - Client Administration*] or "-x option" [*MobiLink - Server Administration*].

UltraLite behavior changes

The following is a list of behavior changes from previous versions of the software.

- **Supported platform changes** The following changes have been made to the supported UltraLite deployment platforms.
  - **ScoutSync no longer supported** Support has been dropped for ScoutSync synchronization software.
  - **VxWorks no longer supported** The VxWorks operating system is no longer supported.
  - **JDK 1.1.8 required for pure Java UltraLite** The pure Java static development model requires JDK 1.1.8 or later, rather than JDK 1.1.4 or later.
  - **Palm OS changes** Changes to the UltraLite architecture for Palm OS provides better performance on newer devices. A consequence is that UltraLite requires more dynamic memory than in previous releases. For anything other than very small databases, it is recommended that Palm OS version 3.5 or later be used, with 4 MB or more of memory.
  - **MobileBuilder and PRC Tools no longer supported** UltraLite development is no longer supported on the PenRight! MobileBuilder platform. Development using the GNU PRC Tool chain is also no longer supported.
- **Development platform changes** Application development for UltraLite components is now supported on Windows NT/2000/XP only. Development using the static interfaces is also supported on

Windows 98 SE. Other members of the Windows 95/98/Me family are not supported for development purposes.

The supported Metrowerks CodeWarrior versions are now 8 and 9.

- **Documentation terminology change** The introduction of the UltraLite components requires new names in order to distinguish the different interfaces. The older UltraLite interfaces (embedded SQL, the C++ API, and the Java API) are now named **static interfaces**, as the queries they use must be specified at compile time. The components provide access to **dynamic SQL**.
- **UltraLite runtime library on Windows NT/2000/XP** The ActiveX and MobileVB components now use a Unicode runtime library on Windows. This runtime library is compatible with version 8.0.2 UltraLite database (*.udb*) files for Windows, but not with version 8.0.2 UltraLite database files built on other Windows operating systems.
- **file_name parameter** In previous versions of the software, the file_name parameter used to specify the UltraLite database file name on the desktop would also be used to specify the file name on a device if no platform-specific parameter was supplied. The file_name parameter is now ignored except for on desktop operating systems.
- **Static Java API changes** The static Java API has changed. The following methods that were on the JdbcDatabase object have been moved to the JdbcConnection object:
  - countUploadRows
  - getLastDownloadTimeDate
  - getLastDownloadTimeLong

  The grant and revoke methods have been added to JdbcConnection for use by applications that do not have an explicit JdbcManager object.
- **Error code changes** Some UltraLite error codes have changed to more specific and useful values. If you test for individual error codes in your application, check the new codes after upgrade.

  For example, if you check for SQLE_DATABASE_NOT_FOUND (or the equivalent in one of the UltraLite interfaces) when connecting to a database, you should change this to SQLE_ULTRALITE_DATABASE_NOT_FOUND.

  For a list of error codes, see the SQL error object in the interface you are using.
- **UL_STORE_PARMS change for embedded SQL** The UL_STORE_PARMS macro is now evaluated during the EXEC SQL CONNECT statement. The database is no longer started during the dbinit call, but rather on connect. This means that UL_STORE_PARMS could be evaluated a different number of times if you use multiple connections. It also means that UL_STORE_PARMS must be defined before any EXEC SQL CONNECT statements.

CHAPTER 6

What's New in Version 8.0.2

Contents

New features in version 8.0.2

This section lists the new features introduced in components of SQL Anywhere Studio version 8.0.2.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 8.0.2. It provides an exhaustive listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

Highlighted new features

- **Clustered index support** Creating a clustered index on a table causes the rows in that table to be stored in approximately the same order as they appear in the index. You can use the LOAD TABLE statement to load a table with information in the clustered order. As you insert information into the table, the clustering characteristics of the table degrade. You can use the REORGANIZE TABLE statement to reestablish the clustering order. Clustered indexes can improve performance.

  To use clustered indexes on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

  For more information, see "Using clustered indexes" [*SQL Anywhere Server - SQL Usage*].

- **Unique identifier support** Adaptive Server Anywhere supports unique identifiers (UUIDs and GUIDs). UUIDs (universally unique identifiers) and GUIDs (globally unique identifiers) are a mechanism for uniquely identifying rows, even across distinct databases in a synchronization environment.

  For more information, see "The NEWID default" [*SQL Anywhere Server - SQL Usage*].

- **Update existing rows with ON EXISTING clause** You can use the ON EXISTING clause of the INSERT statement to update existing rows with new values, as long as the table has a primary key.

  For more information, see "Changing data using INSERT" [*SQL Anywhere Server - SQL Usage*], or the "INSERT statement" [*SQL Anywhere Server - SQL Reference*].

- **BACKUP statement supported on Windows CE** Adaptive Server Anywhere allows you to create image backups of databases operating on the Windows CE platform, or to rename or truncate the database's transaction log.

  For more information, see "Types of backup" [*SQL Anywhere Server - Database Administration*], or the "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

- **Graphical plan enhancements** The graphical plan has been enhanced to include more information, resulting in a new look.

  For more information, see "Graphical plans" [*SQL Anywhere Server - SQL Usage*].

- **Use of work tables is now explicit** The use of work tables is now postponed until as late as possible in the plan. When work tables are used, they now appear explicitly in the graphical plan.

  For more information, see "Graphical plans" [*SQL Anywhere Server - SQL Usage*] or "Use work tables in query processing (use All-rows optimization goal)" [*SQL Anywhere Server - SQL Usage*].

- **New joins added** New joins added to this release include the nested loops semijoin, the nested loops antisemijoin, the hash semijoin and the hash antisemijoin.

  For more information, see "Join algorithms" [*SQL Anywhere Server - SQL Usage*].

Function enhancements

- **Obtain plan for SQL queries of a specific cursor-type** You can now obtain plans for SQL queries based on their cursor type, using the PLAN, EXPLANATION, GRAPHICAL_PLAN functions.

  For more information, see "GRAPHICAL_PLAN function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*], "EXPLANATION function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*], or "PLAN function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

  For information about setting these plan options in Interactive SQL, see "Options dialog: Plan tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Character set conversion function** A new function CSCONVERT is available to convert strings between character sets.

  For more information, see "CSCONVERT function [String]" [*SQL Anywhere Server - SQL Reference*].

- **Variable test function** A new function VAREXISTS is available to test whether a user-defined variable has been created or declared with a given name. After this test, the variable can be created if necessary, and then used safely.

  For more information, see "VAREXISTS function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

Statement enhancements

- **Hide procedure text to keep your logic confidential** You can obscure the logic contained in stored procedures, functions, triggers and views using the SET HIDDEN option. This is allows applications and databases to be distributed without revealing the logic in stored procedures, functions, triggers, and views.

  For more information, see "Hiding the contents of procedures, functions, triggers and views" [*SQL Anywhere Server - SQL Usage*].

- **LOAD TABLE now accepts delimiters of more than 1 byte** The LOAD TABLE statement now supports delimiters that are up to 255 bytes.

  For more information, see "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **New statement provides compatibility for Adaptive Server Enterprise and Microsoft SQL Server** You can use the DEALLOCATE statement to release resources associated with a cursor. This statement is provided for Adaptive Server Enterprise and Microsoft SQL Server compatibility.

  For more information, see "DEALLOCATE statement" [*SQL Anywhere Server - SQL Reference*].

- **ALTER DATABASE statement behaves like dblog utility** You can use the ALTER DATABASE statement to change the transaction log and mirror log names associated with a database file. Previously, you could only do this using the Transaction Log (dblog) utility.

  For more information, see "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

- **LOAD TABLE can be used for both global and local temporary tables** Adaptive Server Anywhere now supports the LOAD TABLE statement on declared local temporary tables. Previously, only global temporary tables were supported.

  For more information, see "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **SET statement can be used to assign variable values** You can now assign values to variables using the SET statement in Transact-SQL procedures.

- **INSERT statement now supports WITH AUTO NAME** If you specify WITH AUTO NAME in an INSERT statement, the names of the items in the SELECT list determine the associations of values to destination columns.

  For more information, see "INSERT statement" [*SQL Anywhere Server - SQL Reference*].

- **EXIT statement enhanced** The Interactive SQL EXIT statement can now set an exit code for Interactive SQL.

  For more information, see "EXIT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].

- **Specify the optimization goal for a query in the FROM clause** You can use the FASTFIRSTROW table hint to set the optimization goal for the query without setting the optimization_goal option to first-row.

  For more information, see "FROM clause" [*SQL Anywhere Server - SQL Reference*].

Security Enhancements

- **New utility allows you to hide the contents of files** Configuration files, also known as command files, sometimes contain passwords. As an enhanced security feature, Adaptive Server Anywhere has a new utility, called the File Hiding utility, that allows you to hide the contents of configuration files using simple encryption.

  For more information, see "File Hiding utility (dbfhide)" [*SQL Anywhere Server - Database Administration*]

- **Certicom encryption changes** Security has been enhanced to support two types of Certicom encryption, ECC_TLS and RSA_TLS. The encryption known in previous versions of Adaptive Server

Anywhere as Certicom encryption has been renamed to ECC_TLS encryption. The Certicom parameter is still accepted and is equivalent to ECC_TLS encryption. Adaptive Server Anywhere now also supports RSA_TLS encryption.

For more information, see "-ec server option" [*SQL Anywhere Server - Database Administration*] or "Encryption connection parameter [ENC]" [*SQL Anywhere Server - Database Administration*].

Performance Enhancements

- **New connection parameters can improve network responsiveness** The LazyClose and PrefetchOnOpen network connection parameters can improve performance on networks with poor latency or with applications that process many requests.

  For information about these parameters, see "LazyClose connection parameter [LCLOSE]" [*SQL Anywhere Server - Database Administration*] and the "PrefetchOnOpen connection parameter" [*SQL Anywhere Server - Database Administration*]

- **Scattered reads now used on Windows NT/2000/XP** Previously, sequential scans of large tables copied pages to a 64 KB buffer and then into the cache. Now, providing you are running in a Windows NT Service Patch 2 or higher environment, or in a Windows 2000/XP environment, and provided your page size is at least 4 KB, scattered reads copy the pages directly to the cache, thus saving time and improving performance.

  For more information, see "Use an appropriate page size" [*SQL Anywhere Server - SQL Usage*].

- **Improved time resolution in request logging** The times obtained using procedure profiling or request logging now have a resolution of 1 millisecond. This change primarily affects servers running on Windows operating systems.

- **Running multiple versions of the Performance Monitor** If you run multiple versions of Adaptive Server Anywhere simultaneously, you can also run multiple versions of the Windows Performance Monitor simultaneously.

  For more information about the Windows Performance Monitor, see "Monitoring statistics using Windows Performance Monitor" [*SQL Anywhere Server - SQL Usage*].

Miscellaneous Enhancements

- **Changing server's temp folder via a registry setting** On Windows CE platforms, you can use the registry to specify which temporary directory the server uses.

  For more information, see "Registry settings on Windows CE" [*SQL Anywhere Server - Database Administration*].

- **New iAnywhere JDBC driver** This robust and high-performance JDBC driver enjoys the benefits of ODBC data sources and the Command Sequence client/server protocol. It is an alternative to the jConnect JDBC driver.

  For information on the iAnywhere JDBC driver, see "Using the iAnywhere JDBC driver" [*SQL Anywhere Server - Programming*].

For information on choosing a JDBC driver, see "Choosing a JDBC driver" [*SQL Anywhere Server - Programming*].

- **Triggers can discriminate among the actions that caused a trigger to fire** You can now carry out different actions depending on whether the trigger was fired by an UPDATE, INSERT, or DELETE operation. This feature enables you to share logic among the different events within a single trigger, and yet carry out some actions in an action-dependent manner.

  For more information, see "Trigger operation conditions" [*SQL Anywhere Server - SQL Reference*].

- **return_date_time_as_string is no longer TDS specific** All connections can now use the return_date_time_as_string option.

  For more information about this option, see "return_date_time_as_string option [database]" [*SQL Anywhere Server - Database Administration*].

- **Units can be specified when adding space to a dbspace** You can extend database files by a specific size, in units of pages, kilobytes, megabytes, gigabytes, or terabytes.

  For more information, see "ALTER DBSPACE statement" [*SQL Anywhere Server - SQL Reference*]

- **sa_make_object system procedure** This system procedure can be used in a SQL script to ensure that a skeletal instance of an object exists before executing an ALTER statement which provides the actual definition.

  For more information, see "sa_make_object system procedure" [*SQL Anywhere Server - SQL Reference*].

- **New global variable compatible with Microsoft SQL Server** A new global variable has been introduced to allow for Microsoft SQL Server compatibility. The @@fetch_status global variable is the same as the @@sqlstatus global variable, except that it returns the status of the most recent fetch in different values.

  For more information, see "Global variables" [*SQL Anywhere Server - SQL Reference*].

- **Character set conversion supported on NetWare** NetWare now supports character set conversion.

- **Information utility reports the version of installed Java classes** The dbinfo utility and a_db_info structure now report the version of the Java classes installed in a database.

  For more information, see "Information utility (dbinfo)" [*SQL Anywhere Server - Database Administration*] and "a_db_info structure" [*SQL Anywhere Server - Programming*].

- **Suppress warnings on fetch operations** Versions 8.0 and later of the database server return a wider range of fetch warnings than earlier versions of the software. The ODBC Configuration for Adaptive Server Anywhere dialog allows you to suppress warning messages returned from the database server to ensure that they are handled properly for applications that are deployed with earlier versions of the software.

For more information, see "ODBC Configuration dialog: ODBC tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Controlling updates to primary key columns** Setting the new prevent_article_pkey_update option to On disallows updates to the primary key columns of tables that are part of a publication. This option helps ensure data integrity, especially in a replication and synchronization environment.

  For more information, see "prevent_article_pkey_update option [database] [MobiLink client]" [*SQL Anywhere Server - Database Administration*].

MobiLink new features

Following is a list of changes and additions to the software introduced in version 8.0.2.

- **Support for .NET** MobiLink now supports Visual Studio .NET programming languages for writing synchronization scripts.

  For more information, see "Writing Synchronization Scripts in .NET" [*MobiLink - Server Administration*], "-sl dnet option" [*MobiLink - Server Administration*], "ml_add_dnet_connection_script" [*MobiLink - Server Administration*], and "ml_add_dnet_table_script" [*MobiLink - Server Administration*].

- **Start classes** You can now write Java and .NET code that executes at the time the MobiLink server starts the Java virtual machine or CLR, before the first synchronization.

  For more information, see "User-defined start classes" [*MobiLink - Server Administration*].

- **Maintain unique primary keys using UUIDs** A new way to maintain unique primary keys on remote databases is introduced with Universally Unique IDs (UUIDs, also known as GUIDs).

  For more information, see "Using UUIDs" [*MobiLink - Server Administration*].

- **New way to handle referential integrity violations** Two new client event hooks, sp_hook_dbmlsync_download_ri_conflict and sp_hook_dbmlsync_download_log_ri_contlict, are introduced to help you manage referential integrity violations during download.

  For more information, see "sp_hook_dbmlsync_download_ri_violation" [*MobiLink - Client Administration*] and "sp_hook_dbmlsync_download_log_ri_violation" [*MobiLink - Client Administration*].

- **Simpler way to delete all rows in a remote table** You can now delete all the data in a remote table by including one row in the download_delete_cursor that has NULL in every primary-key column.

  For more information, see "Writing download_delete_cursor scripts" [*MobiLink - Server Administration*].

Performance and monitoring enhancements

- **MobiLink Monitor** A graphical tool, the MobiLink Monitor, has been introduced to allow you to see the time taken by every aspect of the synchronization, sorted by MobiLink user or by worker thread.

For more information, see "MobiLink Monitor" [*MobiLink - Server Administration*].

- **Users can estimate number of upload rows to dbmlsync** A new dbmlsync command line option has been created, -urc, which allows you to improve synchronization performance by providing an estimate of the number of rows that will be uploaded.

  For more information, see "-urc option" [*MobiLink - Client Administration*].

- **Users can specify persistent HTTP/HTTPS connections** You can use the **persistent** option to tell MobiLink to attempt to use the same connection for all HTTP requests in a synchronization. This setting may improve performance. It should only be used when you are connecting directly to MobiLink, and not through an intermediate agent such as a proxy or redirector.

  For more information, see "CREATE SYNCHRONIZATION USER statement [MobiLink]" [*SQL Anywhere Server - SQL Reference*].

- **New ways to control warning messages** Three new dbmlsrv9 command line options have been created: -zw, -zwd, and -zwe. With -zw, you can control which levels of warning message you want reported. With -zwd, you can disable specific warning codes. With -zwe, you can enable specific that are disabled with -zw.

  For more information, see "-zw option" [*MobiLink - Server Administration*], "-zwd option" [*MobiLink - Server Administration*] and "-zwe option" [*MobiLink - Server Administration*].

- **New verbose logging options** The dbmlsync -v command line option has been altered and expanded. Now, using -v alone causes minimum verbosity. To get maximum verbosity, use -v+. There are also several new levels that can be specified to fine tune the information that is logged. These options are also available as extended options.

  For more information, see "-v option" [*MobiLink - Client Administration*].

Connection enhancements

- **Ping support** The remote database can now ping the MobiLink server.

  For more information, see "-pi option" [*MobiLink - Client Administration*] and "Ping synchronization parameter" [*MobiLink - Client Administration*].

- **New synchronization stream** MobiLink now supports the HTTPS protocol. This new stream implements HTTP over SSL/TLS using RSA encryption, and is compatible with any other HTTPS server.

  For more information, see "-x option" [*MobiLink - Server Administration*] and "CREATE SYNCHRONIZATION USER statement [MobiLink]" [*SQL Anywhere Server - SQL Reference*].

- **New buffer_size option** You can now specify a maximum buffer size for a fixed length HTTP message with the **buffer_size** option.

  For more information, see "CREATE SYNCHRONIZATION USER statement [MobiLink]" [*SQL Anywhere Server - SQL Reference*].

- **Auto-dial for MobiLink clients** MobiLink clients running on Pocket PC 2002 or Windows desktop computers can now connect through dial-up network connections. Using scheduling, your remote can

synchronize unattended. The new synchronization stream parameters are **network_name**, **network_connect_timeout**, and **network_leave_open**.

For more information, see "CREATE SYNCHRONIZATION USER statement [MobiLink]" [*SQL Anywhere Server - SQL Reference*].

New Web server support

- **Servlet Redirector** MobiLink now supports Web servers that support the Java servlet API 2.2, including Apache Tomcat.

  For more information, see "Synchronizing Through a Web Server with the Redirector" [*MobiLink - Server Administration*].

Security enhancements

- **RSA cipher suite supported** You can now use RSA encryption as well as the existing elliptical-curve encryption for synchronization security. The utilities gencert and readcert support the RSA certificates as well as elliptical-curve certificates.

  For more information, see "Encrypting MobiLink client/server communications" [*SQL Anywhere Server - Database Administration*].

- **gencert can sign pregenerated certificate requests** The certificate generation utility gencert has a new command line option that allows you to sign pregenerated certificate requests.

  For more information, see "Certificate generation utility [gencert] (deprecated)" [*SQL Anywhere Server - Database Administration*].

SQL Remote new features

SQL Remote version 8.0.2 includes the following new features.

- **Error logs sent to consolidated database** For improved troubleshooting of errors at remote sites, log information can be collected at the consolidated database.

  For more information, see "Troubleshooting errors at remote sites" [*SQL Remote*].

UltraLite new features

UltraLite 8.0.2 introduces several new features:

- **UltraLite Components** UltraLite database technology can now be used from new development platforms in an easy-to-use fashion. UltraLite Components bring UltraLite technology to users of eMbedded Visual Basic, AppForge MobileVB, and Java. The component for Java is an alternative to the UltraLite for Java described in this book. The component is not a 100% pure Java implementation, but instead uses native classes for better performance.

The UltraLite Component documentation is available in the online books. For a starting point, see UltraLite - Database Management and Reference [*UltraLite - Database Management and Reference*].

- **Upgrading UltraLite databases** When deploying a new version of an application, you can now choose to upgrade the schema of UltraLite database to the schema of the new application.

  In 9.0.1, ULEnableGenericSchema was replaced by ULRegisterSchemaUpgradeObserver.

- **Java runtime is thread-safe** The UltraLite Java runtime is now thread-safe, enabling the development of multi-threaded UltraLite applications.

- **Deleting UltraLite database files** You can delete an UltraLite database file from an application using the ULDropDatabase function.

  For more information, see:

  - Embedded SQL: "ULDropDatabase function" [*UltraLite - C and C++ Programming*]
  - C++ API: Drop Method

- **Universally unique identifiers** UltraLite databases can now use the UNIQUEIDENTIFIER Adaptive Server Anywhere data type. This type is a BINARY(16) used for storing universally unique identifiers (UUIDs or GUIDs). UNIQUEIDENTIFIER columns that use the NEWID function as a default value can guarantee unique primary keys across a whole MobiLink installation, as an alternative to GLOBAL AUTOINCREMENT.

  For more information, see "The NEWID default" [*SQL Anywhere Server - SQL Usage*].

- **New security options for synchronization** Two new secure synchronization protocols are introduced in this release. HTTPS is HTTP implemented over a transport-layer security protocol, and RSA is a form of transport-layer security encryption used over HTTP or TCP/IP networks.

  These security options use Certicom technology. Use of Certicom technology requires that you obtain the separately-licensed SQL Anywhere Studio security option and is subject to export regulations. For more information on this option, see "SQL Anywhere 10 components" [*SQL Anywhere 10 - Introduction*].

  For more information about HTTPS synchronization, see "Stream Type synchronization parameter" [*MobiLink - Client Administration*].

- **Reset last download time** To resynchronize previously downloaded data, for example to set an application to a clean state, you can reset the last download timestamp.

  For more information, see "ULResetLastDownloadTime function" [*UltraLite - C and C++ Programming*].

- **Troubleshooting previous synchronizations** Functions are now available to obtain information about the success or failure of the most recent synchronization. This feature is particularly useful for Palm OS applications that use HotSync, in which case the synchronization is carried out externally to the application.

For more information, see "ULGetSynchResult function" [*UltraLite - C and C++ Programming*]. This feature is not yet available for UltraLite Java applications.

- **Generate more and smaller files** The -x option causes the UltraLite generator to write out more and smaller files for C/C++ projects. This option is to help in cases where the generated code is too large for the compiler to handle in a single file.
- **Improved synchronization observer** The synchronization observer function has been enhanced. More states and fields have been added to the interface to enable the design of more responsive and informative synchronization dialogs.

Behavior changes in version 8.0.2

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 8.0.2.

Adaptive Server Anywhere behavior changes

The following is a list of behavior changes from previous versions of the software.

- **Windows CE 2.11 no longer supported** Support has been dropped for the Windows CE 2.11 platform.
- **SH3 and SH4 chips no longer supported** Support for Windows CE devices using the SH3 and SH4 chips has been dropped.
- **optimization_goal setting** The default setting for the optimization_goal option is set to **All-rows** rather than **first-row**. This affects the execution plan chosen for some queries and so will change performance characteristics.

  For more information, see "optimization_goal option [database]" [*SQL Anywhere Server - Database Administration*].
- **xp_cmdshell displays a command window on Windows operating systems** It is now possible to control whether xp_cmdshell starts a new window. The behavior change applies to databases created with or upgraded to version 8.0.2 or later. On older databases, the previous behavior of not displaying a command window is maintained. The new behavior is compatible with other databases such as Adaptive Server Enterprise and Microsoft SQL Server.

  You can hide the command window by specifying a second parameter in the call to **xp_cmdshell**.

  For more information, see "xp_cmdshell system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Full-length English day names are recognized regardless of the language used by the database server** When creating events, the full-length English day names are recognized by the database server, regardless of the language (German, Chinese, and so on) the database server is using. This means that event definitions in the reload script will be recognized by a server running with a different language.

  Events that use the abbreviated English day names (Mon, Tue, and so on) are not recognized by servers running in languages other than English.

  For more information, see "CREATE EVENT statement" [*SQL Anywhere Server - SQL Reference*].
- **OPTION settings validated** Integer options with minimum and maximum values are now validated. Setting an option to an invalid value gives the error "Invalid setting for option '%1'" [*SQL Anywhere 10 - Error Messages*].

  If you unload and reload a database that contains invalid option settings, they are set to the closest legal value.

The affected options are as follows. The square brackets indicate an inclusive range.

Option	Range
isolation_level	[0, 3]
precision	[0, 127]
scale	[0, 127]
nearest_century	[0, 100]
max_hash_size	[2, 64]
MAX_WORK_TABLE_HASH_SIIZE	[2, 64]
first_day_of_week	[1, 7]
default_timestamp_increment	[1, 60000000]

- **Renamed joins** The names of two joins have changed, both in the graphical plan and in the documentation. Nested loops join not exists (JNE) are now called Nested loops antisemijoin (JNLA), and nested loops exists joins (JE) are now called nested loops semijoins (JNLS)

  For more information, see "Join algorithms" [*SQL Anywhere Server - SQL Usage*].

Deprecated and unsupported features

This list includes features that are no longer supported and that impact existing applications.

- **-d server option deprecated on Windows** When used on NetWare, the -d option forces the use of POSIX I/O rather than DFS (Direct File System) I/O. In Windows, the option is still allowed on the command line, but is ignored.

MobiLink behavior changes

The following is a list of behavior changes from previous versions of the software.

- **serial communications protocol no longer supported** The serial protocol is no longer supported. In its place, you can use HTTP, HTTPS, or TCP/IP.

- **Certicom no longer a certificate-issuing authority** You can no longer obtain transport-layer security certificates from Certicom. However, you can continue to use the Certicom reqtool utility to generate certificate requests, and you can purchase the certificates from a variety of other sources, including VeriSign and Entrust Technologies.

  For more information, see http://www.verisign.com/ or http://www.entrust.com/certificate_services/index.htm.

- **dbmlsrv option -vw deprecated** The -vw dbmlsrv command line option, which was used to suppress warning messages, has been deprecated. In its place, you can use -zw or -zwd.

  For more information, see "-zw option" [*MobiLink - Server Administration*] and "-zwd option" [*MobiLink - Server Administration*].

- **dbmlsync option -v behavior change** The -v dbmlsync command line option has been altered and expanded. Now, using -v alone causes minimum verbosity.

  For more information, see "-v option" [*MobiLink - Client Administration*].

- **Full-length English day names are recognized regardless of the language used by the synchronization server** When creating schedules for MobiLink users, publications, and subscriptions, or when specifying scheduling information on the dbmlsync command line, you must use the full-length form of English day names (such as Monday) if you want the schedule to be recognized by a synchronization server running in a language other than English.

  Schedules that use the abbreviated English day names (such as Mon) are not recognized by synchronization servers running in languages other than English.

  For more information, see "CREATE SYNCHRONIZATION USER statement [MobiLink]" [*SQL Anywhere Server - SQL Reference*].

- **Better support for long data in dbmlsync** DBMLSync now handles BLOBs in a much more efficient way while building the upload stream. BLOBs are now read into memory in pieces, so the ability to handle long BLOBs is no longer limited by available memory. When multiple publications are synchronized at one time, BLOB data is stored one time and shared between the upload streams. The output log now prints the size of the BLOB and its first 32 bytes.

- **HTTP option use_cookies removed** The use_cookies option has been removed. If you use it, the option is ignored. MobiLink now automatically detects when it needs cookies.

UltraLite behavior changes

The following is a list of behavior changes from previous versions of the software.

- **Windows CE 2.11 no longer supported** Support has been dropped for the Windows CE 2.11 platform.

- **SH3 and SH4 chips no longer supported** Support for Windows CE devices using the SH3 and SH4 chips has been dropped.

- **serial communications protocol no longer supported** The serial protocol is no longer supported. The major use of serial synchronization was from clients on the Palm Computing Platform. These clients can use HotSync synchronization instead.

- **No transport-layer security on VxWorks** The Certicom libraries that provide transport-layer security for synchronization are no longer supported on the VxWorks operating system.

- **VxWorks 5.5 not supported** VxWorks 5.3 and 5.4 are the supported versions of the VxWorks operating system.

  VxWorks unsupported in version 9
  Support for the VxWorks platform is dropped entirely in version 9.

- **Certicom libraries require JDK 1.2** The Certicom security libraries have been updated with this release. The new libraries for Java applications require JDK 1.2, rather than JDK 1.1.4.

CHAPTER 7

What's New in Version 8.0.1

Contents

New features in version 8.0.1

This section lists the new features introduced in components of SQL Anywhere Studio version 8.0.1.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 8.0.1. It provides an exhaustive listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

- **Specify space to be reserved in table pages** You can reduce table fragmentation by specifying the percentage of free space that should be reserved in table pages.

  For more information, see "Reducing table fragmentation" [*SQL Anywhere Server - SQL Usage*] and "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*].

To specify the percentage of space to be allocated on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

- **New system tables** Two new system tables, SYSATTRIBUTE and SYSATTRIBUTENAME, have been added.

  For more information, see "ISYSATTRIBUTE system table" [*SQL Anywhere Server - SQL Reference*] and "ISYSATTRIBUTENAME system table" [*SQL Anywhere Server - SQL Reference*].

- **sa_disk_free_space system procedure** This procedure allows you to determine the space available for your dbspaces, temporary file, transaction log, and transaction log mirror.

  For more information, see "sa_disk_free_space system procedure" [*SQL Anywhere Server - SQL Reference*].

- **sa_flush_statistics system procedure** Database administrators can use this procedure to ensure that cost model statistics that exist only in the database server cache are flushed out.

  For more information, see "sa_flush_statistics system procedure" [*SQL Anywhere Server - SQL Reference*].

- **New ways to obtain server message window contents** There is a new system procedure and three new properties that return information from the Server Messages window.

  For more information, see "sa_get_server_messages system procedure" [*SQL Anywhere Server - SQL Reference*]; and MessageText, MessageTime, and MessageWindowSize in "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **Determine ANSI equivalency of non-ANSI statements** The REWRITE function accepts a new argument, ANSI, which causes the function to return the ANSI equivalent of any SELECT, UPDATE, or DELETE statement.

For more information, see "REWRITE function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

- **Variable assignment allowed in UPDATE statement** The SET clause of the UPDATE statement can now be used to assign a value to a variable, in addition to updating the table. This feature is compatible with Adaptive Server Enterprise.

  For more information, see "UPDATE statement" [*SQL Anywhere Server - SQL Reference*].

- **Alternative to autoincrement** The GET_IDENTITY function is provided as an alternative for allocating identity values to autoincrement columns.

  For more information, see "GET_IDENTITY function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

- **Square brackets can delimit identifiers** You can use square brackets to delimit identifiers. Square brackets can always be used, regardless of the setting of the quoted_identifier option.

  For more information, see "Identifiers" [*SQL Anywhere Server - SQL Reference*].

- **Specify isolation level in FROM clause** You can use the WITH table-hint argument to specify a locking method for a particular table or view for a particular SELECT, UPDATE, or DELETE statement.

  For more information, see "FROM clause" [*SQL Anywhere Server - SQL Reference*].

- **Data Migration wizard** The Data Migration wizard allows you to migrate remote tables to an Adaptive Server Anywhere database from Sybase Central.

  You cannot migrate foreign keys if the target database is version 8.0.0 or earlier. To migrate foreign keys, you must upgrade the target database's file format by unloading and reloading the database.

  For more information, see "Migrating databases to SQL Anywhere" [*SQL Anywhere Server - SQL Usage*].

- **Unload a version 5.x or 6.x database from Sybase Central** Sybase Central now allows you to connect to a version 5.x of 6.x database in order to upgrade the database file format using the Unload Database wizard. To do this, you must run the database on a version 8.0.0 or later server.

- **Back up and shut down your database from the Upgrade Database wizard** You can now back up your database files, including the main database file, the transaction log, and dbspaces from the Sybase Central Upgrade Database wizard. The wizard also allows you to shut down your database when the upgrade is complete.

- **sa_migrate enhancement** The sa_migrate procedure has an optional argument, *migrate_fkeys* that allows you to specify whether or not you want to migrate foreign key mappings when you migrate tables from a remote database. In previous releases, foreign key mappings were always migrated when you used the sa_migrate procedure.

  For more information, see "sa_migrate system procedure" [*SQL Anywhere Server - SQL Reference*].

  To use this feature on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

- **New sort_collation database option** The sort_collation database option allows implicit use of the SORTKEY function on ORDER BY expressions. When the value of this option is set to a valid *collation name* or *collation ID*, any string expression in the ORDER BY clause is treated as if the SORTKEY function had been invoked.

  For more information, see "sort_collation option [database]" [*SQL Anywhere Server - Database Administration*].

- **Use an IP address/port to connect to a server** You can use the VerifyServerName=NO protocol option to skip the verification of the server name and allow Adaptive Server Anywhere clients to connect to an Adaptive Server Anywhere server if they know only an IP address/port. The VerifyServerName parameter is only used if DoBroadcast=NONE is specified.

  For more information, see "VerifyServerName protocol option [VERIFY]" [*SQL Anywhere Server - Database Administration*]

- **New LocalOnly protocol option controls broadcasts** You can use the LocalOnly protocol option to connect only to a server on the local computer, if one exists. Setting LocalOnly=YES uses the regular broadcast mechanism, except that broadcast responses from servers on other computers are ignored.

  For more information, see "LocalOnly protocol option [LOCAL]" [*SQL Anywhere Server - Database Administration*].

- **Specify how much of the cache is used for pinning cursors** You can use the pinned_cursor_percent_of_cache option to adjust the amount of cache that can be used for pinning cursors. Lowering the limit can improve performance in low memory environments.

  For more information, see "pinned_cursor_percent_of_cache option [database]" [*SQL Anywhere Server - Database Administration*].

- **Monitor database file and log file fragmentation** You can use the DBFileFragments and LogFileFragments database properties to choose monitor file fragmentation. Fragmentation of the transaction log file is usually not a significant concern; however, fragmentation of the database file can be a cause of reduced performance and may warrant use of a disk defragmentation utility.

  For more information, see "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **New connection properties.** Two new connection properties have been added. LivenessTimeout returns the liveness timeout of the connection, and IdleTimeout returns the idle timeout of the connection.

  For more information, see "Connection-level properties" [*SQL Anywhere Server - Database Administration*].

- **New server properties** The new IdleTimeout server property returns the default idle timeout value.

  For more information, see "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **Non-deterministic functions** Functions that modify underlying data, or that rely on underlying data that may change during the course of query execution, can be declared NOT DETERMINISTIC.

Functions that are declared this way are re-evaluated each time they are called during query execution. Otherwise, the function value is cached and re-used for better performance.

For more information, see "CREATE FUNCTION statement" [*SQL Anywhere Server - SQL Reference*].

- **Ensure all transactions in backup are complete** By default, the BACKUP statement renames or truncates the transaction log without waiting for open transactions to complete. You can now ensure that all transactions contained in a backup are complete by specifying a WAIT AFTER END clause.

  For more information, see "BACKUP statement" [*SQL Anywhere Server - SQL Reference*]

MobiLink new features

Following is a list of changes and additions to the software introduced in version 8.0.1.

- **Full error context reporting** The MobiLink server now shows the full error context in its output file when an error occurs during synchronization.

  For more information, see "-o option" [*MobiLink - Server Administration*].

- **User ID mapping** MobiLink now allows you to more readily find a database user ID or map a MobiLink user name to a user ID.

  For more information, see "modify_user connection event" [*MobiLink - Server Administration*].

- **Set address and type as client options** The MobiLink client now allows you specify the communication type and address on the command line to connect to the MobiLink server.

  For more information, see "MobiLink SQL Anywhere Client Extended Options" [*MobiLink - Client Administration*].

- **Log MobiLink-issued ODBC statements** You can instruct MobiLink to log to an ODBC output file all the ODBC statements issued by MobiLink.

- **Modify the download timestamp** You can modify the last download timestamp or the next last download timestamp in two new events.

  For more information, see "modify_last_download_timestamp connection event" [*MobiLink - Server Administration*] and "modify_next_last_download_timestamp connection event" [*MobiLink - Server Administration*].

- **Automatic timestamp conflict tolerance** In the event of a timestamp conflict between the consolidated and remote database, this option allows timestamp values with a precision higher than the lowest-precision to be used for conflict detection purposes.

  For more information, see "-zp option" [*MobiLink - Server Administration*].

SQL Remote new features

SQL Remote version 8.0.1 includes the following new features.

- **SMTP user authentication** Parameters are provided for separate user authentication on SMTP servers when using the SMTP/POP message system.

  For more information, see "The SMTP message system" [*SQL Remote*].

UltraLite new features

UltraLite 8.0.1 introduces several new features:

- **CodeWarrior 8 support** This release supports CodeWarrior version 8.
- **Support for multi-threaded applications** UltraLite applications can now be multi-threaded on platforms that support this kind of application.
- **Pocket PC 2002 support** Pocket PC 2002 is added to the list of supported platforms.
- **JDBC ResultSet methods added** The ResultSet.findColumn and ResultSet.get*Type* methods are now supported.
- **Access to information from UltraLite Java** The **JdbcConnection.getLastIdentity** method, **getLastDownLoadTime** method, and **JdbcDatabase.countUploadRows** method allow access to useful information. These features were previously available only in C/C++ applications.
- **User authentication in UltraLite Java** The Java version of UltraLite now supports user authentication.
- **HotSync synchronization progress displayed** The status field of the HotSync Progress dialog on your desktop computer now shows the progress of synchronization with UltraLite applications.
- **HotSync configuration** You can configure the HotSync conduit from Palm Desktop.
- **Automatic scripting from UltraLite applications** UltraLite applications can now provide column names to the MobiLink server so that synchronization scripts can be automatically generated.
- **Get SQL data type of a column from the C++ API** The GetColumnSQLType method returns the data type of a column.
- **Optional checkpoint during synchronization** Synchronizations that download large numbers of updates can cause the UltraLite database to grow significantly in size. This growth can be limited by carrying out checkpoints during synchronization. The new **checkpoint_store** synchronization parameter controls checkpointing. By default, no checkpoints are carried out.

  For more information, see "Checkpoint Store synchronization parameter" [*MobiLink - Client Administration*].

Behavior changes in version 8.0.1

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 8.0.1.

Adaptive Server Anywhere behavior changes

The following is a list of behavior changes from previous versions of the software.

- **New naming convention for renamed transaction log files** Double digits at the end of transaction log files renamed during backup have been changed to double characters. For example, the renamed log file from the first backup on December 10, 2000, is now named *001210AA.log* instead of *00121001.log*. The first two digits indicate the year, the second two digits indicate the month, the third two digits indicate the day of the month, and the final two characters distinguish among different backups made on the same day. This increases the number of backups possible in a day from 100 to 676.
- **LOAD TABLE now recalculates computed columns** LOAD TABLE now detects computed columns and evaluates them for each row inserted into the table.
- **Adaptive Server Anywhere Console utility (dbconsole) now allows connections to be reconnected** Previously an Adaptive Server Anywhere Console utility (dbconsole) session only allowed one connection. Connections can now be disconnected and reconnected without exiting the application.

Deprecated and unsupported features

This list includes features that are no longer supported and that impact existing applications.

- **DEBUG connection parameter deprecated** The DEBUG connection parameter has been deprecated. You can still use LOG parameter to create a log file containing the debug information. From version 8.0.1 on, `LOG=filename` does what `DEBUG=YES;LOG=filename` used to do.

  For more information, see "Connection parameters" [*SQL Anywhere Server - Database Administration*].
- **AGENT connection parameter deprecated** The AGENT connection parameter has been deprecated. You can use the CommLinks parameter with appropriate protocol options to achieve the same behavior.

  For more information, see "Connection parameters" [*SQL Anywhere Server - Database Administration*].
- **Port connection property removed** The port connection parameter has been removed.
- **Adaptive Server Anywhere Translation Driver removed** Use of translation drivers is no longer recommended. The server automatically handles character set conversion.
- **SharedMemory tried first** The ports specified in the LINKS= connection parameter were tried in the order in which they were specified. Now, if the sharedmemory (shmem) port is specified, it is tried first, followed by the other ports specified in the order in which they appear.

- **GLOBAL AUTOINCREMENT** The default value has been changed from 0 to 2147483647. global_database_id can now be set to 0 and will cause values to be generated starting at 1.

MobiLink behavior changes

- **Timestamp mismatch notification** When the timestamps between consolidated and remote databases are at variance, the MobiLink server will log a warning with each synchronization.
- **GLOBAL AUTOINCREMENT** The default value has been changed from 0 to 2147483647. global_database_id can now be set to 0 and will cause values to be generated starting at 1.

  It is still the case that if global_database_id is not set, or is set to the default value, attempts to cause a global autoincrement value to be generated result in a NULL. This commonly gives an error when attempting to insert the value into a non-nullable primary key column and is the indication that the global_database_id option has not been set.

  Disallowing a setting of 0 for global_database_id prevented generation of values starting at 1. Instead, values would start at the partition size specified for the column.

  For more information, see "global_database_id option [database]" [*SQL Anywhere Server - Database Administration*].
- **dbmlstop performs soft shutdown** By default (if none of -w, -f, -h or -t are specified), dbmlstop does a soft shutdown. This means that it stops accepting new connections and exits when the current synchronizations are complete.

For more information, see "MobiLink stop utility [mlstop]" [*MobiLink - Server Administration*].

UltraLite behavior changes

- **Palm database backup** In previous releases, if the ULUtil application was used to backup a database, the database would be backed up on each subsequent HotSync operation.

  Most UltraLite data is effectively backed up by synchronization. As the most common use of an explicit backup is to create an initial database for deployment, continuing to make backups on HotSync is not the desired behavior in most cases. Now, each time an UltraLite application starts, it disables backups on future HotSync operations.

  If you want to explicitly require backups for databases every time a HotSync is performed, you can do so by setting the **palm_all_backup** parameter in the UL_STORE_PARMS macro.

Deprecated and unsupported features

UltraLite support for synchronization on the Palm Computing Platform using ScoutSync technology is deprecated. Version 8.0.x will continue to support ScoutSync up to version 3.6, but the next major release of SQL Anywhere Studio will not support ScoutSync.

CHAPTER 8

What's New in Version 8.0.0

Contents

New features in version 8

This section lists the new features introduced in components of SQL Anywhere Studio version 8.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 8.0. It provides an exhaustive listing of major and minor new features, with cross references to locations where details of each feature appear in the manuals.

If you have the printed version of this book, and if you do not have the complete SQL Anywhere Studio documentation set, you should look in the online documentation for a detailed description of each feature.

Some new features require that you upgrade the database to version 8, or that you upgrade the database file format by unloading and reloading the database. If a database upgrade or file format upgrade is required to access a particular feature, the requirement is indicated in the description below.

For information on how to carry out these tasks, see "Upgrading to SQL Anywhere 10" on page 311.

The Adaptive Server Anywhere new features are grouped under the following headings:

Query processing and database performance

- **Improved query processing** This version includes enhancements to the query execution engine and the optimizer, resulting in a significant improvement in performance, especially for complex queries. Enhancements to Adaptive Server Anywhere query processing include the following:
  - More sophisticated internal processing of joins.
  - Improvements to the optimizer's cost model used to assess alternative access plans.

- Improvements to the execution model.

  Most of these changes are internal. Documentation is provided in "Query Optimization and Execution" [*SQL Anywhere Server - SQL Usage*].

An effect of these changes is that it is no longer the case that the materialization of results is necessarily inefficient. Use of temporary work tables may be a very efficient way to execute a query. For more information, see "Use work tables in query processing (use All-rows optimization goal)" [*SQL Anywhere Server - SQL Usage*].

The optimizer now performs cost-based selection of indexes, and does not solely rely on predicate selectivities as was the case with prior releases.

Much of the improved query processing does not require an upgraded database. To use the new cost model on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

- **New index type** A new type of index has been added that improves performance for multiple column indexes and for indexes that include wide columns. It is a compressed B-tree index.

  Adaptive Server Anywhere automatically creates the appropriate type of index based on index width (the sum of the width of all columns in the index). A compressed B-tree index is created when the width of the index is greater than nine bytes and less than one-eighth of the page size to a maximum of 256 bytes; otherwise, Adaptive Server Anywhere creates hash B-tree indexes.

  The WITH HASH SIZE clause of the CREATE INDEX statement is deprecated.

  To use the new index types on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

  A new limitation is imposed: foreign key indexes must have the same size and type as the corresponding primary key index.

  dbunload now omits the hash size specification if it was originally specified with the default (WITH HASH SIZE 10).

- **New database option optimization_goal** Determines whether query processing is optimized towards returning the first row quickly, or minimizing the cost of returning the complete result set. The default is to optimize for the first rows.

  For more information, see "optimization_goal option [database]" [*SQL Anywhere Server - Database Administration*].

- **Performance enhancements for table scans** Databases created in Adaptive Server Anywhere 8.0 with 2K, 4K, or 8K pages have performance-enhancements for queries that require sequential table scans. Adaptive Server Anywhere creates bitmaps, also known as page maps, for large tables. A bitmap lists all of the pages containing data for a given table. This feature permits searching large tables in only one I/O operation.

  For more information, see "Table and page sizes" [*SQL Anywhere Server - SQL Usage*].

To gain the benefits of this enhancement on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

- **Improved storage of checkpoint log** The checkpoint log is now stored in consecutive pages at the end of the database file. This leads to improved performance by allowing sequential scans and multipage writes of the material in the checkpoint log.

  For more information about the checkpoint log, see "Checkpoints and the checkpoint log" [*SQL Anywhere Server - Database Administration*].

  To gain the benefits of this enhancement on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

- **Plan caching** Adaptive Server Anywhere now caches execution plans for queries and INSERT, UPDATE and DELETE statements performed inside stored procedures, user-defined functions, and triggers. The maximum number of plans to cache is specified with the option setting max_plans_cached. To disable plan caching, set this option to 0.

  For more information, see "Plan caching" [*SQL Anywhere Server - SQL Usage*].

- **Overriding the default I/O cost model** You can now override the default I/O cost model using the ALTER DATABASE statement with the CALIBRATE clause.

  For more information, see "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

- **New database option max_plans_cached** Sets the maximum number of execution plans that are stored in cache.

  For more information, see "max_plans_cached option [database]" [*SQL Anywhere Server - Database Administration*].

- **New database option min_table_size_for_histogram** This option sets the minimum table size for which histograms are created. Histograms store information about the distribution of values in a column, and the optimizer uses them to choose an efficient execution plan.

Security

- **Strong encryption over TCP/IP** Adaptive Server Anywhere now supports certificate-based encryption over TCP/IP ports on Solaris, Linux, NetWare, and all supported Windows operating systems with the exception of Windows CE. Strong encryption protects the confidentiality and integrity of network packets as they pass between the client and the server. This encryption is also called Transport Layer Security (TLS).

  The database server -ec command line option allows you to set the server's connection parameters and replaces the -e command line option in previous versions of Adaptive Server Anywhere. You can set the client connection parameters with the encryption connection parameter.

For more information, see "-ec server option" [*SQL Anywhere Server - Database Administration*] and "Encryption connection parameter [ENC]" [*SQL Anywhere Server - Database Administration*].

To use this feature, you must use version 8 software at both the client and the server. You do not need to upgrade the database.

- **Strong encryption of the database file** The database file itself can now be strongly encrypted for greater security, especially on notebook and laptop computers prone to theft.

  For more information, see the following locations:

  - "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*]
  - "-ek database option" [*SQL Anywhere Server - Database Administration*]
  - "-ep server option" [*SQL Anywhere Server - Database Administration*]
  - "CREATE DECRYPTED FILE statement" [*SQL Anywhere Server - SQL Reference*].

    You must use version 8 software to create encrypted database files.

SQL features

- **Full outer joins** Full outer joins are now supported. In addition, the keyword OUTER is now optional for right, left, and full outer joins.

  For more information, see "Outer joins" [*SQL Anywhere Server - SQL Usage*].

- **CASE statements** The ANSI standard allows two forms of CASE statements. Adaptive Server Anywhere 8.0 supports both syntaxes.

  For more information, see "CASE statement" [*SQL Anywhere Server - SQL Reference*].

- **WAITFOR statement** This statement delays processing for the current connection for a specified amount of time or until a given time.

  For more information, see "WAITFOR statement" [*SQL Anywhere Server - SQL Reference*].

- **RAISERROR statement allows connections to be disallowed** This statement can now be used to disallow or limit connections.

  For more information, see "RAISERROR statement [T-SQL]" [*SQL Anywhere Server - SQL Reference*].

- **Timezone adjustment** To permit easier coordination of date/time values across time zones, the following new features have been added:

  - **CURRENT UTC TIMESTAMP** Adjusts the time zone value by the server's time zone adjustment value.
  - **DEFAULT UTC TIMESTAMP** Specifies a default value for INSERTs and sets updated columns to the value.

- **TimeZoneAdjustment property** returns the number of minutes that must be added to the Coordinated Universal Time (UTC) to display the new local time.
- **time_zone_adjustment option** Allows a connection's time zone adjustment to be modified.

- **New collation functions** The SORTKEY function generates values that can be used to sort character data. SORTKEY allows you to perform sorting beyond the default behavior of Adaptive Server Anywhere collation.

  The COMPARE function allows you to directly compare two character strings based on alternate collation rules.

  For more information, see "SORTKEY function [String]" [*SQL Anywhere Server - SQL Reference*] and "COMPARE function [String]" [*SQL Anywhere Server - SQL Reference*].

- **ERRORMSG function** The new SQL function ERRORMSG can be used to obtain error messages.

  For more information, see "ERRORMSG function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

- **Data type conversion functions** The ISDATE and ISNUMERIC functions test if a string can be converted to a date or number, respectively.

  For more information, see "ISDATE function [Data type conversion]" [*SQL Anywhere Server - SQL Reference*], and "ISNUMERIC function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*]

Development and administration tools

- **Accessibility features** SQL Anywhere Studio is compliant with Section 508 of the US Federal Rehabilitation Act. The user interfaces and documentation have been prepared in compliance with the act. An accessibility enablement component provides software that enables the use of accessibility tools. The accessibility enablement component is not installed by default.

  For more information, see "SQL Anywhere 10 components" [*SQL Anywhere 10 - Introduction*].

- **Query Editor** A graphical query editor has been added to Interactive SQL. With the Query Editor, you can create or edit SELECT statements without using SQL code. You can open the Query Editor in Interactive SQL by clicking Tools ► Edit Query.

  For more information, see "Introduction to the Query Editor" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Editable data in Interactive SQL and Sybase Central** You can update the database by editing Interactive SQL result sets, and by editing tables and views in Sybase Central. You can copy, edit, insert, and delete row values.

  Data displayed in Sybase Central can be copied to the clipboard.

  For more information, see "Editing result sets in Interactive SQL" [*SQL Anywhere Server - Database Administration*].

- **Interactive SQL supports SQL escape syntax handling** Interactive SQL now supports JDBC escape syntax that allows you to access a library of functions implemented by the JDBC driver.

  For more information, see "Using JDBC escape syntax" [*SQL Anywhere Server - Programming*].

- **Procedure profiling** Sybase Central contains a Profile tab that displays information about the number of calls and execution times for stored procedures, functions, events, and triggers. You can also view information about the execution speed for each line within a procedure. Profiling information is available through Sybase Central and SQL stored procedures.

  For more information about viewing procedure profiling information in Sybase Central, see "Procedure profiling using system procedures" [*SQL Anywhere Server - SQL Usage*].

  For more information about obtaining procedure profiling information with SQL stored procedures, see "sa_procedure_profile_summary system procedure" [*SQL Anywhere Server - SQL Reference*] and "sa_procedure_profile system procedure" [*SQL Anywhere Server - SQL Reference*].

  To use this feature, you must upgrade the database.

- **Improved information for access plans** There are two new ways to view the plan, a graphical display and a graphical display with statistics. These new plans provide more information about the processing cost of your query, and allow you to examine the cost of subsets of the query. The default access plan is now the graphical plan. The long and short plans are now based on the Ariadne syntax used by Adaptive Server Enterprise, and have new abbreviations.

  For more information, see "Reading execution plans" [*SQL Anywhere Server - SQL Usage*].

- **Results pane displays query execution plan** The Interactive SQL Results pane now has a Results tab. The Results tab displays the results of your query, and the Plan tab displays the execution plan for the query. Previously, the query execution plan appeared in the Interactive SQL Messages pane.

  For more information, see "Options dialog: Results tab" [*SQL Anywhere 10 - Context-Sensitive Help*].

- **Results pane displays UltraLite plan** The Interactive SQL Results pane now has an UltraLite Plan tab. This tab displays the UltraLite plan optimization strategy in XML format, as a string.

- **XML export using the OUTPUT statement** You can export query results as XML format. The output has an embedded DTD. Binary values are encoded in CDATA blocks with the binary data rendered as two-hexadecimal-digit strings.

  For more information, see "OUTPUT statement [Interactive SQL]" [*SQL Anywhere Server - SQL Reference*].

- **Interactive SQL batch options** Additional control is given to Interactive SQL when running batch files, through the -codepage and -onerror command line options. Also, the -d1 command line option provides feedback useful for debugging batch files.

  For more information, see "Interactive SQL utility (dbisql)" [*SQL Anywhere Server - Database Administration*].

Application development

- **New cursor types** The cursors supplied by Adaptive Server Anywhere have been enhanced to provide cleaner semantics, to better match new cursor types such as keyset-driven cursors, and to take advantage of the new query optimization possibilities.

  For more information, see "SQL Anywhere cursors" [*SQL Anywhere Server - Programming*].

- **Improved fetching for long columns** The amount of data that can be fetched in a single operation has been increased from 32 KB to a configurable value with a default of 256 KB. In ODBC the value can be set using the SQL_ATTR_MAX_LENGTH statement attribute. In embedded SQL, use the DT_LONGVARCHAR and DT_LONGBINARY types.

  For more information, see "Retrieving data" [*SQL Anywhere Server - Programming*], and "Sending and retrieving long values" [*SQL Anywhere Server - Programming*].

- **New embedded SQL function to obtain database properties** The function **db_get_property** can be used to obtain database properties.

  For more information, see "db_get_property function" [*SQL Anywhere Server - Programming*]. For information on database properties, see "Understanding database properties" [*SQL Anywhere Server - Database Administration*].

- **blocking_timeout option** The new blocking_timeout option lets you control how long a transaction waits to obtain a lock.

  For more information, see "blocking_timeout option [database]" [*SQL Anywhere Server - Database Administration*].

- **return_date_time_as_string option** The return_date_time_as_string option allows you to control how date, time, and timestamp values are returned over jConnect and Open Client.

  For more information, see "return_date_time_as_string option [database]" [*SQL Anywhere Server - Database Administration*].

Administration and troubleshooting

In addition to the administration enhancements added to Sybase Central, listed above, version 8 includes the following administration enhancements.

- **Improve table performance without disrupting access** The REORGANIZE TABLE statement can be used to improve performance when a full rebuild of the database is not possible, due to the requirements for continuous access to the database. Use this statement to defragment rows in a table, or to compress indexes which have become sparse due to DELETEs. It can also reduce the total number of pages used to store the table and its indexes, as well as reduce the number of levels in an index tree.

  To reorganize tables based on a primary key, foreign key, or index, the database must be Adaptive Server Anywhere version 7 or above.

For more information, see "REORGANIZE TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **Fast database validation** A new type of validation check has been added that reduces the amount of time it takes to validate a database. This option is of particular interest to people who need to validate large databases with small cache sizes. Affected tools include the sa_validate system procedure, the Validation utility (**dbvalid**) and the VALIDATE TABLE statement.

  For more information, see "Improving performance when validating databases" [*SQL Anywhere Server - Database Administration*].

  To use this feature on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

- **Backup does not need to wait for outstanding transactions to complete** If a backup instruction requires the transaction log to be truncated or renamed, uncommitted transactions are carried forward to the new transaction log. This means that the server no longer waits for outstanding transactions to be committed or rolled back before initiating a backup.

  For more information, see "Log Translation utility (dbtran)" [*SQL Anywhere Server - Database Administration*] and "Backup internals" [*SQL Anywhere Server - Database Administration*].

  To use this feature on databases created before this release, you must upgrade the database file format by unloading and reloading the database.

- **Obtaining fragmentation statistics** File, table, and index fragmentation can all decrease performance. In Adaptive Server Anywhere 8.0 when you start a database on Windows NT, the server automatically displays information about the number of file fragments in each dbspace.

  The new system procedures, sa_table_fragmentation and sa_index_density, allow database administrators to obtain information about the fragmentation in a database's tables and indexes.

  For more information about file fragmentation, see "Reducing file fragmentation" [*SQL Anywhere Server - SQL Usage*].

  For more information about table fragmentation, see "Reducing table fragmentation" [*SQL Anywhere Server - SQL Usage*] and "sa_table_fragmentation system procedure" [*SQL Anywhere Server - SQL Reference*].

  For more information about index fragmentation, see "Reducing index fragmentation" [*SQL Anywhere Server - SQL Usage*] and "sa_index_density system procedure" [*SQL Anywhere Server - SQL Reference*].

- **Obtain the most recently prepared SQL statement for a connection** The database server -zl command line option turns on capturing of the most recently prepared SQL statement for each connection to databases on a server. You can also turn on this feature using the sa_server_option stored procedure with the remember_last_statement setting.

When this feature is turned on, the **LastStatement** property function and the sa_conn_activity system procedure return the most recently prepared SQL statement for the current connection and all connections to databases on a server respectively.

For more information, see "-zl server option" [*SQL Anywhere Server - Database Administration*], "sa_conn_activity system procedure" [*SQL Anywhere Server - SQL Reference*], and "sa_server_option system procedure" [*SQL Anywhere Server - SQL Reference*].

- **-cw command line option** This server option lets you use cache sizes up to 64 GB on Windows 2000, Windows XP, and Windows Server 2003.

  For more information, see "-cw server option" [*SQL Anywhere Server - Database Administration*].

- **-qp option** This server option lets you suppress messages about performance in the Server Messages window.

  For more information, see "-qp server option" [*SQL Anywhere Server - Database Administration*].

- **Improved debugging server log** The information logged in the connection debugger has been improved to give more context about the portion of the connection being attempted; to remove the CONN: prefix; to increase the number of TCP/IP messages.

- **Databases can hold more procedures** The primary key values for the SYSPROCEDURE, SYSPROCPARM, SYSPROCPERM, and SYSTRIGGER system tables have been changed from SMALLINT to UNSIGNED INT. This change increases the number of procedures that a database can hold.

  For more information about the number of procedures a database can hold, see "SQL Anywhere size and number limitations" [*SQL Anywhere Server - Database Administration*].

  To use this feature, you must upgrade the database file format.

- **Monitoring query performance** New system procedures and utilities have been included to measure query performance.

  For more information, see "sa_get_request_profile system procedure" [*SQL Anywhere Server - SQL Reference*], "sa_get_request_times system procedure" [*SQL Anywhere Server - SQL Reference*], and "Monitor query performance" [*SQL Anywhere Server - SQL Usage*].

- **New diagnostic properties** Properties allow you to obtain information about connections, databases, and the current database server. The following connection properties have been added in this release:

  - UtilCmdsPermitted property
  - TempTablePages property
  - LastStatement property
  - PacketSize property
  - max_plans_cached property
  - QueryCachePages property

- QueryLowMemoryStrategy property

  For more information, see "Connection-level properties" [*SQL Anywhere Server - Database Administration*].

The following database properties have been added in this release:

- DBFileFragments property
- LogFileFragments property
- BlobArenas property
- SeparateForeignKeys property
- VariableHashSize property
- TableBitMaps property
- FreePageBitMaps property
- SeparateCheckpointLog property
- Histograms property
- LargeProcedureIDs property
- PreserveSource property
- TransactionsSpanLogs property
- Capabilities property
- TempTablePages property
- CompressedBTrees property
- ProcedurePages property
- QueryCachePages property
- QueryLowMemoryStrategy property

  For more information, see "Database-level properties" [*SQL Anywhere Server - Database Administration*].

The following server properties have been added in this release:

- MachineName property
- IsJavaAvailable property
- PlatformVer property

  For more information, see "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **Additional performance monitor statistics** Several performance monitor statistics have been added for this release.

  For more information, see "Performance Monitor statistics" [*SQL Anywhere Server - SQL Usage*].

- **Login procedure allows connections to be disallowed** The login_procedure option allows a stored procedure to be called for each new connection. This procedure can now be used to disallow database connections.

  For more information, see "login_procedure option [database]" [*SQL Anywhere Server - Database Administration*].

- **dbsvc enhancements** The dbsvc utility for managing Windows services has been extended to list service name used to start and stop the service with the system **net start** and **net stop** commands, and to handle dependencies on other services and groups.

  For more information, see "Service utility (dbsvc) for Windows" [*SQL Anywhere Server - Database Administration*].

- **Source format preserved for stored procedures** The source format, including spaces and line breaks, is now stored in the database as a comment. This comment is used for procedure profiling.

Client/server connections

- **Improved buffer size negotiation** Buffer sizes can now be specified separately for both the client and the server.

  To use this feature, you must use version 8 software at both the client and the server. You do not need to upgrade the database.

- **Communication compression** A new type of communication compression can lead to improved performance if you are transferring data across networks with limited bandwidth, including some wireless networks, some modems, serial links and some WANs.

  For more information, see "Adjusting communication compression settings to improve performance" [*SQL Anywhere Server - Database Administration*].

  To use this feature, you must use version 8 software at both the client and the server. You do not need to upgrade the database.

- **Enhanced dbping** The dbping utility has additional options to help diagnose connection problems. These include the ability to use ODBC to connect, and the ability to report connection, database, and server properties upon connection.

  For more information, see "Ping utility (dbping)" [*SQL Anywhere Server - Database Administration*].

- **Suppress TDS debugging option** The suppress_tds_debugging option controls whether TDS debugging information appears in the Server Messages window.

For more information, see "suppress_tds_debugging option [database]" [*SQL Anywhere Server - Database Administration*].

- **PrefetchBuffer connection parameter** This connection parameter lets you specify the maximum amount of memory for storing prefetched rows.

  For more information, see "PrefetchBuffer connection parameter [PBUF]" [*SQL Anywhere Server - Database Administration*].

- **PrefetchRows connection parameter** The PrefetchRows connection parameter lets you specify the maximum number of rows to prefetch when querying the database. In some circumstances, increasing the number of rows prefetched from the database server by the client can improve query performance.

  For more information, see "PrefetchRows connection parameter [PROWS]" [*SQL Anywhere Server - Database Administration*].

- **Client can specify idle timeout** Each client can specify its own idle timeout using the IDLE connection parameter. Previously, all connections to a server used the same idle timeout which was specified by the -ti server command line option.

  For more information, see "Idle connection parameter" [*SQL Anywhere Server - Database Administration*].

Java in the database

Java in the database includes the following new features:

- **Java 2 support** Java in the database can now use classes from Java 2 (JDK 1.2 and 1.3) and Java.

  To use this feature, you must upgrade the database using ALTER DATABASE or by using the dbupgrad utility and supplying the -jdk option.

- **JDBC 2.0** Java classes in the database can now use the JDBC 2.0 interface to access data.

  To use this feature, you must upgrade the database using ALTER DATABASE or by using the dbupgrad utility and supplying the -jdk option.

- **Diagnostic procedure** A new system procedure, **sa_java_loaded_classes**, lists all classes loaded by the Java virtual machine.

  For more information, see "sa_java_loaded_classes system procedure" [*SQL Anywhere Server - SQL Reference*].

  To use this feature, you must upgrade the database.

- **Security manager** You can use a built-in security manager or provide your own implementation to control access to security-sensitive Java features.

  For more information, see "Security management for Java" [*SQL Anywhere Server - Programming*].

Documentation

Several new features have been added to the Adaptive Server Anywhere documentation set to help you find, access and use the information more quickly.

- **Re-organized books** There have been two major changes to the documentation set since the last release:
  - The *Replication and Synchronization Guide* has been split into two books, describing each of the two synchronization technologies separately. These new books are the *MobiLink Synchronization User's Guide* and the *SQL Remote User's Guide*.
  - The Adaptive Server Anywhere *User's Guide*, *Programming Interfaces Guide*, and *Reference Manual* have been replaced by a *Database Administration Guide*, a *SQL User's Guide*, a *SQL Reference Manual*, and a *Programming Guide*. The database error messages have been moved into their own book. The new organization makes each book a more manageable size in printed form.
- **New context-sensitive Help** All the user-interface tools, including Sybase Central, Interactive SQL, the Adaptive Server Anywhere debugger, and the Query Editor, share a common cross-platform context-sensitive help system, complete with links to the online books.
- **Enhanced online books** The HTML Help version of the online books includes a menu bar for quick access to SQL Anywhere Web links, tutorials, procedures, and more.

Miscellaneous

- **Connections persist across hibernation times** Connections from embedded SQL, ODBC or OLE DB clients now persist while a computer hibernates. Previously, TCP/IP connections between a client and a server on the same computer would be dropped when the computer was woken from hibernation if the computer hibernated for longer than the liveness or idle timeout time.
- **Viewing current license information** The dblic utility now accepts an argument that allows you to view current license information for a server executable without starting the server.

  For more information, see "Server Licensing utility (dblic)" [*SQL Anywhere Server - Database Administration*].
- **Viewing collation label and name for custom collations** The dbinfo utility now returns the collation label and name for custom collations. As well, two new fields, collationnamebuffer and collationnamebufsize, have been added to the a_db_info structure in *dbtools.h*.
- **sp_remote_tables system procedure** A new argument, **tabletype**, has been added to the sp_remote_tables stored procedure. This argument returns the remote table's type.

  For more information about the **tabletype** *argument*, see "sp_remote_tables system procedure" [*SQL Anywhere Server - SQL Reference*].

- **-ct command line option** Using the -ct command line option, you can turn character set conversion on and off. Character set conversion is now enabled by default, and to turn it off, you can specify -ct-. To turn character set conversion on, use -ct+.
- **Obtain remote table foreign key information** Two new stored procedures, sp_remote_exported_keys and sp_remote_imported_keys, allow you to obtain information about foreign keys and their corresponding primary keys for remote tables.

  For more information, see "sp_remote_exported_keys system procedure" [*SQL Anywhere Server - SQL Reference*] and "sp_remote_imported_keys system procedure" [*SQL Anywhere Server - SQL Reference*].
- **xp_sendmail** There are now extended stored procedures for sending email over SMTP as well as MAPI. For more information, see "xp_startsmtp system procedure" [*SQL Anywhere Server - SQL Reference*] and "xp_stopsmtp system procedure" [*SQL Anywhere Server - SQL Reference*].

  The xp_sendmail stored procedure now accepts messages of any length. The length of the long VARCHAR parameters for the procedure is limited to the amount of memory available on your system.

  For more information, see "xp_sendmail system procedure" [*SQL Anywhere Server - SQL Reference*].
- **Replication Server 12 feature for the log transfer manager** The **qualify_table_owners** parameter in the LTM configuration file provides support for the Replication Server 12 feature allowing the table names, owners, and column names in the primary databases to be different from the replication databases.

  For more information, see "The LTM configuration file" [*SQL Anywhere Server - Database Administration*].
- **ASANYSH8 environment variable** A new environment variable, ASANYSH8, has been added. Interactive SQL, Sybase Central, the Adaptive Server Anywhere Console utility, and the debugger use this environment variable to located the shared components directory.

MobiLink new features

The following is a list of changes and additions to the software introduced in version 8.0.

Flexibility

- **Java synchronization logic** Synchronization scripts can now be implemented in Java instead of or in addition to the SQL language. These scripts are run in an external JRE using the MobiLink Java environment.

  For more information, see "Writing Synchronization Scripts in Java" [*MobiLink - Server Administration*].
- **Synchronization using publications** All the data in a MobiLink client no longer needs to be synchronized at the same time. Rather, data can be organized into publications and each publication synchronized independently. A new syntax for publications and synchronization subscriptions is provided, that is simpler and more precise than the previous syntax.

For more information, see "SQL Anywhere Clients" [*MobiLink - Client Administration*].

- **Configuring Web servers to handle MobiLink synchronization** You can now carry out HTTP synchronization with the MobiLink server behind a firewall. A Web server plug-in for popular Web servers allows you to carry out HTTP synchronization through Web servers.

  For more information, see "Synchronizing Through a Web Server with the Redirector" [*MobiLink - Server Administration*].

- **ActiveSync support for Windows CE clients** Both Adaptive Server Anywhere and UltraLite Windows CE MobiLink clients can use the Windows CE ActiveSync synchronization software.

  For more information, see "Using ActiveSync synchronization" [*MobiLink - Client Administration*].

- **Enhanced client command line functionality** You can specify extended options in both `CREATE/ALTER SYNCHRONIZATION SUBSCRIPTION` statements and on the command line.

  For more information, see "dbmlsync syntax" [*MobiLink - Client Administration*].

- **Extended options can be stored in the database** Using the `CREATE/ALTER SYNCHRONIZATION SUBSCRIPTION` statements it is possible to store extended options and connection parameters in the database and associate them with subscriptions, users or publications. *Dbmlsync* now reads this information from the database.

  For more information see "dbmlsync syntax" [*MobiLink - Client Administration*].

Performance

- **Statement-based uploads** MobiLink now allows statement-based uploads that are not only more intuitive than cursor-based uploads, but also significantly faster. Statement-based uploads employ the **upload_insert**, **upload_delete**, **upload_update**, **upload_new_row_insert**, and **upload_old_row_insert** events. **upload_fetch** script is used for conflict resolution.

  For more information see "Writing scripts to upload rows" [*MobiLink - Server Administration*].

- **Multi-processor administration** MobiLink has a new option for setting the maximum number of processors to use. The -zt option provides for greater control of the resources used by the MobiLink server. It can also help to discover and/or work around an ODBC driver with multi-processor issues.

  For more information see "-zt option" [*MobiLink - Server Administration*].

- **Optional download acknowledgement** The MobiLink synchronization client can now synchronize without a download acknowledgement, so that the MobiLink server worker thread does not need to wait for the client to apply the download, freeing up the worker thread sooner for its next synchronization. Download acknowledgement is now an option. Eliminating the download acknowledgement can improve throughput, particularly for slower clients. Note that without a download acknowledgement, the consolidated side will not know that the download succeeded until the next synchronization.

  For more information, see "MobiLink SQL Anywhere Client Extended Options" [*MobiLink - Client Administration*].

- **Buffered download stream** The MobiLink server now buffers the download stream in a download cache. Since acknowledgement is not required from the client to commit the download transaction, the buffered download stream is sent to the client after the commit. The download transaction is no longer potentially held up by network delays.

  The download stream can also be buffered at Adaptive Server Anywhere clients. The size of the buffer available can be set using the *dbmlsync* DownloadBufferSize extended option.

  For more information, see "MobiLink SQL Anywhere Client Extended Options" [*MobiLink - Client Administration*].

- **Bulk loading of connection and table scripts** The first connection or table script requested for a specific table to version_id pairing will cause a bulk load of all the scripts into the cache. The result is improved performance by getting all the scripts in bulk rather than individually.

- **MobiLink server shutdown enhancements** You can tell *dbmlstop* to wait until the MobiLink server is completely shutdown before proceeding. You can also use *dbmlstop* to stop a specific MobiLink server by name.

  For more information, see "MobiLink stop utility [mlstop]" [*MobiLink - Server Administration*].

- **Connection timeout** MobiLink database connections that are unused for a specified amount of time are now disconnected automatically by the server. The timeout can be set using the -ct (connection timeout) command line option.

  For more information, see "-ct option" [*MobiLink - Server Administration*].

- **Maximum number of concurrent uploaders option** The -wu command line option can set the maximum number of worker threads allowed to upload concurrently, resulting in, for some deployments, increased throughput.

  For more information, see "-wu option" [*MobiLink - Server Administration*].

Security

- **MobiLink user authentication** A password-based system for user authentication adds additional security to your MobiLink installation. Now, using -zu, you can allow automatic addition of users when the authenticate_user script is undefined. This allows for user schema information to be used as MobiLink authentication.

  For more information, see "MobiLink Users" [*MobiLink - Client Administration*].

- **MobiLink user administration** The dbmluser utility has been extended to allow users to be deleted from the system as well as added. Other refinements have been made to this utility. The dbmluser command line options -pf, -pp, and -pu have been deprecated and replaced with -f, -p, and -u respectively.

  For more information, see "MobiLink user authentication utility [mluser]" [*MobiLink - Server Administration*].

Enhanced reporting

- **Statistical scripts** MobiLink now has scripts for tracking synchronization statistics. Once gathered, these synchronization statistics may be used for monitoring the performance of your synchronizations.

  For more information, see "synchronization_statistics connection event" [*MobiLink - Server Administration*], "synchronization_statistics table event" [*MobiLink - Server Administration*], "upload_statistics connection event" [*MobiLink - Server Administration*], and "upload_statistics table event" [*MobiLink - Server Administration*].

- **Detailed network error information** The MobiLink server and client now display detailed error information along with error codes to help you better resolve any errors as they arise. You will see the network layer reporting the error, the network operation being performed, the error itself and a system-specific error code.

- **Remote Adaptive Server Anywhere output log sent to MobiLink server on error** Troubleshooting synchronization problems is simplest when both the remote log and the MobiLink server log are available for inspection. This new feature sends the Adaptive Server Anywhere remote's output log up to the MobiLink server when a client-side error occurs.

  For more information, see "-e option" [*MobiLink - Server Administration*].

- **Log messages identify the worker thread** Messages displayed to the MobiLink server log now indicate the worker thread that logged the message. This makes it possible to distinguish messages that are due to the same user attempting to synchronize concurrently. It also helps distinguish messages when the same user synchronizes twice without delay.

- **Verbose logging** You can use additional modifiers on the MobiLink server -v command line option to configure MobiLink server logging.

  For more information, see "-v option" [*MobiLink - Server Administration*].

- **Ignored rows are reported to clients** If the MobiLink server ignores any uploaded rows because of absent scripts, a messages is returned to the client. The message is displayed as a warning by Adaptive Server Anywhere clients, and in the ignored_rows synchronization parameter in UltraLite clients.

  For more information, see "Ignored Rows synchronization parameter" [*MobiLink - Client Administration*].

Ease of use

- **Last download timestamp** The last download timestamp is written to the MobiLink client database automatically.

- **Automatic synchronization script generation** MobiLink can be instructed to generate scripts suitable for snapshot synchronization. The -za option controls creation and activation of these scripts.

- **Example synchronization script generation** MobiLink can be instructed to generate example synchronization scripts. The -ze command line option is used to control whether example scripts are to be generated.

Adaptability

- **Support for popular RDBMSs** As consolidated databases, MobiLink now supports Oracle 8i and 9i, Microsoft SQL Server 7, Microsoft SQL Server 2000, IBM's DB2 and more.

  For more information, see "ODBC drivers supported by MobiLink" [*MobiLink - Server Administration*].

- **Liveness detection in TCP/IP streams** The TCP/IP-based streams that are used during MobiLink synchronization now accept a new parameter, both on the client and server side, called **keep_alive**, that enables liveness checking.

  For more information, see "-x option" [*MobiLink - Server Administration*].

UltraLite new features

UltraLite 8.0 introduces the following new features:

Security

- **User authentication** In previous releases, UltraLite databases had no user authentication mechanism to govern access. In this release, a built-in user authentication mechanism is provided. Unlike user IDs for most relational database management systems, the UltraLite user IDs do not imply any ownership of tables and other database objects.

- **Database encryption** You can improve the security of your data by encrypting your database. Two methods are supplied.

  - **Strong encryption** The database can be encrypted using a strong encryption algorithm for maximum security. There is a performance penalty to pay for this security. The encryption is key-based and uses the AES 128-bit algorithm.

  - **Database obfuscation** You can improve the security of your data by obfuscating the database. Without obfuscation, the data in the database is viewable using a tool such as a hex editor. Obfuscation prevents casual attempts at viewing data but does not offer the watertight protection of strong encryption. Obfuscation does not have the performance penalty that strong encryption carries.

    For more information, see "UltraLite security considerations" [*UltraLite - Database Management and Reference*].

- **Secure synchronization for UltraLite Java applications** Secure synchronization using Certicom transport-layer security was previously available only from C/C++ UltraLite applications. It is now available from UltraLite Java applications.

Synchronization

- **ActiveSync synchronization** UltraLite applications on Windows CE devices can use ActiveSync to synchronize.

  For more information, see "Adding ActiveSync synchronization to your application" [*UltraLite - C and C++ Programming*].

- **More flexible synchronization** Several new features have been added to enable more efficient and flexible selection of data to synchronize:
  - You can use publications to partition your data into different sets, which can be synchronized separately. This permits the efficient synchronization of time-sensitive data, perhaps over slow connection links, while other data can be synchronized at a more convenient time.
  - Download-only synchronization permits you to add read-only tables to your UltraLite database, and to synchronize them efficiently using a download-only synchronization.
  - You can mark a table to be synchronized each time, whether or not the data in the table has changed. This feature allows you to maintain user-configurable information on the UltraLite client that controls synchronization.
- **Global autoincrement default column values** This feature provides a straightforward way of maintaining primary key uniqueness in a synchronizing database.

  For more information, see "Overriding partition sizes for autoincremented columns" [*MobiLink - Client Administration*].
- **Additional control for UltraLite generator** New command line options have been added for the ulgen and sqlpp executables:
  - **Script version** You can associate a script version with generated synchronization scripts.
  - **Log query execution plans** The query execution plans for generated queries can be exported and displayed in Interactive SQL.
- **Error reporting** The **stream_error** field on the **ul_synch_info** structure can be used to determine the cause of synchronization errors.

  For more information, see "Stream Error synchronization parameter" [*MobiLink - Client Administration*].

Database management

- **Re-use of existing databases** In previous releases of UltraLite, any change to a database application required a rebuild and synchronization of the database. With this release, you can continue to use an UltraLite database with a new version of your application as long as the database schema does not change. Changes to queries do not of themselves require a new database, unless they reference new columns and so change the schema of the generated database.
- **Database defragmentation** The UltraLite store is designed to efficiently reuse free space, so that explicit defragmentation is not required under normal circumstances. For applications with extremely strict space requirements, an explicit defragmentation function is provided.
- **Choice of page size** You can choose to use 2 KB page sizes as an alternative to the default 4 KB pages.

Development features

- **CodeWarrior 7 support** The UltraLite plugin for CodeWarrior now supports CodeWarrior version 7.

- **eMbedded Visual C++** Development using this tool is supported, and an eMbedded Visual C++ project is supplied for the CustDB sample application.
- **Palm OS 4.0 and file-based data storage** UltraLite now supports version 4.0 of the Palm Computing Platform. Beginning with Palm 4.0, a variety of secondary storage schemes is introduced. You can use a file-based UltraLite data store on an expansion card for a Palm 4.0 device.

  For more information, see "ULEnableFileDB function (deprecated)" [*UltraLite - C and C++ Programming*].
- **Improved synchronization for Palm Computing Platform** A new and simplified synchronization mechanism for HotSync and ScoutSync synchronization on the Palm Computing Platform has several benefits over previous synchronization mechanisms:
  - Launch and exit times are fast.
  - No extra storage is required on the Palm device during synchronization.
  - The application can be synchronized several times without launching.
  - No stream parameter needs to be specified.

  The **ULPalmDBStream** and **ULConduitStream** functions are deprecated.

  For more information, see "Adding HotSync synchronization to Palm applications" [*UltraLite - C and C++ Programming*].
- **Easier deployment on the Palm Computing Platform** You can deploy initial copies of the UltraLite database to your end users so that the first synchronization does not have to download an initial copy of the data for each user.

  For more information, see "Deploying Palm applications" [*UltraLite - C and C++ Programming*].
- **Improved handling of Palm segments** When developing for the Palm Computing Platform, application code must be divided into segments of limited size.

  The segmentation method provided in earlier versions of the software allowed no user control over the segmentation of the UltraLite generated code, and tended to assign too many segments (which could degrade performance). A new mechanism generates fewer segments and provides customers with control over the assignment of segments.
- **LONG values in embedded SQL** You can use host variables for long values (between 32 KB and 64 KB) using the DECL_LONGVARCHAR and DECL_LONGBINARY.
- **Analyzer hooks in the reference database** The UltraLite generator now invokes stored procedures before and after the analysis process.
- **Query plan information** The UltraLite generator can now output the access plan to be used for queries in UltraLite applications. Also, you can view the access plan that would be used for UltraLite from Interactive SQL.
- **Script version control** You can specify the script version to be used for synchronization on the UltraLite generator command line.

- **Additional SQL and API features** The following features are now available to UltraLite applications.
  - **@@identity supported** The @@identity global variable is now supported by UltraLite. This feature is useful in the context of global autoincrement default column values. In the C++ API, use the **ULConnection::GetLastIdentity()** method.
  - **Number of rows in a table** From the C++ API programming interface you can determine the number of rows in a table using the **ULTable::GetRowCount()** method. Embedded SQL users continue to use the SELECT COUNT(*) FROM *table-name* statement.
  - **Delete all rows in a table** From the C++ API programming interface you can delete all rows in a table using the **ULTable::DeleteAllRows()** method. Embedded SQL users continue to use the DELETE FROM *table-name* statement.
  - **Number of rows affected** From embedded SQL you can determine the number of rows affected by the last INSERT, UPDATE, or DELETE statement using the SQLCOUNT macro.
  - **Number of rows to be uploaded** You can determine the number of rows that need to be synchronized.

    For more information, see "ULCountUploadRows function" [*UltraLite - C and C++ Programming*].
  - **Last download time** You can obtain the last download time of a publication from the UltraLite application.

    For more information, see "ULGetLastDownloadTime function" [*UltraLite - C and C++ Programming*].
  - **Additional cursor operations** The **ULTable** class of the C++ API has additional methods (**FindFirst**, **FindNext**, **FindPrevious**, **FindLast**) to locate rows in a result set.
  - **Queries from DUMMY system table** Queries of the form SELECT … FROM DUMMY are now supported.
  - **Updating multiple tables** Cursors over multiple tables can now accept updates that modify more than one table.
  - **Improved LONG data type handling for embedded SQL** The DECL_LONGVARCHAR and DECL_LONGBINARY host variable types can be used to send or retrieve data over 32 KB in a single operation.

    For more information, see "Data types in embedded SQL" [*UltraLite - C and C++ Programming*].

SQL Remote new features

- **Event-hook procedures** A set of event-hook procedures have been added to enable customization of the replication process. By writing stored procedures with specified names, you can add customizations at several points in the actions the Message Agent takes during replication.

  For more information, see "SQL Remote event-hook procedures" [*SQL Remote*].

Behavior changes in version 8

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 8.

Adaptive Server Anywhere behavior changes

The following are behavior changes from previous versions of the software.

For a list of newly deprecated and unsupported features, see "Deprecated and unsupported features" on page 255.

- **Java in the database separately licensed** As a consequence, the default behavior when creating a database is to exclude support for Java in the database.

  Java in the database is no longer needed in UltraLite reference databases, as the UltraLite generator has been changed to use an external Java virtual machine.

  For more information, see "SQL Anywhere 10 components" [*SQL Anywhere 10 - Introduction*].

- **Aggregate functions and outer references** Adaptive Server Anywhere version 8 follows new SQL/99 standards for clarifying the use of aggregate functions when they appear in a subquery. These changes affect the behavior of statements written for previous versions of the software: previously correct queries may now produce error messages, and result sets may change.

  For more information, see "Aggregate functions and outer references" [*SQL Anywhere Server - SQL Usage*].

- **User-supplied selectivity estimates** Adaptive Server Anywhere allows you to specify explicit selectivity estimates to guide the choice of access plan. These estimates were most useful as workarounds to performance problems where the software-selected access plan was poor. The new user_estimates connection option controls whether the optimizer uses or ignores user-supplied selectivity estimates.

  If you have used these estimates as a workaround to performance problems, it is recommended that you set the user_estimates option to OFF because an explicit estimate may become inaccurate and may force the optimizer to select poor plans. This version includes query processing enhancements such as internal join algorithms which provide a significant improvement in query performance.

  For more information about user-supplied selectivity estimates, see "user_estimates option [database]" [*SQL Anywhere Server - Database Administration*] and "Explicit selectivity estimates" [*SQL Anywhere Server - SQL Reference*].

- **Row ordering** A side-effect of improvements to query processing for version 8.0 is that row ordering is less deterministic. In the absence of an ORDER BY clause, Adaptive Server Anywhere returns rows in whatever order is most efficient. This means the appearance of result sets may vary depending on when you last accessed the row and other factors. The only way to ensure that rows are returned in a particular order is to use ORDER BY.

  The LIST function is among those functions particularly affected by this change.

- **Access plan changes** The access plans selected by this release of Adaptive Server Anywhere are less likely to use indexes than previous releases of the software. Improvements to the efficiency of table scans, together with a more selective cost model used in comparing the cost of access plans, leads to a more accurate assessment of the usefulness of indexes than in previous versions of the software.
- **Cursor changes** A side effect of cursor enhancements is that the cursors in this version provide behavior closer to defined standards than before. This may produce cursor sensitivity changes for some cursors, as Adaptive Server Anywhere supplies behavior that better matches the expectations of ODBC and other interfaces. For example, embedded SQL SCROLL cursors now disallow prefetching, so that value changes are reflected in the cursor.

  This change may affect existing applications that check return codes only for SQL_SUCCESS and not SQL_SUCCESS_WITH_INFO. Applications that check for SQL_SUCCESS_WITH_INFO receive a warning if the cursor behavior is different from that requested. The warning is SQLCODE=121, SQLSTATE 01S02.

  Insensitive cursors are not updatable.

  For more information, see "Insensitive cursors" [*SQL Anywhere Server - Programming*].
- **Stored procedure storage** Stored procedures are now stored as written. Adaptive Server Anywhere does create an internal representation of the procedure, which is used for profiling.
- **OPEN CURSOR on insert not supported** The ability to open a cursor on an INSERT statement has been dropped. Opening an updatable cursor on a SELECT statement gives the same capabilities in an industry-standard manner.
- **User-defined functions** User defined function parameters and return values are now cached. If a function is used several times within a SQL statement, the cached parameter values may result in the cached result being used, instead of the function being evaluated again. In previous releases, user-defined functions were re-evaluated each time they were needed. The new behavior provides better performance and more consistent results, but may change results compared to previous releases of the software.
- **NUMBER(*) function changes** The use of the NUMBER function has been restricted to avoid problematic behavior. NUMBER is intended for use in the select-list of a query, to provide a sequential row-numbering of the result set, and this use is still permitted.

  The NUMBER function may now give negative numbers in cases where it previously did not, such as if you carry out an absolute fetch with a value of -1 and then move backward through the cursor. The new behavior corresponds to the ISO/ANSI fetch offset.

  Use of the NUMBER function in many circumstances, such as a WHERE clause or a HAVING clause, now gives an error.

  For more information, see "NUMBER function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].
- **Custom collation changes** Previously, the -d option in the Collation utility accepted three parameters; now it accepts only two parameters. The *cust-map-file* parameter is no longer accepted.

As well, the script files *collsqmp.sql* and *custmap.sql* are no longer present and cannot be used for built-in or custom collations, respectively.

For newly-created databases, the SYSCOLLATIONMAPPINGS table contains only one row with the collation mapping. For databases created with previous versions of Adaptive Server Anywhere, this table contains a row for each built-in collation.

- **Trigger name changes** Trigger names no longer need to be unique across a database. They only need to be unique within the table to which they apply. The syntax of DROP TRIGGER and COMMENT ON TRIGGER has consequently changed so that you can only specify an owner if you also specify a table. This means that older scripts that qualify triggers with only an owner will now result in a "Table not found" error.
- **Addresses changed in sample database** The addresses in the Adaptive Server Anywhere 9.0 Sample database are different from those in previous releases.
- **JAR file name for internal JDBC driver changed** The internal JDBC driver classes are now installed as a JAR file named ASAJRT instead of ASAJDBC.
- **RESTORE DATABASE statement permissions** A connection to the utility database is no longer required to execute a RESTORE DATABASE statement. The permissions required to execute a RESTORE DATABASE statement are controlled by the -gu command line option.

  For more information, see "RESTORE DATABASE statement" [*SQL Anywhere Server - SQL Reference*].
- **Return empty string as a NULL string for TDS connections** The tds_empty_string_is_null option controls whether the server returns empty strings as a string containing one blank character or a NULL string for TDS connections.

  For more information, see "tds_empty_string_is_null option [database]" [*SQL Anywhere Server - Database Administration*].
- **COMMENT statement changed** Previously, the syntax for COMMENT ON INDEX included an optional owner name of the index. The index name can now optionally include the owner and table. The syntax for COMMENT ON INDEX is now

  COMMENT ON INDEX [[*owner*.]*table*.]*index-name* **IS** *comment*

  For more information, see "COMMENT statement" [*SQL Anywhere Server - SQL Reference*].
- **Character set conversion enabled by default** In previous versions of Adaptive Server Anywhere, character set conversion was turned off by default and you had to specify the -ct command line option to enable character set conversion. Character set conversion is now enabled by default, but can be disabled using the -ct- command line option.

  When the server determines that the connection's character set differs from the database's character set, the server applies character set conversion to all the character strings sent to and from the server for that connection.

The server disables character set conversion for a connection when it determines that the database and the connection have equivalent character sets.

In most cases, character set conversion should be enabled. One possible change in behavior occurs when binary data is inserted into a database and is fetched as character data, or vice versa. In this case, the data may not be returned exactly as it was entered because the server applies character set conversion only to character data. To avoid this problem, applications should not send or fetch character data using a binary type.

- **CONVERT, timestamp_format and date_format** When using the timestamp_format or date_format options, if you specify a character symbol in mixed case (such as `Mmm`), Adaptive Server Anywhere now chooses the case that is appropriate for the language that is being used. In addition, the CONVERT function now converts character dates into the case that is appropriate to the language that is being used. For example, in English the appropriate case is `May`, while in French it is `mai`.

  For more information, see "date_format option [compatibility]" [*SQL Anywhere Server - Database Administration*], "timestamp_format option [compatibility]" [*SQL Anywhere Server - Database Administration*], and "CONVERT function [Data type conversion]" [*SQL Anywhere Server - SQL Reference*].

- **Change to three-valued Boolean logic** Two-valued Boolean logic applies only to cases of *expr* = NULL, where *expr* refers to a base column or an expression over a base column. Otherwise, three-valued logic applies. The ansinull option now affects only this specific case in the query's WHERE clause.

- **Sybase Central and Interactive SQL accept COMMLINKS connection parameter** In previous versions of Adaptive Server Anywhere, Sybase Central and Interactive SQL (the dbisql utility) ignored the COMMLINKS connection parameter. Sybase Central and Interactive SQL now accept this parameter.

  As a result of this change, some connection strings may behave differently than in previous versions of Adaptive Server Anywhere. Specifically, if you do not supply `COMMLINKS=tcpip`, Interactive SQL and Sybase Central do not look for servers on the network.

  For more information, see "CommLinks connection parameter [LINKS]" [*SQL Anywhere Server - Database Administration*].

- **Clients ignore SQLLOCALE environment variable** Clients can use the CharSet connection parameter to specify the character set to be used on a connection. In previous versions of Adaptive Server Anywhere, the CHARSET parameter of the SQLLOCALE environment variable was used to change the client's default character set if the CharSet connection parameter was not supplied. Clients now ignore the SQLLOCALE environment variable.

- **Unsupported character sets cause connection failure** Clients can use the CharSet connection parameter to specify the character set to be used on a connection. However, if the server does not support the requested character set, the connection fails. When a client requested an unsupported character set in previous versions of Adaptive Server Anywhere, the connection succeeded with a warning. If the client does not specify a character set, but the client's local character set is unsupported by the server, the connection succeeds, but with a warning that the character set is not supported.

This behavior occurs in version 8 clients connecting to version 6.x, version 7.x, and version 8 database servers.

- **Default packet size change** The default packets size for client/server communications has been changed from 1024 bytes to 1460 bytes.

  For more information on packet size, see "CommBufferSize connection parameter [CBSIZE]" [*SQL Anywhere Server - Database Administration*], and "-p server option" [*SQL Anywhere Server - Database Administration*].

- **dbdsn utility manages Adaptive Server Anywhere data sources only** The dbdsn utility for managing Adaptive Server Anywhere ODBC data sources is now explicitly restricted to Adaptive Server Anywhere data sources only.

- **login_procedure option requires DBA authority** The login_procedure option can only be set by a user with DBA authority. In previous versions of Adaptive Server Anywhere, DBA authority was not required to set this option. A user with DBA authority can change the setting of this option for other users, but users without DBA authority cannot change their own setting of this option. As a result of this change, the DBA can ensure that a common procedure, if necessary, is executed when a user connects.

  For more information, see "login_procedure option [database]" [*SQL Anywhere Server - Database Administration*].

- **ESTIMATE_SOURCE returns new values** The ESTIMATE_SOURCE function returns more detailed values than previously.

  For more information, see "ESTIMATE_SOURCE function [Miscellaneous]" [*SQL Anywhere Server - SQL Reference*].

Deprecated and unsupported features

This list includes features that are no longer supported and that impact existing applications.

- **NetWare 4.10 unsupported** Novell NetWare version 4.11 and later is still supported. Versions 3.x and 4.10 are unsupported.

- **NetBios unsupported** The NetBios port is no longer supported. If you use NetBios, you should switch to TCP/IP or SPX.

- **IPX unsupported** The IPX port is no longer supported. If you use IPX, you should switch to SPX or TCP/IP.

- **Deprecated collations** The following collations are no longer supported. Where indicated, they have been superceded by different collations:

Deprecated	Superceded by
437	437LATIN1

Deprecated	Superceded by
850	850LATIN1
852	852LATIN2
860	860LATIN1
863	863LATIN1
865	865NOR
SJIS	932JPN
SJIS2	932JPN
WIN_LATIN1	1252LATIN1
WIN_LATIN5	1254TRK
Internal	850LATIN1
437EBCDIC	

- **-e option no longer supported** The -e command line option and the -e option in the Data Source utility, used to encrypt client/server communications, are no longer supported. The -ec option has replaced them. On the server, -ec **simple** uses the same encryption algorithm as -e in previous versions of Adaptive Server Anywhere.
- **None parameter deprecated** The None parameter for the isql_plan option is no longer supported. The query optimization plan now appears on the Plan tab in the Results pane. When you click the Plan tab, a plan always appears. Previously, the plan appeared in the Messages pane.
- **WITH HASH SIZE n clause deprecated** The WITH HASH SIZE clause is no longer supported.
- **max_work_table_hash_size option deprecated** The max_work_table_hash_size option is no longer supported.
- **max_hash_size option deprecated** The max_hash_size option is no longer supported.
- **SATMP environment variable deprecated** The SATMP environment variable used by UNIX versions of Adaptive Server Anywhere to indicate a directory where temporary files are kept is no longer supported. On UNIX, the ASTMP environment variable can be used to indicate where temporary files are kept.

  For more information, see "SATMP environment variable" [*SQL Anywhere Server - Database Administration*].

- **dbtran -id option removed** The -id command line option on the dbtran utility is not present in this software.

MobiLink behavior changes

- **MobiLink Adaptive Server Anywhere client setup** MobiLink clients are now configured using publications and synchronization subscriptions, rather than synchronization definitions.

  For more information, see "SQL Anywhere Clients" [*MobiLink - Client Administration*].

- **Last download timestamp parameter changes scripts** The addition of a new parameter to many scripts makes timestamp-based synchronization easier to implement. The new parameter breaks existing scripts, as it is supplied as the first parameter to many scripts. To continue using existing scripts, change the behavior to supply the last download timestamp as the final parameter by supplying the -zd MobiLink server command line option.
- **MobiLink shutdown** Previously, *dbmlstop* commands from a remote connection could cause the MobiLink server to shut down. Now only *dbmlstop* requests from the same machine as the MobiLink server will cause the MobiLink server to shut down. The -zs option, which would allow *dbmlstop* to stop the server, is no longer required.
- **Default setting for liveness detection in TCP/IP streams has changed** The default setting for keep_alive is now 1 (ON).
- **MobiLink can hide dbmluser information** The amount of information displayed when the dbmluser command line utility is used, such as timestamp, copyright, and other MobiLink server messages no longer appear by default.
- **MobiLink user authentication** You must use the -zu+ option on the MobiLink server command if you do not use MobiLink user authentication.
- **Default log extension now .mls** Each file is now named DDMMYYNN.MLS where DD is the day of the month, MM is the month number, and YY is the year in the century. NN is a sequence number that starts at 1 with the first file.
- **dbmlsync StreamCompression extended option deprecated** This option is now ignored.

UltraLite behavior changes

- **Required code change for Palm applications** Your code must specify whether to use standard record-based database storage or to use the file-based expansion card storage for Palm Computing Platform version 4.x. You must add a single function call before calling ULPalmLaunch (embedded SQL) or ULData.PalmLaunch (C++ API). The function calls are as follows:

  ```
  ULEnablePalmRecordDB( &sqlca );
  ```

  or


```
ULEnableFileDB( & sqlca );
```

Supply **ULEnablePalmRecordDB** if you use record-based storage, and **ULEnableFileDB** for file-based storage. If the device does not support file-based storage, ULPalmLaunch sets SQLCODE -82.

The following environments and/or features are no longer supported by UltraLite:

- **DOS target platform** DOS is no longer a supported platform.
- **Metrowerks CodeWarrior 5 development platform** CodeWarrior 6 is now required for UltraLite development.
- **Palm 2.x no longer supported** UltraLite no longer supports development for Palm OS 2.x devices such as the PalmPilot Professional. Version 3.0 or later is required.
- **ULPalmDBStream and ULConduitStream deprecated** The new synchronization stream for HotSync or ScoutSync synchronization on the Palm Computing Platform means that the **ULPalmDBStream** and **ULConduitStream** functions are obsolete. They are still accepted, but have no effect.
- **UltraLite generator uses external Java virtual machine** The UltraLite Analyzer now runs external to the database engine, and so can be used against reference databases even if they are not Java-enabled.
- **UltraLite JDBC package name changed** The package name for the UltraLite JDBC functions has been changed from **com.sybase.asa.ultralite.jdbc** to **ianywhere.ultralite.jdbc**. This requires a change to the `import` statements used for UltraLite applications.
- **All changes must be committed before download synchronization** Download-only synchronization is no longer an exception to the rule that all changes must be committed before synchronization.

You should also check Adaptive Server Anywhere behavior changes, as some may have an impact on your application.

CHAPTER 9

What's New in Version 7.0.3

Contents

New features

This section introduces the new features in Adaptive Server Anywhere version 7.0.3. It provides a listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

- **Database properties for blank padding and case sensitivity** You can now use two new properties to determine if your database uses blank padding when comparing strings (BlankPadding) or if your database is case sensitive (CaseSensitive).

  For more information see "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **Server property for C2 security mode** You can now use the new C2 server property to determine whether the database server was started using the -sc option. The -sc option is intended for use in a C2-certified environment.

  For more information see "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **Login procedure allows connections to be blocked** The login_procedure option allows a stored procedure to be called for each new connection. This procedure can now be used to disallow database connections.

  For more information see "login_procedure option [database]" [*SQL Anywhere Server - Database Administration*].

- **FileDSN now supported on UNIX** The FileDSN connection parameter for ODBC data sources is now supported on UNIX.

Behavior changes

The following is a behavior changes from previous versions of the software.

- **Load table semantics changed** The LOAD TABLE command now has improved semantics if a column list is specified. A column list must specify each of the columns that exist in the file in the order in which they appear. Column names that do not appear in the list are set to NULL, zero, an empty string, or a default value, depending on the column nullability, data type, and default behavior.

  Columns that exist in the input file but which are to be ignored by LOAD TABLE can be specified using the column name **filler()**.

  For more information see "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

CHAPTER 10

What's New in Version 7.0.2

Contents

New features in version 7.0.2

This section lists the new features introduced in components of SQL Anywhere Studio version 7.0.2.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 7.0.2. It provides an exhaustive listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

- **Dynamic cache sizing** On Windows 95/98, the size of the database server cache increases and decreases depending on the load on the database server and the other demands on system memory. This feature removes the need for choosing an explicit cache size in many circumstances, and can also boost performance.

  For more information, see "Dynamic cache sizing on Windows" [*SQL Anywhere Server - SQL Usage*].

- **Viewing current license information** The License [dblic] utility now accepts an argument that allows you to view current license information for a server executable without starting the server.

  For more information, see "Server Licensing utility (dblic)" [*SQL Anywhere Server - Database Administration*].

- **Additional collations** There are three new collations available: one to support Russian and Ukrainian (1251CYR, ANSI Code Page 1251), one to support Turkish (1254TRK, ANSI Code Page 1254) and one to support specialty requirements for some German users (1252DEU, ANSI Code Page 1252).

  The 1252LATIN1 collation continues to be the recommended German collation. 1252DEU is a specialty collation only, and should not be used without understanding its sorting and comparison properties.

  For a complete list of available collations, see "Choosing collations" [*SQL Anywhere Server - Database Administration*].

- **Interactive SQL return codes** When run from the command prompt, Interactive SQL now sets a program exit code indicating the success or otherwise of the operations in the session.

  For more information, see "Interactive SQL utility (dbisql)" [*SQL Anywhere Server - Database Administration*].

- **delete_old_logs enhancement** The delete_old_logs database option is used in management of offline transaction logs in a replication environment. The option has been enhanced to permit more control over when processed transaction logs are deleted.

  For more information, see "delete_old_logs option [MobiLink client] [SQL Remote] [Replication Agent]" [*SQL Anywhere Server - Database Administration*].

- **Connection troubleshooting and enhancements** The following changes have been made to permit better troubleshooting and tuning of client/server communications:

- The APPINFO string is now added to the client debug log file.

  For more information, see "AppInfo connection parameter [APP]" [*SQL Anywhere Server - Database Administration*].

- Two new connection parameters can be used to tune prefetching of rows.

  For more information, see "PrefetchRows connection parameter [PROWS]" [*SQL Anywhere Server - Database Administration*] and "PrefetchBuffer connection parameter [PBUF]" [*SQL Anywhere Server - Database Administration*].

- The **ConnectionName** connection parameter value was previously overridden for ODBC clients. You can now use the **ConnectionName** parameter from ODBC clients.

  For a list of connection parameters, see "Connection parameters" [*SQL Anywhere Server - Database Administration*].

- **Language Selection utility** The Language Selection (dblang) utility allows you to report and modify the language registry for the Adaptive Server Anywhere messages and Sybase Central interface elements.

  For more information, see "Language Selection utility (dblang)" [*SQL Anywhere Server - Database Administration*].

- **dbspawn enhancement** The Spawn (dbspawn) utility optionally reports the operating system process ID of the database server.

  For more information, see "Start Server in Background utility (dbspawn)" [*SQL Anywhere Server - Database Administration*].

- **First day of week option** The default first day of week is now 7, which is Sunday. This value affects the result of DATEPART when obtaining a weekday value. You can change the first day of week using the DATEFIRST option in the Transact-SQL SET statement. You can set it permanently using SET OPTION first_day_of_week=*n*.

  For more information, see "SET statement [T-SQL]" [*SQL Anywhere Server - SQL Reference*], or "first_day_of_week option [database]" [*SQL Anywhere Server - Database Administration*].

- **New migration tool** You can migrate (import) remote Oracle, DB2, Microsoft SQL Server, Sybase Adaptive Server Enterprise and Sybase Adaptive Server Anywhere databases into Adaptive Server Anywhere using the new sa_migrate set of stored procedures.

  For more information, see "Migrating databases to SQL Anywhere" [*SQL Anywhere Server - SQL Usage*].

- **Event handlers** Adaptive Server Anywhere can now determine how many instances of a particular event handler is executing at any given time. This is useful for limiting event handlers to only one instance at a time.

  For more information, see "EVENT_PARAMETER function [System]" [*SQL Anywhere Server - SQL Reference*].

- **New connection property** A new connection property helps distinguish between internal connections used to run event handlers.

  For more information, see "CONNECTION_PROPERTY function [System]" [*SQL Anywhere Server - SQL Reference*].

- **Dbdsn supports user and system specifiers** The Data Source [dbdsn] utility now supports the `u` (user) and `s` (system) options.

  For more information, see "Data Source utility (dbdsn)" [*SQL Anywhere Server - Database Administration*].

- **Support for comments in @filename files** Adaptive Server Anywhere now supports comment lines in @filename files.

  For more information, see "@data server option" [*SQL Anywhere Server - Database Administration*].

- **Truncate timestamp option** To allow for greater compatibility with non-Adaptive Server Anywhere databases, you can now truncate timestamp values.

  For more information, see "truncate_timestamp_values option [database] [MobiLink client]" [*SQL Anywhere Server - Database Administration*].

- **Obtaining licensing information** Engine properties have been added to help you obtain accurate licensing information about your copy of Adaptive Server Anywhere.

  For more information, see "Server-level properties" [*SQL Anywhere Server - Database Administration*].

- **Resetting the autoincrement value** The sa_reset_identity system procedure allows you to reset an autoincrement value for the next row.

  For more information, see "sa_reset_identity system procedure" [*SQL Anywhere Server - SQL Reference*].

MobiLink new features

- **Maximum number of threads applying upload streams** To reduce database contention, the `-wu` command line option can now be used to set the maximum number of worker threads allowed to upload concurrently. The upload requests are processed in first-come, first-serve order.
- For more information, see "MobiLink Server Options" [*MobiLink - Server Administration*].

Behavior changes in version 7.0.2

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 7.0.2.

Adaptive Server Anywhere behavior changes

The following are behavior changes from previous versions of the software.

- **Aliases must be defined before first reference** In earlier versions of SQL Anywhere, it was possible to refer to an alias in a SELECT list before the definition of the alias had appeared. An attempt to do so will now generate the error "Definition for alias alias-name must appear before its first reference". To prevent this error, the SELECT list must be re-ordered so that the alias definition appears before its first use.

CHAPTER 11

What's New in Version 7.0.1

Contents

New features in version 7.0.1

This section lists the new features introduced in components of SQL Anywhere Studio version 7.0.1.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 7.0.1. It provides an exhaustive listing of major and minor new features, with cross references to locations where each feature is discussed in detail.

- **New Service utility** Running a database server as a service under NT allows databases to keep running without tying up the computer on which they are running. Previously, you added services using the Create a New Service wizard from Sybase Central. In Version 7 of Adaptive Server Anywhere, you can now also manage Adaptive Server Anywhere services on Windows NT using the Service Creation [dbsvc] utility. A variety of options allow you to add or delete a service, list all Adaptive Server Anywhere services, or display the details of a particular service. This feature is particularly useful for embedding the creation of a service in installations.

  For more information about the Service utility, see "Service utility (dbsvc) for Windows" [*SQL Anywhere Server - Database Administration*].

- **Windows CE 3.0 support** In addition to Windows CE 2.11, Adaptive Server Anywhere now supports Windows CE 3.0 on the following processors:

  - MIPS
  - Hitachi SH3.
  - ARM.

  Support for Windows CE 2.11 is provided on a wider range of platforms.

  With support for Windows CE 3.0, the OLE DB driver on CE works without installing any additional software.

- **Embedded SQL enhancements** A new function, **db_locate_servers**, provides a programmatic way of locating Adaptive Server Anywhere database servers listening on TCP/IP.

  For more information, see "db_locate_servers function" [*SQL Anywhere Server - Programming*].

  A new callback function, DB_CALLBACK_CONN_DROPPED, provides a way of adding logic when the database server is about to drop a connection.

  For more information, see "db_register_a_callback function" [*SQL Anywhere Server - Programming*].

- **Connection-level Debug and LogFile connection parameters** The DBG and LOG client-side connection parameters are now connection-specific, so you can configure debug information separately for different connections, even from the same application.

For more information, see "LogFile connection parameter [LOG]" [*SQL Anywhere Server - Database Administration*].

- **New database property** The **LTMGeneration** property has been added for users of the Replication Agent, or LTM. This property is primarily for use in technical support cases.

  For more information, see "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **New deployment feature** Users of InstallShield Professional 5.5 and up can use the new SQL Anywhere Studio InstallShield Template Projects to deploy their own application. This feature allows you to quickly build your application's installation using the entire template project, or just the parts that apply to your install.

- **New backup statement feature** When using the Backup statement, you can specify an empty string as a directory to rename or truncate the log without copying it first. This is particularly useful in a replication environment where space is a concern. You can use this feature with an event handler on transaction log size to rename the log when it reaches a given size, and with the delete_old_logs option to delete the log when it is no longer needed.

  For more information, see "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

MobiLink new features

Following is a list of changes and additions to the software introduced in version 7.0.1.

- **User authentication** A password-based system for user authentication adds additional security to your MobiLink installation.

  For more information, see "MobiLink Users" [*MobiLink - Client Administration*].

- **Extensive documentation of transport-layer security** The transport-layer security documentation has been extended to describe a variety of architectures possible with this powerful security mechanism.

  For more information, see "Transport-Layer Security" [*SQL Anywhere Server - Database Administration*].

- **Customizing synchronization and synchronization-related processes** The Adaptive Server Anywhere synchronization client *dbmlsync* now supports a set of events. You can add stored procedures to your Adaptive Server Anywhere database to program event-based actions. This adds flexibility to the synchronization process, including the ability to schedule synchronization.

  For more information, see "Introduction to dbmlsync hooks" [*MobiLink - Client Administration*].

- **Synchronization optimizations** You can optimize the following aspects of the synchronization process.

  - UltraLite client applications can specify that a synchronization includes only uploads, and that no download phase should be attempted.

This option lessens the overall synchronization time when only uploads are needed.

- Adaptive Server Anywhere clients can specify an incremental upload option to reduce memory requirements for large uploads.

  For more information, see "Using dbmlsync extended options" [*MobiLink - Client Administration*].

- Adaptive Server Anywhere clients can permit concurrent modification of rows during synchronization.

  For more information, see "Concurrency during synchronization" [*MobiLink - Client Administration*].

- **Scheduling synchronization** You can use an extended option to configure the *dbmlsync* utility or a synchronization definition to synchronize according to a schedule.

  For more information, see "Scheduling synchronization" [*MobiLink - Client Administration*].

- **Adaptive Server Anywhere client synchronization utility enhancements** There are several enhancements to the *dbmlsync* utility:

  - You can supply the -mp and -mn options to supply or change the MobiLink password.
  - You can supply repeated -n options to synchronize more than one synchronization definition.
  - The -v option now generates more useful information, including options set in the synchronization definition.
  - The -r option is extended to allow more flexibility in uploads when the recorded progress indicators in the client and consolidated databases do not match.
  - The -x option renames and restarts the transaction log. This option is useful if you use the consolidated database as a backup of the data at the client, so that client-side backups are not required.
  - If you do not specify connection parameters on the command line, *dbmlsync* displays a dialog on which you can provide connection parameters and startup options.
  - The *dbmlsync* window displays synchronization progress, and allows you to cancel synchronization.

  For more information, see "dbmlsync syntax" [*MobiLink - Client Administration*].

- **New MobiLink server options** The MobiLink server provides additional options.

  For more information, see "MobiLink Server Options" [*MobiLink - Server Administration*].

- **New script events** New scripts have been added for handling and reporting errors arising from the ODBC Driver Manager, and to provide additional flexibility when designing synchronization techniques.

  For more information, see the following:

  - "handle_odbc_error connection event" [*MobiLink - Server Administration*]
  - "prepare_for_download connection event" [*MobiLink - Server Administration*]

- "report_odbc_error connection event" [*MobiLink - Server Administration*]

- **Interface to dbmlsync features** Developers using the C programming language can add features of the *dbmlsync* utility to their application.

  For more information, see "Initiating synchronization from an application" [*MobiLink - Client Administration*].

SQL Remote new features

SQL Remote version 7.0.1 includes the following new features.

- **More message links on Novell NetWare** You can now use the FTP and SMTP/POP message links on Novell NetWare.
- **Enhanced verbose mode** Verbose mode for the Message Agent now writes out full connection information, with user IDs and passwords replaced by asterisks.

UltraLite new features

UltraLite 7.0.1 introduces several new features:

- **New synchronization stream for Palm Computing Platform** In addition to the current **ULPalmDBStream** synchronization stream, a new synchronization stream is available for the Palm Computing Platform in this release. The new stream is called **ULConduitStream**, and in many circumstances this stream can provide dramatic performance improvements for HotSync synchronization.

  This feature superceded
  A new conduit-based synchronization stream introduced in version 8.0.0 supercedes both **ULPalmDBStream** and **ULConduitStream**.

- **Monitoring and canceling synchronization** You can view synchronization status and build the ability to cancel synchronization into your UltraLite applications.
- **User authentication in MobiLink** MobiLink synchronization now has its own user authentication scheme. Password fields and methods have been added to the UltraLite synchronization parameters to take advantage of this scheme.

  For more information, see "Network protocol options for UltraLite synchronization streams" [*MobiLink - Client Administration*].

- **New platforms for secure synchronization** You can now use the transport-layer security features for synchronization from a wider range of target platforms, including Windows CE on the Hitachi SH4 chip, and VxWorks on Intel x86 chips and on the Windows VxSim emulator.

  For more information, see the following:

- "Network protocol options for UltraLite synchronization streams" [*MobiLink - Client Administration*].
- "Synchronization on Windows CE" [*UltraLite - C and C++ Programming*].

VxWorks unsupported in version 9
Support for the VxWorks platform is dropped entirely in version 9.

- **Non-synchronizing tables** You can include tables in the reference database that are included in the UltraLite database, but are not synchronized. Other than synchronization, the tables can be used like any other table in the remote database.
- **Windows CE emulator support enhancements** You can now run UltraLite applications under Windows CE x86 emulators.
- **Synchronization optimization** Client applications can specify that a synchronization includes only uploads, and that no download phase should be attempted. This option lessens the overall synchronization time when only uploads are needed, especially over slow communication links.

  For more information, see "Network protocol options for UltraLite synchronization streams" [*MobiLink - Client Administration*].
- **Automatic HTTP version detection** The MobiLink server now detects and uses the HTTP version used by each client. This capability renders the **version** parameter on the MobiLink server -x option redundant.

  For information on the MobiLink server command line, see "MobiLink Server Options" [*MobiLink - Server Administration*].
- **Client port specification** You can specify, at a client, a range of ports used by a client during synchronization. This feature can be useful when synchronizing from a client inside a firewall to a MobiLink server outside.

  For more information, see "Network protocol options for UltraLite synchronization streams" [*MobiLink - Client Administration*].

CHAPTER 12

What's New in Version 7.0.0

Contents

New features in version 7.0.0

The primary format for the documentation is HTML Help. The HTML Help Home Page gives you easy access to the new features, information about how to contact Sybase, and other starting points for this release.

If you do not have Internet Explorer 4.0 or HTML Help installed on your computer, you will install Windows Help instead of HTML Help. The content is the same except for the HTML Help home page, which is not present in Windows Help.

If you are using Windows Help, you should look at Chapter 1 of *Getting Started with Adaptive Server Anywhere* for information on Adaptive Server Anywhere new features, and at the first chapters of the *UltraLite Developer's Guide* and the *Replication and Synchronization Guide* for information on new features in those technologies.

Adaptive Server Anywhere new features

This section introduces the new features in Adaptive Server Anywhere version 7.0. It provides an exhaustive listing of major and minor new features, with cross references to locations where details of each feature appear in the manuals.

If you have the printed version of this book, and if you do not have the complete SQL Anywhere Studio documentation set, you should look in the online documentation for the detailed description of each feature. To locate the information in the online documentation, go to the index and enter the specified title.

Administration and ease of use enhancements

- **Task scheduling and event handling in the database** You can now add scheduled operations to the database. This can be useful for automatic backups, periodic reports to fill summary tables, and other tasks.

  The database server can also be instructed to execute event handlers when certain events occur, including disk space thresholds on the drives holding the database file or the transaction log file, or failed connection attempts.

  Event handlers can be created and altered using Sybase Central, and can be debugged using the Adaptive Server Anywhere debugger.

  For more information see "Automating Tasks Using Schedules and Events" [*SQL Anywhere Server - Database Administration*], and "CREATE EVENT statement" [*SQL Anywhere Server - SQL Reference*].

- **Updated Sybase Central** Sybase Central has been rewritten and contains significant new features. In particular, Sybase Central is now available from any supported platform, and not just Windows operating systems.

- **Updated Interactive SQL** The Interactive SQL [dbisql] utility has been enhanced and is now available as a windowed-application from any supported platform.

- **New validation features** Additional validation of databases is provided by the new VALIDATE INDEX statement and by enhancements to the VALIDATE TABLE statement. This statement is called

both by the Validation [dbvalid] utility, and by the sa_validate system procedure. The enhancements are available through all these routes.

For more information, see "VALIDATE statement" [*SQL Anywhere Server - SQL Reference*].

- **Lock troubleshooting** A new system procedure, sa_locks, provides information on locks in the database. If lock issues are identified, information on the connection processes involved can be found using the **AppInfo** connection property.

  For more information, see "sa_locks system procedure" [*SQL Anywhere Server - SQL Reference*], and "AppInfo connection parameter [APP]" [*SQL Anywhere Server - Database Administration*].

- **Unloading result sets** The new UNLOAD SQL statement allows query result sets to be unloaded into a comma-delimited text file.

  For more information, see "UNLOAD statement" [*SQL Anywhere Server - SQL Reference*].

- **Validate backup copies of databases** If you backup a database using the WAIT BEFORE START clause, the backup copy is created in such a fashion that it can be started in read-only mode and validated.

  For more information, see "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

- **Default global autoincrement** This feature provides an easy way to generate integer keys which are unique across all databases in a SQL Remote replication environment.

Integration with distributed computing architectures

- **Distributed transactions and three-tiered computing** Distributed transactions include operations on more than one server in a single transaction. A transaction server controls the commit and rollback behavior of distributed transactions.

  In this release, Adaptive Server Anywhere can participate in distributed transactions coordinated by the Microsoft Distributed Transaction Coordinator (DTC). Products such as Sybase Enterprise Application Server and Microsoft Transaction Server can use DTC for transaction coordination, so DTC support enables Adaptive Server Anywhere to participate in three-tiered computing with these products.

  For more information, see "Three-Tier Computing and Distributed Transactions" [*SQL Anywhere Server - Programming*].

Integration with COM

- **OLE DB provider** OLE DB is a data access model from Microsoft. It uses the Component Object Model (COM) interfaces and, unlike ODBC, OLE DB does not assume that the data source uses a SQL query processor. While it has been possible to access Adaptive Server Anywhere via OLE DB using an OLE DB/ODBC bridge provided by Microsoft, this release of Adaptive Server Anywhere includes an OLE DB provider. This provider brings several benefits:

  - OLE DB is the principal data access option for the forthcoming version of Windows CE.
  - Some features, such as updating through a cursor, are not available using the OLE DB/ODBC bridge.
  - If you use the Adaptive Server Anywhere OLE DB provider, ODBC is not required in your deployment.

For more information, see "SQL Anywhere OLE DB and ADO APIs" [*SQL Anywhere Server - Programming*].

Connectivity enhancements

- **Java connectivity improvements** If you use jConnect to connect to Adaptive Server Anywhere from a Java application, you can now take advantage of many of the features previously available only to ODBC and embedded SQL applications, such as autostarting of database servers, and detailed control over network communications using protocol options.

- **TCP/IP connectivity** Establishing a client/server connection over TCP/IP is now simpler. Clients no longer need to specify the port number when attempting to connect, even if the server is running on a port other than the default port number (2638). If the default port number is in use when a database server is started, the server acquires an unused port number from the operating system.

  If you are trying to connect through a firewall (using UseUDP=NO), and if the database server is not running on port 2638, you must still specify a port number. For more information on this scenario, see "Connecting across a firewall" [*SQL Anywhere Server - Database Administration*].

  The Server Enumeration utility (dblocate) displays all Adaptive Server Anywhere database servers running TCP/IP on a network. For more information, see "Server Enumeration utility (dblocate)" [*SQL Anywhere Server - Database Administration*].

- **SPX connectivity** You can use the SPX protocol for connecting to databases. This feature is particularly useful in Novell NetWare environments with IPX/SPX as the primary network protocol. SPX is recommended over IPX.

  For more information on SPX at the client, see "CommLinks connection parameter [LINKS]" [*SQL Anywhere Server - Database Administration*]. For information on SPX on the server, see "-x server option" [*SQL Anywhere Server - Database Administration*]. For network protocol options that you can use with SPX, see "Network protocol options" [*SQL Anywhere Server - Database Administration*].

Performance enhancements

- **Dynamic cache sizing** On Windows NT and UNIX, the size of the database server cache increases and decreases depending on the load on the database server and the other demands on system memory. This feature removes the need for choosing an explicit cache size under in many circumstances, and can also boost performance. On Windows 95/98, a less comprehensive cache resizing is implemented.

  For more information, see "Use the cache to improve performance" [*SQL Anywhere Server - SQL Usage*].

- **Indexing enhancements** Additional flexibility has been added to control the amount of information stored in indexes (the **hash size**) to improve index selectivity. Also, the architecture of primary and foreign key indexes has been altered.

  For indexes on multiple columns, or for indexes on columns in which the first set of characters or digits are similar across many rows, control over hash size provides a way of increasing the selectivity of indexes, and so improving performance.

For more information, see "Using indexes" [*SQL Anywhere Server - SQL Usage*], "CREATE INDEX statement" [*SQL Anywhere Server - SQL Reference*], and "CREATE TABLE statement" [*SQL Anywhere Server - SQL Reference*].

For information on how to find the number of levels in an index, see "sa_index_levels system procedure" [*SQL Anywhere Server - SQL Reference*].

In previous releases, primary and foreign keys have had a single index automatically associated with them, which describes all primary key values and all the related foreign key entries. In some situations, this architecture lead to poor performance. The new index organization separates these indexes, which leads to improved performance in some situations.

For more information on key indexes, see "Use keys to improve query performance" [*SQL Anywhere Server - SQL Usage*].

Your database must be unloaded and reloaded to take advantage of variable hash size indexes, and separate key indexes. Running the Upgrade [dbupgrad] utility is not sufficient.

- **Separate storage for string extensions** The physical storage of values longer than 255 characters has been reorganized. The pages allocated for a table are now divided into two disjoint sets. The first set contain only rows. Where a column value in a row contains a string longer than 255 characters, only a prefix of the string (up to 255 characters) and a reference to a string extension are stored in the row. For strings longer than 255 characters, the string extensions are allocated in the second set of table pages. This change improves performance on queries requiring scans of tables storing long values because a sequential scan of a table only needs to traverse the pages in the first set.

  Your database must be unloaded and reloaded to take advantage of this feature.

- **New database page-sizes** In addition to 1K, 2K, and 4K page sizes, you can now create databases with page sizes of 8K, 16K or 32K.

  Large page sizes can improve performance in some cases, particularly for large databases. However, there are additional memory requirements with large page sizes, and so they should only be used after investigation of the costs and benefits.

  For more information, see "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*], and "CREATE DBSPACE statement" [*SQL Anywhere Server - SQL Reference*].

  For information on the number of indexes per table and how it depends on page size, see "SQL Anywhere size and number limitations" [*SQL Anywhere Server - Database Administration*].

- **Optimizer tuning** You can use the optimization_goal option to instruct the optimizer to optimize for the time it takes to return the first row of a query, or the overall time it takes to return all rows. The default is to optimize for the first row. If you are using applications such as PowerBuilder DataWindow applications, which require a complete result set, you may want to change this option setting.

  For more information, see "optimization_goal option [database]" [*SQL Anywhere Server - Database Administration*].

- **Optimizer enhancements** Further enhancements to the optimizer have been implemented to assist with performance of queries that use internal temporary tables and that use primary and foreign key indexes. These enhancements require no user action.

Miscellaneous enhancements

- **Larger numbers of users and other identifiers** Many identifiers in the system tables identifying database objects have been changed from SMALLINT to UNSIGNED INTEGER. This change increases the number of objects that can be held in a database without violating an absolute limit.
- **Inserting and exporting images and documents** Two new system external functions allow you to read and write the contents of files. These functions allow direct inserting of images, documents, and so on into tables from environments such as Interactive SQL.

  For more information, see "Inserting documents and images" [*SQL Anywhere Server - SQL Usage*], "xp_read_file system procedure" [*SQL Anywhere Server - SQL Reference*], and "xp_write_file system procedure" [*SQL Anywhere Server - SQL Reference*].
- **New interface for external functions** Stored procedures and user-defined functions that reference external libraries now use a new interface. The new interface provides a wider range of operating systems (including UNIX), a wider range of data types, removes the restriction that returned data fit into 255 bytes, and supports NULL as a valid value for arguments. The older interface is still supported, but should not be used for new development work.

  For more information, see "Creating procedures and functions with external calls" [*SQL Anywhere Server - SQL Usage*].
- **START DATABASE, STOP DATABASE and STOP ENGINE statements** These statements were previously available only from Interactive SQL. They are now available from all applications.

  For more information, see "START DATABASE statement" [*SQL Anywhere Server - SQL Reference*], "STOP DATABASE statement" [*SQL Anywhere Server - SQL Reference*], and "STOP ENGINE statement" [*SQL Anywhere Server - SQL Reference*].
- **FIRST and TOP clause in updates and deletes** The FIRST and TOP clauses can be used to update or delete only the first one or more of any set of rows satisfying a WHERE clause.

  For more information, see "DELETE statement" [*SQL Anywhere Server - SQL Reference*], and "UPDATE statement" [*SQL Anywhere Server - SQL Reference*].
- **Explicit table locking** The LOCK TABLE statement allows direct control over concurrency at a table level, independent of the current isolation level.

  For more information, see "LOCK TABLE statement" [*SQL Anywhere Server - SQL Reference*].
- **Expressions in Transact-SQL outer joins** The *= and =* operators in a WHERE clause provide a way of specifying outer joins for users who want to use the Transact-SQL dialect. In previous releases, only column names could be used in such joins. Now as long as each side of the join operator refers to a single table, any expression can be used in these joins. For example, the following query is now possible:


```
select *
from customer, sales_order
where substr( customer.id, 1, 1 ) *=
        substr( sales_order.cust_id, 1, 1)
```

- **Cursors in stored procedures can reference variables** In stored procedures and user-defined functions, you can declare a cursor on a variable using the following syntax:

  DECLARE *cursor-name* **CURSOR USING** *variable-name*

  where *variable-name* is a string variable containing the SELECT statement for the cursor.

  For more information, see "DECLARE CURSOR statement [ESQL] [SP]" [*SQL Anywhere Server - SQL Reference*].

- **Additional database and server properties** The following properties have been added:

  - **PageSize** The database server uses a single page size from startup until it is closed down. This page size is the maximum page size database that can be mounted by the database server. You can now obtain this page size using the PageSize server-level property function:

    ```
    select property( 'PageSize' )
    ```

  - **AppInfo** This function provides identification information for a client application. It is a connection property:

    ```
    select connection_property( 'AppInfo' )
    ```

    For more information, see "AppInfo connection parameter [APP]" [*SQL Anywhere Server - Database Administration*].

  - **IsRuntimeServer** This function returns YES if the database server is a limited desktop runtime personal database server. Otherwise, it returns NO.

  - **Log truncation points** Properties for replication-specific log offsets have been added. The properties **LTMTrunc**, **RemoteTrunc**, and **SyncTrunc** return the minimal confirmed log offset for the Replication Agent, SQL Remote, and MobiLink *dbmlsync* replication, respectively. These offsets are also known as truncation points because they indicate the point at which the transaction log can be truncated. The property **CurrentRedoPos** returns the current offset in the log file, where the next database operation is to be logged.

    For a complete list of property functions and information on how to access them, see "Understanding database properties" [*SQL Anywhere Server - Database Administration*].

- **Referential integrity checks before commit** A new system procedure (sa_check_commit) allows you to check for referential integrity conflicts before committing changes to a database.

  For more information, see "sa_check_commit system procedure" [*SQL Anywhere Server - SQL Reference*].

- **SQL function enhancements** The following functions have been added or enhanced.

- **REPLACE function** This new function replaces all occurrences of a substring with another substring.

  For more information, see "REPLACE function [String]" [*SQL Anywhere Server - SQL Reference*].

- **LIST function enhancement** The LIST function now accepts an optional second value, which is the delimiter string that separates the list items.

  For more information, see "LIST function [Aggregate]" [*SQL Anywhere Server - SQL Reference*].

- **Output redirection change** The output redirection functionality in Interactive SQL has been extended to include three new Interactive SQL statements and an Export option in the File menu.

  You can now use an OUTPUT TO statement to redirect content from the Results pane to a new file. You can add an APPEND clause to append the content to the end of an existing file, or you can add a VERBOSE clause to include the content of the Messages pane with the output.

  In earlier versions, output redirection in Interactive SQL could only be done with the symbols >#, >>#, >&, and >>&. You can still use these symbols, but the new Interactive SQL statements allow for more precise output and code that is easier to read.

  For more information, see "Exporting query results" [*SQL Anywhere Server - SQL Usage*].

- **Embedded SQL enhancements** A new function, **db_string_ping_server**, has been introduced to test that a database server can be located with a specified current connection string.

  For more information, see "db_string_ping_server function" [*SQL Anywhere Server - Programming*].

- **New LOAD TABLE / UNLOAD TABLE format** A new format has been added to the UNLOAD TABLE statement to allow data to be output in BCP format and to the LOAD TABLE statement to allow the import of Adaptive Server Enterprise generated BCP out files containing BLOBs.

  For more information, see "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*] or "UNLOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **Last default timestamp** The new global variable **@@dbts** returns a TIMESTAMP value that represents the last value generated for a column using DEFAULT TIMESTAMP.

  For more information, see "Global variables" [*SQL Anywhere Server - SQL Reference*].

- **Troubleshooting enhancements** On starting the database server, you can log operations executed by the server to a file using the –zr option. You can use the sa_server_option procedure to control the same behavior while the server is running.

  For more information, see "sa_server_option system procedure" [*SQL Anywhere Server - SQL Reference*], and "-zr server option" [*SQL Anywhere Server - Database Administration*].

- **Archive backup on NetWare** The archive backup format is now supported on NetWare. Archive backups to tape require NetWare 5.

For more information, see "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

- **Added filtering for dbtran** The command version of the Log Translation [dbtran] utility allows further filtering of the output.

  For more information, see "Log Translation utility (dbtran)" [*SQL Anywhere Server - Database Administration*].

- **Faster table truncation** The TRUNCATE TABLE statement is much faster for version 7.0 databases, for tables with foreign keys.

- **Suppressing event log messages** If you run the database server as a Windows NT service, you can suppress event log messages using a registry entry.

  For more information, see "Suppressing Windows event log messages" [*SQL Anywhere Server - Database Administration*].

SQL Remote new features

SQL Remote version 7.0 includes the following new features.

- **Globally unique primary keys** You can now use a DEFAULT GLOBAL AUTOINCREMENT column in an Adaptive Server Anywhere database, together with a global_database_id option setting in each database, to guarantee unique primary keys throughout a SQL Remote installation of Adaptive Server Anywhere databases. This is a more convenient method than the more manual primary key pool technique.

  For more information, see "Using global autoincrement default column values" [*SQL Remote*].

- **Internal unload for dbxtract** The Extract [dbxtract] utility now uses the UNLOAD statement introduced in Adaptive Server Anywhere version 7.0 by default, rather than the slower OUTPUT statement. Options have been introduced to allow you to choose a combination of internal (server-side) and external (client-side) unload and load operations.

  For a complete listing of options, see "Extraction utility" [*SQL Remote*].

MobiLink and UltraLite new features

Following is a list of changes and additions to the software since version 6.0.3.

- **Adaptive Server Anywhere clients** MobiLink technology now supports Adaptive Server Anywhere as a client, as well as UltraLite applications.

  For more information, see "SQL Anywhere Clients" [*MobiLink - Client Administration*].

- **mlxtract creates Adaptive Server Anywhere client databases** *mlxtract* creates Adaptive Server Anywhere databases, suitable for use as MobiLink clients, using an Adaptive Server Anywhere reference database as a template.

- **Synchronization script versions** Synchronization scripts can now be grouped by assigning a script version name with each script. This feature allows the MobiLink server to respond differently when synchronizing different types of applications, or different versions of the same application.
- **New data types** LONG BINARY and LONG VARCHAR data types can now be replicated using MobiLink technology.
- **New HotSync conduit** A new HotSync conduit allows HotSync synchronization with a centrally located MobiLink server. The MobiLink server no longer needs to be on the same computer as the HotSync manager is.
- **ScoutSync conduit** UltraLite applications for the Palm Computing Platform can now synchronize using ScoutSync technology, available from Riverbed Technologies.
- **report_error script** A new script provides a convenient way to report errors during synchronization. The **report_error** script also makes debugging the behavior of the **handle_error** script much easier. The **report_error** script has the same parameters as the **handle_error** script, except that the first parameter is the action code returned by **handle_error**.

Behavior changes in version 7.0.0

This section lists deprecated and unsupported features, and behavior changes from previous versions of the software.

Adaptive Server Anywhere behavior changes

Deprecated and unsupported features

This list includes features that are no longer supported and that impact existing applications.

- **Windows 3.x and Windows CE 2.0 no longer supported** Windows 3.1 and Windows 3.11 are no longer supported. Windows CE 2.0 is no longer supported.
- **DDE protocol no longer supported** The DDE protocol was used to communicate from 16-bit Windows 3.x applications to a Windows 95/98 database server on the same computer. It is no longer required: Windows 3.x applications based on older versions of the software can use TCP/IP to communicate with the version 7.0 database server.
- **IPX protocol deprecated** Although communications using IPX are still supported in the present release, it is highly recommended that you use the SPX protocol instead. The protocol options are the same as for IPX, and performance is better. Support for IPX will be dropped in a future release.

  By default, both the database server and the client software do not start the IPX protocol unless you instruct it to do so explicitly using the –x option or the **CommLinks** connection parameter. The SPX protocol is started by default.

  For information on using SPX from the client side, see "CommLinks connection parameter [LINKS]" [*SQL Anywhere Server - Database Administration*]. For information on using SPX from the server side, see "-x server option" [*SQL Anywhere Server - Database Administration*].
- **Deprecated network protocol options** The Broadcast and CommAutoStop protocol options are still allowed, but have no effect. They will not be supported in future versions of Adaptive Server Anywhere.
- **No dbclient compatibility executable** In version 6, the dbcli6.exe utility provided easier compatibility with version 5 client connection methods. There is no comparable utility in version 7.

Behavior changes

This list includes behavior changes in existing features that may impact applications or have an impact during development or database management.

- **Interactive SQL changes** The new version of Interactive SQL has some changes from previous versions. As it is an interactive tool, most do not need documentation.

  The supported formats for INPUT and OUTPUT statements have changed, and now include:

  - **INPUT** ASCII, DBASE, DBASEII, DBASEIII, EXCEL, FIXED, FOXPRO, LOTUS

- **OUTPUT** ASCII, DBASE, DBASEII, DBASEIII, EXCEL, FIXED, FOXPRO, HTML, LOTUS, SQL

- **Server name space change** It is now disallowed for more than one database server with the same name to be running on TCP/IP anywhere on the network. Previously, multiple servers with the same name were allowed as long as they were on separate ports.

- **Mirrored logs deleted when delete_old_logs is On** Previously, any mirror of an old transaction log was not deleted, although the primary copy of the old transaction log was deleted.

- **ODBC SQLDescribeCol behavior** A **SQLDescribeCol** call on the **@@identity** field now returns SQL_BIGINT. In earlier versions, it returned SQL_INTEGER.

- **Update constraints** A new ansi_update_constraints option has been added. Setting this option to Cursors or Strict restricts updates to those allowed by the ANSI standard. Setting this option to Off, which is the historical behavior, allows a greater range of updates.

  For more information, see "ansi_update_constraints option [compatibility]" [*SQL Anywhere Server - Database Administration*], and "UPDATE statement" [*SQL Anywhere Server - SQL Reference*].

- **Identifier length limit** Long identifiers are treated more consistently than in the past. Identifiers longer than 128 bytes were sometimes accepted and sometimes not, depending on the type of database object being named. Now any attempt to define identifiers longer than 128 bytes reports an error.

  For more information, see "Identifiers" [*SQL Anywhere Server - SQL Reference*].

- **jConnect connections** If you use the REMOTEPWD field to connect via jConnect to a named database on an Adaptive Server Anywhere database server, you must assign the field in a different manner for jConnect version 4.2 and above, included with this software.

  For more information, see "Supplying a URL to the driver" [*SQL Anywhere Server - Programming*].

- **User-defined errors** Within procedures and triggers, you can declare exceptions in the range 99000 to 99999 as user-defined errors in compound statements. You can use the SIGNAL statement to handle these errors.

  For more information, see "BEGIN statement" [*SQL Anywhere Server - SQL Reference*], and "SIGNAL statement" [*SQL Anywhere Server - SQL Reference*].

- **LOAD TABLE and UNLOAD TABLE security** A database server option has been added to control the permissions required to execute the LOAD TABLE and UNLOAD TABLE statements.

  For more information, see "-gl server option" [*SQL Anywhere Server - Database Administration*].

- **@@identity in triggers** If a table (T1) with an autoincrement column has an insert trigger which causes an insert into a second table (T2) also having an autoincrement column, it was not previously possible to obtain the autoincrement value assigned for T1 after the insert had completed. At that point, the value of @@identity would be the value assigned to T2. The behavior of @@identity has been altered to make the value accessible.

  For the new behavior of @@identity within triggers, see "@@identity global variable" [*SQL Anywhere Server - SQL Reference*].

- **Embedded SQL DECL_FIXCHAR** In previous releases, the SQL preprocessor converted a type DECL_FIXCHAR to an array. For example, `DECL_FIXCHAR(12)name;` was converted to `char name[12];`.

  In the current release, the SQL preprocessor converts DECL_FIXCHAR declarations to a declaration using a struct with a char array member called "array". For example, `DECL_FIXCHAR(12)name;` is now converted to `struct {char array[12];} name;`. References to individual characters in the variable declared above are of the form `name.array[i]`.

SQL Remote behavior changes

The following behavior has changed in version 7.0:

- **dbxtract uses internal unload** The default behavior of dbxtract is now to use the UNLOAD statement to unload data on the server side, rather than the OUTPUT statement to unload data on the client side. The –ii, -ix, –xi, -xx options allow you to choose which combination of internal and external operations to use, and replace the options –i and –x available in previous releases.

  For a complete listing of options, see "Extraction utility" [*SQL Remote*].

MobiLink and UltraLite behavior changes

- **New table and script names** The tables that hold synchronization scripts and related information in the consolidated database now have new names. Previously, these table names began with the prefix **ul_**. This prefix has been changed to **ml_**. Older consolidated databases must be upgraded for compatibility with version 7.0.

  Similarly, the stored procedure that facilitates adding table scripts has been renamed from **sp_table_script** to **ml_add_table_script** and the stored procedure that facilitates adding connection scripts has been renamed from **sp_connection_script** to **ml_add_connection_script**.

  Under DB2, these names are truncated to 18 characters.

- **Synchronization scripts require a version name** Synchronization scripts must now be assigned a script version name. Script version names allow the MobiLink server to treat different clients differently.

CHAPTER 13

What's New in Version 6.0.3

Contents

New features in version 6.0.3

This section lists the new features introduced in components of SQL Anywhere Studio version 6.0.3.

Adaptive Server Anywhere new features

In addition to bug fixes, Adaptive Server Anywhere version 6.0.3 includes new features in both the software and the documentation.

- **Combined stored procedure and Java debugger** The Java debugger that was provided in previous releases has been upgraded. The new version of the debugger is able to debug not only Java classes within the database, but also SQL stored procedures and triggers.

  For information on how to use the debugger, see "Debugging Procedures, Functions, Triggers, and Events" [*SQL Anywhere Server - SQL Usage*].

- **Read-only databases** You can designate a database as read only when you start a database server. This feature makes deployment of databases on read-only media, such as CD-ROMs, more straightforward.

  The **ReadOnly** database property returns On for read-only databases, and OFF for databases that are not being run in read-only mode.

  For more information on read-only databases, see "-r server option" [*SQL Anywhere Server - Database Administration*].

- **Computed column extensions** New flexibility has been added to computed columns. You can now add computed columns to non-empty tables, and change the expression associated with a computed column. Computed columns are recalculated in a number of circumstances to ensure that the values are reliable.

  For more information, see "Working with computed columns" [*SQL Anywhere Server - SQL Usage*], and "Inserting and updating computed columns" [*SQL Anywhere Server - SQL Usage*].

  For information on syntax, see "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **Support for the euro** Collations have been added that include the euro currency symbol. These collations are the 1252LATIN1 and ISO9LATIN1 collations.

- **Additional collations** Other collations have been added to the list of supplied collations, including 852POL (OEM Code Page 852 (Latin 2), with Polish ordering), 1250POL (Windows Latin2 code page 1250 with Polish ordering), 1250Latin2 (Windows Latin2 Code page 1250). 932JPN (Japanese), 936ZHO (similar to EUC_CHINA), and 950TAI (similar to EUC_TAIWAN).

  For a complete list, see "Choosing collations" [*SQL Anywhere Server - Database Administration*].

- **New Windows CE platforms** The SH4 and ARM processors are now supported under Windows CE 2.1x.

- **ALTER TABLE extensions** The ALTER TABLE statement has been extended to provide SQL/92-compliant clauses to set and drop defaults on columns. These clauses are an alternative to the existing MODIFY clause.

  ```
  ALTER column-name SET DEFAULT default-value
  | ALTER column-name DROP DEFAULT
  ```

  For more information, see "ALTER TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **LOAD TABLE extensions** You can now load specific columns of a table using the LOAD TABLE statement. A new CHECK CONSTRAINTS option has been introduced to address rebuild issues.

  For more information, see "LOAD TABLE statement" [*SQL Anywhere Server - SQL Reference*].

- **Easier connections across firewalls** A set of protocol options has been introduced to allow easier connections across firewalls.

  For more information, see "Connecting across a firewall" [*SQL Anywhere Server - Database Administration*].

- **BACKUP statement extended** The MATCH keyword has been introduced to allow renaming of the backup copy of the transaction log to a file name of the form *YYMMDDnn.log*. If you use this keyword, you can execute the same statement multiple times without writing over data.

  For more information, see "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

- **Easier unload and reload** The Unload [dbunload] utility has been enhanced (-ar option) to allow a single-step unload and reload of a database that can be used whether or not your database is involved in replication.

  For more information, see "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*], and "Rebuilding databases" [*SQL Anywhere Server - SQL Usage*].

- **Temporary file location** The database server checks for a new environment variable, ASTMP, when deciding on the location of the temporary file. This allows you to use directories other than system temporary directories for the temporary file.

  For more information, see "SATMP environment variable" [*SQL Anywhere Server - Database Administration*].

- **New system procedures** New system procedures allow DBA users to override some database server options (sa_server_option), and to flush the database server cache (sa_flush_cache).

  For more information, see "System procedures" [*SQL Anywhere Server - SQL Reference*].

- **Character set conversion tuning** You can control the application locale used in character set conversion for an individual connection using the new CharSet connection parameter.

  For more information, see "CharSet connection parameter [CS]" [*SQL Anywhere Server - Database Administration*].

- **Re-organized Performance Monitor statistics** The statistics made available to the Windows NT Performance Monitor have been organized into areas. Some statistics have been added, and ones of little use have been removed.

  For a list of available statistics, see "Monitoring statistics using Windows Performance Monitor" [*SQL Anywhere Server - SQL Usage*].

- **Database properties from the utility database** You can now execute SELECT statements, with no tables, against the utility database. This is primarily of use for retrieving database and connection properties.

  For more information, see "Using the utility database" [*SQL Anywhere Server - Database Administration*].

- **New database properties** The following properties are available using the property function.

  - **IsNetworkServer** Returns YES if connected to a network database server, and NO if connected to a personal database server.

    For more information, see "Server-level properties" [*SQL Anywhere Server - Database Administration*].

  - **DefaultCollation** You can use the new **DefaultCollation** property to find the default collation to be used when creating a database.

    For more information, see "Determining the default collation" [*SQL Anywhere Server - Database Administration*], and "Server-level properties" [*SQL Anywhere Server - Database Administration*].

  - **MultiByteCharSet** You can use the **MultiByteCharSet** database property to determine whether a database is using a multi-byte or single-byte collation.

    For information on this property, see "Database-level properties" [*SQL Anywhere Server - Database Administration*].

- **Support for some JDBC 2.0 functions in internal JDBC** The internal server-side JDBC driver now supports functions from the JDBC 2.0 interface. Server-side Java applications can now use features such as such as scrollable, updatable result sets and batch updates. A side effect is that you can now access result sets from Java methods from Interactive SQL.

- **Using the main method in Java classes** You can now execute a `main` method of a Java class from SQL.

  For more information, see "Calling the main method" [*SQL Anywhere Server - Programming*].

- **User-defined functions using Java classes** You can wrap a Java method in a SQL user-defined function.

  For more information, see "CREATE FUNCTION statement" [*SQL Anywhere Server - SQL Reference*].

- **Extensions to stored procedures using Java methods** You can use OUT and INOUT parameters in stored procedures that are wrappers for Java methods.

  For more information, see "Returning values from Java via stored procedures" [*SQL Anywhere Server - Programming*].

- **Multi-threaded Java classes in the database** Support has been added for the package `java.lang.thread`.

  For more information, see "Using threads in Java applications" [*SQL Anywhere Server - Programming*].

- **File access from Java** Support has been added for all the classes in the package *java.io*, including those that enable file access from classes in the database. For security reasons, the java_input_output option has been introduced, which must be set by the DBA to enable this feature.

  This feature is supported on Windows NT and UNIX.

- **CONVERT function extensions** The date and time styles supported by the CONVERT function have been extended.

  For more information, see "CONVERT function [Data type conversion]" [*SQL Anywhere Server - SQL Reference*].

- **Database server startup dialog** On 32-bit Windows operating systems, if you start a database server with no arguments, a window appears where you can specify a database file and additional parameters.

  For more information, see "Starting the database server" [*SQL Anywhere Server - Database Administration*].

- **Log Translation [dbtran] utility enhancements** The Log Translation [dbtran] utility permits filtering of the transaction log operations to isolate subsets of operations.

  For more information, see "Log Translation utility (dbtran)" [*SQL Anywhere Server - Database Administration*].

- **Transaction Log [dblog] utility enhancements** The Transaction Log [dblog] utility now displays additional summary information, including offset information.

  For more information, see "Transaction Log utility (dblog)" [*SQL Anywhere Server - Database Administration*].

- **Start Server in Background utility enhancements** The Start Server in Background utility (dbspawn) has a -f option to force a server to start even if one is already running. This option uses a ForceStart connection parameter, used only by the `db_start_engine` Embedded SQL function.

  For more information, see "Start Server in Background utility (dbspawn)" [*SQL Anywhere Server - Database Administration*], and "db_start_engine function" [*SQL Anywhere Server - Programming*].

- **Replication Agent runs as a daemon** On UNIX operating systems, you can run the Replication Agent as a daemon by supplying the -ud option.

For more information, see "Log Transfer Manager utility (dbltm)" [*SQL Anywhere Server - Database Administration*].

SQL Remote new features

In addition to bug fixes, SQL Remote version 6.0.3 includes the following new features. Some features in Adaptive Server Anywhere that are particularly relevant to SQL Remote are also included in this list:

- **FTP and SMTP/POP support on UNIX** The range of message systems supported on UNIX operating systems has been expanded to include FTP and SMTP/POP.
- **Message link options stored in the database** The message link parameters that control SQL Remote behavior over each message system can now be stored in the database as opposed to the registry. This simplifies deployment and management issues related to message link parameters.
- **Date and time replication formats** You can now specify database options that instruct SQL Remote what format to use when replicating dates and times. These options are sr_time_format, sr_date_format, and sr_timestamp_format.

  For more information, see "Replication of dates and times" [*SQL Remote*], and "SQL Remote options" [*SQL Remote*].
- **Message Agent and SQL Remote Open Server run as a daemon** On UNIX operating systems you can run these applications as a daemon using the -ud option.
- **Easier unload and reload of Adaptive Server Anywhere databases** The Unload [dbunload] utility has been enhanced (-ar option) to allow a single-step unload and reload of a database that can be used whether or not your database is involved in replication.

  For more information, see "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*], and "Rebuilding databases" [*SQL Anywhere Server - SQL Usage*].
- **Enhanced transaction log [dblog] output** The Transaction Log [dblog] utility now displays additional summary information, including offset information.

  For more information, see "Transaction Log utility (dblog)" [*SQL Anywhere Server - Database Administration*].
- **Log Translation [dbtran] utility enhancements** The Log Translation [dbtran] utility permits filtering of the transaction log operations to isolate subsets of operations. This is of particular use to SQL Remote administrators.

  For more information, see "Log Translation utility (dbtran)" [*SQL Anywhere Server - Database Administration*].

MobiLink and UltraLite new features

Following is a list of changes and additions to the software since version 6.0.2.

- **New data types** Real and double data types are now fully supported.
- **Character set conversion** The MobiLink server now translates all uploaded characters to Unicode and passes them to the consolidated database using the Unicode ODBC API. Conversely, it translates all downloaded characters from Unicode to the character set of your UltraLite application. Character set conversion within the consolidated database server can influence the results, but the new system allows more consistent behavior across multiple platforms.

  For more information, see "Controlling ODBC driver character set conversion" [*MobiLink - Server Administration*].
- **MobiLink server runs as a Windows NT service** When you run the MobiLink server as a service, you can configure it to continue running when you log off the Windows NT workstation.
- **DB2 setup scripts provided** To make it easier to use IBM DB2 as a consolidated database, a DB2 setup script has been added to the available set scripts.

  For a list of setup scripts, see "Setting up a consolidated database" [*MobiLink - Server Administration*].

Behavior changes in version 6.0.3

This section lists the behavior changes introduced in components of SQL Anywhere Studio version 6.0.3.

Adaptive Server Anywhere behavior changes

- **Adding columns with default values** When an added column has a default value, the entire column is populated with the default. In previous releases, the column was populated with NULL.
- **Permissions of referential integrity actions** When changes are made to a primary table, referential integrity actions such as cascading deletes or updates can take place on a secondary table. These actions are implemented using system triggers. The triggers now execute with the permissions of the owner of the secondary table. Previously, they executed with permissions of the owner of the primary table. The new behavior means that cascaded operations can take place between tables with different owners, without additional permissions having to be granted.
- **datediff, MONTHS, and YEARS functions** The number of months between two dates is now calculated as the number of first-of-the-months between the dates. For example, the difference between January 25 and February 2 is 1; the difference between January 1 and January 31 is 0. The number of years is now calculated as the number of first-of-the-years between the dates.

  This changes the results of these functions by one number, in some cases. The change was made for compatibility with Adaptive Server Enterprise.

  For the smaller time units there are overflow values to the DATEDIFF function that are now imposed. Previous versions of the software gave incorrect answers if the limit was exceeded.

  For a full description, see "DATEDIFF function [Date and time]" [*SQL Anywhere Server - SQL Reference*].
- **Default page size** The default page size for databases is now 2048 bytes. This choice is a better choice for many users.
- **Default database collation** The default collation used when creating databases has changed. The default depends on your operating system settings.

  For information on how to find the default collation, see "Determining the default collation" [*SQL Anywhere Server - Database Administration*].
- **SQL Preprocessor default collation** If no collation is explicitly specified, the Embedded SQL Preprocessor now uses locale information to choose a default collation. If the locale information is unavailable, then 850LATIN1 will be used. The collation used is reported following the banner. Previous behavior was to use 850.

  For information on the preprocessor, see "SQL preprocessor" [*SQL Anywhere Server - Programming*].
- **Enforced server name length** The server name is checked on startup, and is truncated to a maximum value of 40 characters. On NetBIOS, it is truncated to 16 characters. From the client side, the value of the EngineName parameter is also truncated to 40 characters.

For more information, see "EngineName connection parameter [ENG]" [*SQL Anywhere Server - Database Administration*].

- **Agent connection parameter** The Agent connection parameter behavior has been changed. The meaning of this parameter changed from version 5 to version 6, as the need for the *dbclient* executable was removed. The parameter meaning has changed to be more useful in a Version 6 environment.

  The Agent connection parameter is deprecated as of version 8.0.1.

SQL Remote behavior changes

The following behavior has changed in SQL Remote version 6.0.3:

- **Message link parameters stored in the database** By default, the message link parameters are now moved into the database when the Message Agent is run for the first time with the new version of the software. If you have software that explicitly accesses these parameters in their old locations external to the database, it will be affected by this change. You can continue using the old behavior by setting the external_remote_options database option to On.
- **Passwords stored** When a password is entered for a message link, it was not stored in previous versions of the software. As the parameters are now held in the database, a saved password is not held on disk and so is more secure. Passwords are now saved by default. You can continue using the old behavior by setting the save_remote_passwords option to OFF.

CHAPTER 14

What's New in Version 6.0.2

Contents

New features in version 6.0.2

This section lists the new features introduced in components of SQL Anywhere Studio version 6.0.2.

Adaptive Server Anywhere new features

In addition to bug fixes, Adaptive Server Anywhere version 6.0.2 includes new features in both the software and the documentation.

Cross references
The printed documentation is not necessarily updated with each maintenance release. Cross references in this section may not be valid in the printed documents. For current information, see the online documentation.

- **UltraLite deployment option** UltraLite databases for small devices such as the PalmPilot and Windows CE computers can be developed with this version of the software.

  For information, see the book *UltraLite Developer's Guide*.

- **Backup and Restore SQL statements** Adding BACKUP and RESTORE as SQL statements provides server side backup and automation of backups using SQL scripts.

  The BACKUP statement provides direct backup to tape.

  For more information, see "BACKUP statement" [*SQL Anywhere Server - SQL Reference*].

- **Security features** New security features have been added.

  - **Auditing** Database administrators can keep track of activity performed on a database by turning on the auditing option. The record of activities is kept in the transaction log. By turning on auditing, you increase the amount of data saved in the transaction log to include login attempts, accurate timestamps of all events, all permissions checks, and all actions requiring DBA authority.

    For more information, see "Auditing database activity" [*SQL Anywhere Server - Database Administration*].

  - **Minimum password length** Database administrators can specify a minimum password length, to discourage easily discovered passwords.

    For more information, see "min_password_length option [database]" [*SQL Anywhere Server - Database Administration*].

- **Locating servers** A utility is provided for troubleshooting connections.

  For more information, see "Ping utility (dbping)" [*SQL Anywhere Server - Database Administration*].

- **Starting databases from jConnect connections** Database connections over TDS, including connections from Java applications over jConnect, can start a database on a server.

For more information, see "Supplying a URL to the driver" [*SQL Anywhere Server - Programming*].

- **ODBC 3.51** The ODBC driver has been updated to ODBC 3.51. This version of ODBC includes support for Unicode applications.

  For more information, see "ODBC conformance" [*SQL Anywhere Server - Programming*].

- **Control of allowed JOIN syntax** In previous releases, some multi-table queries have been allowed that have ambiguous join clauses. In the present release, you can set an option to disallow such queries.

  For more information, see "extended_join_syntax option [database]" [*SQL Anywhere Server - Database Administration*].

- **Administration utility enhancements** Options have been added to the administration utilities to provide additional features.

  - **Transaction Log [dbtran] utility** If you use the new -d option, dbtran puts each operation as it occurs in the transaction log file. This makes transaction log output easier to read. This has been added primarily for auditing purposes.

    For more information, see "Log Translation utility (dbtran)" [*SQL Anywhere Server - Database Administration*].

  - **Transaction Log [dbtran] utility** You can run dbtran against a running database server instead of against a log file. This feature has been added to increase the security of the transaction log—there is now no need to access the transaction log directly.

    For more information, see "Log Translation utility (dbtran)" [*SQL Anywhere Server - Database Administration*].

  - **Log Transfer Manager [dbltm] utility logging** New options allow you to tune message logging from these utilities.

    For more information, see "Log Transfer Manager utility (dbltm)" [*SQL Anywhere Server - Database Administration*].

  - **New Log Transfer Manager [dbltm] utility options** New options enable you to replicate only backed up transactions (**backup_only**), and to shut down as soon as all data is replicated (**continuous**).

    For more information, see "The LTM configuration file" [*SQL Anywhere Server - Database Administration*].

SQL Remote new features

In addition to bug fixes, SQL Remote version 6.0.2 includes the following new features:

- **Performance enhancements** A major enhancement of the Adaptive Server Anywhere Message Agent (dbremote) operational model for scanning the transaction log and sending messages greatly improves the range of achievable replication turnaround times.

Minimum lag times between entering data at one site and its replication to another site were limited in earlier versions to times on the order of ten minutes. With the new operational model, minimum lag times on the order of seconds can be achieved in some circumstances.

When the Message Agent message-sending process runs in continuous mode, it now stays (**hovers**) at the end of the active transaction log while waiting for more data to be committed, instead of rescanning the transaction log each time. This allows you to poll more frequently, which can significantly reduce time for replication.

For more information, see "Tuning Message Agent performance" [*SQL Remote*].

- **SQL Remote message logging** New options allow you to tune message logging from these utilities.

  For more information, see "Message Agent" [*SQL Remote*].

Behavior changes in version 6.0.2

This section lists behavior changes in the components of SQL Anywhere Studio.

Adaptive Server Anywhere behavior changes

The following are behavior changes from previous versions of the software.

- **Permissions required to debug Java** In order to use the Java debugger, you must either have DBA authority, or be granted membership in the SA_DEBUG group. The SA_DEBUG group does not exist in databases created prior to 6.0.2, and in these older databases any user can use the Java debugger. The SA_DEBUG group was added to close a potential security hole.

  For more information, see "Requirements for using the debugger" [*SQL Anywhere Server - SQL Usage*].

- **Default packet size change** The default packets size for client/server communications has been changed from 512 bytes to 1000 bytes. This change improves performance for multi-row fetches and fetches of large rows. It also increases the memory requirements.

  For more information on packet size, see "CommBufferSize connection parameter [CBSIZE]" [*SQL Anywhere Server - Database Administration*], and "-p server option" [*SQL Anywhere Server - Database Administration*].

CHAPTER 15

What's New in Version 6.0.1

Contents

New features in version 6.0.1

This section introduces the new features in Adaptive Server Anywhere version 6.0.1. It provides a listing of major new features, with cross references to locations where each feature is discussed in detail.

Adaptive Server Anywhere for Windows CE

The Microsoft Windows CE operating system developed for handheld computing devices and embedded devices custom-built to carry out a specific task.

Starting with Version 6.0.1, Adaptive Server Anywhere is available for Windows CE. The Windows CE version of Adaptive Server Anywhere has the following characteristics:

- **Full-featured database** All SQL features in other versions of Adaptive Server Anywhere are available in the Windows CE version, including transaction processing, referential integrity actions, procedures and triggers, and so on.

  The Java features and the remote data access features are not available in Windows CE.
- **Administer from your desktop** When running Windows CE on a device that can be attached to a network or directly to a PC, you can administer your Windows CE database from a Sybase Central running on the PC.
- **ODBC and Embedded SQL applications** You can use either of these interfaces to develop client applications.
- **SQL Remote replication** The SQL Remote file link is implemented to be compatible with Windows CE ActiveSync synchronization.

Remote data access

Remote data access gives you access to data on external data sources, as if they were stored on the local database.

For information about remote data access, see "Accessing Remote Data" [*SQL Anywhere Server - SQL Usage*] and "Server Classes for Remote Data Access" [*SQL Anywhere Server - SQL Usage*].

Character set conversion

Character set conversion has been added to translate strings automatically between different character sets as data is passed between client applications and the database server. This enables more flexibility in mixed character-set environments.

Character set conversion can be carried out among character sets that represent the same characters, but at different values. There needs to be a degree of compatibility between the character sets for this to be possible. For example, character set conversion is possible between EUC-JIS and Shift-JIS character sets, but not between EUC-JIS and OEM code page 850.

To enable character-set conversion, you must start the database server using the new -ct option.

Most of the character set conversion features occur automatically, with little user intervention required.

For a description of character set conversion, see "Character set conversion" [*SQL Anywhere Server - Database Administration*].

New Java features

There are some changes made to the Java support. These include the following:

- **Compressed jar files** You can now install compressed jar files and zip files into the database. However, you should not use the *jar* utility that comes with the Sun JDK. Other zip utilities do produce suitable files.
- **Result sets from Java procedures** You can wrap Java methods in a stored procedure, which can return a result set or multiple result sets to the calling environment.

  For information on this feature, see "Returning result sets from Java methods" [*SQL Anywhere Server - Programming*].
- **Default internal connection** When a database connection is established for internal JDBC operations, it is now recommended that you use the following URL:

  ```
  jdbc:default:connection
  ```

  In version 6.0.0, an empty string was used to establish this connection. While the empty string does still work, it is deprecated. The new URL corresponds to the SQLJ1 proposed standard.

Additional new features

Several other features have been added to Adaptive Server Anywhere 6.0.1. These include the following:

- **jConnect 4.0** The version of jConnect included in this product has been updated to version 4.0.
- **AutoStart connection parameter** This parameter prevents a personal server from starting if no network connection is successful.

  For a description, see "AutoStart connection parameter [ASTART]" [*SQL Anywhere Server - Database Administration*].
- **MESSAGE statement** Extensions to the MESSAGE statement allow messages to be directed to the client, the Server Messages window, or a log file.

  For a description, see "MESSAGE statement" [*SQL Anywhere Server - SQL Reference*].
- **Message callbacks** Windows Embedded SQL applications can handle messages received from the server while a request is being processed by registering a message callback function.

For more information, see "Implementing request management" [*SQL Anywhere Server - Programming*].

- **More control over operating system threads** A new database server option (-gx) controls the number of operating system threads that are in use. The existing -gt option controls how many can be in use at one time, effectively controlling the number of CPUs that can be exploited.

  For more information, see "The SQL Anywhere database server" [*SQL Anywhere Server - Database Administration*].

- **Connection property system procedures** The sa_conn_properties_by_conn and sa_conn_properties_by_name system procedures provide alternative ways of querying connection information.

- **NULLIF function** This provides an abbreviated form of the CASE expression. NULLIF compares the values of the two expressions. If the first expression equals the second expression, NULLIF returns NULL. If the first expression does not equal the second expression, NULLIF returns the first expression. The NULLIF function provides a short way to write some CASE expressions.

  For more information, see "Miscellaneous functions" [*SQL Anywhere Server - SQL Reference*].

New features in SQL Remote

Several features have been added to SQL Remote.

- **Minimized Message Agent** The Message Agent can be made to start with a minimized window using the -q option.
- **Message Agent request to resend messages** The point at which the Message Agent requests that a missing message be resent is now user-configurable using the -rp option.

  For information on these options, see "Message Agent" [*SQL Remote*] and "Tuning incoming message polling" [*SQL Remote*].
- **Cleaning the stable queue** For Adaptive Server Enterprise, the new -fq option on the Message Agent assists administration by cleaning confirmed messages from the stable queue.

  For information, see "Message Agent" [*SQL Remote*].

Behavior changes

This section describes behavior changes between version 6.0.0 and 6.0.1.

Java system table changes The system tables used to record Java class information (SYSJAR, SYSJARCOMPONENT, and SYSJAVACLASS) had SMALLINT primary keys. These data types have been altered to use INTEGER primary keys. This change allows more Java classes to be stored in a database, and more changes to the Java classes in the database.

This change takes effect for new databases and databases upgraded using the Upgrade utility (dbupgrad) from this or future releases.

Default ansinull setting for Transact-SQL and jConnect connections This has been changed to On, which matches Adaptive Server Enterprise default behavior.

Database server -v option Prior to Version 6, this option produced verbose output to the transaction logs. This is obsolete, and -v is now used to supply version information.

Database server -gss option The behavior of the -gs server option, used to set the stack size, was complicated. The -gs option is now deprecated, and -gss provides the same functionality in a clearer way.

For more information, see "The SQL Anywhere database server" [*SQL Anywhere Server - Database Administration*].

Character set conversion in Interactive SQL Formerly, when the char_oem_translation option was set to DETECT, Interactive SQL would fetch the collation label from the database to determine whether or not OEM to ANSI character set conversion would be turned on. If the collation label started with a string that indicated an ANSI code page, conversion would be turned off. Otherwise it would be turned on. When the option was set to DETECT, Interactive SQL would display a message in the status window indicating the collation label of the database and the display conversion setting.

The new behavior is as follows. If the option is set to DETECT, Interactive SQL will obtain the CharacterSet connection property from the server. This is the character set that the server is using for sending all character strings on this connection. If this character set indicates an ANSI code page, then OEM to ANSI conversion is turned off. Otherwise it is turned on. A new message is displayed, indicating the collation label of the database, the character set used for communication over this connection, and the display conversion setting.

CHAPTER 16

Upgrading to SQL Anywhere 10

Contents

Upgrading SQL Anywhere

Before using existing applications with this version of the software, be sure to review the list of behavior changes to determine whether your application is affected. See SQL Anywhere 10 - Changes and Upgrading on page 1.

Note
Adaptive Server Anywhere has been renamed SQL Anywhere. In this chapter, SQL Anywhere is used to refer to all versions.

Upgrading version 10.0.0 databases

If you are upgrading from version 10.0.0, you can either use the Upgrade utility or rebuild your database. See "Upgrading version 10.0.0 databases" on page 316, and "Rebuilding version 10.0.0 databases" on page 317.

Databases with materialized views
It is recommended that you refresh the materialized views in your database after upgrading your database server, or after rebuilding or upgrading your database to work with an upgraded database server. See "Refreshing materialized views" [*SQL Anywhere Server - SQL Usage*].

Upgrading version 9 and earlier databases

If you are upgrading to SQL Anywhere version 10.0.1 from version 9 or earlier, you must rebuild the database, which consists of unloading the old database, and reloading it into a new version 10 database. Attempting to load version 9 or earlier databases results in an error on database startup. There are three approaches for rebuilding existing databases:

- Use the version 10.0.0 Unload utility (dbunload) with the -an (create a new database) or -ar (replace the old database) option. See "Rebuilding a version 9 or earlier database using the Unload utility" on page 324.

  Note
  The Unload utility (dbunload) has the same file name in all versions of SQL Anywhere. You must make sure you are using the correct version. See "Using the utilities" on page 314.

- Use the Unload Database wizard in Sybase Central. You can choose to create a new database, replace an existing database with the new database, or unload the database to a file. See "Rebuilding a version 9 or earlier database from Sybase Central" on page 322.

- Unload the database using an older version of dbunload, and then reload the database using the *reload.sql* file and the version 10.0.0 database server. If you need to make schema changes, this is the recommended way of upgrading. After you make the schema changes, you can initialize a new database, and then apply the rebuild script to it.

Rebuilding Mac OS X databases
You must use SQL Anywhere 9.0.2 or earlier software to unload a version 9.0.2 or earlier database on Mac OS X. If you want to unload a Mac OS X database using SQL Anywhere 10 software, you must unload the database on a different platform. The reload can be performed on Mac OS X using the version 10 software.

If you want to change the characteristics of the database during unload and reload (for example, change a case-sensitive database to a case-insensitive database), the procedure is more involved. For more information, see "Rebuilding databases" [*SQL Anywhere Server - SQL Usage*].

Compatibility with existing software

- SQL Anywhere 10 database servers support connections from client applications using software from version 6.0.0 or later. Version 5 and earlier clients cannot connect to a version 10 database server. When version 9 and earlier clients connect to a version 10 database server, they cannot use the following features:
  - Kerberos logins
  - The embedded SQL NCHAR type
  - Improved support of Unicode data from ODBC, OLE DB, and ADO.NET (for example, describing NCHAR as WCHAR columns)
  - BLOB performance enhancements for Unicode applications using ODBC, and all applications using OLE DB and ADO.NET
  - Enhancements that primarily improve WAN performance, but that also provide some improvements to LAN performance

  Setting SATMP for shared memory connections
  A different search order is used to locate the temporary file in version 9 and earlier than is used in version 10. If you are connecting a version 9 or earlier client to a version 10 database server over shared memory, you must set the SATMP (version 10) and ASTMP (version 9 and earlier) environment variables to specify the location of the temporary file. If you do not set these environment variables, the shared memory connection attempt will fail.

- Management of old databases and old database servers from the current version of Sybase Central is provided as follows:
  - You can connect to and administer version 8 and later databases running on version 8 and later servers.
  - You can connect to a version 5, 6, 7, 8, or 9 database on a version 8 or later database server to rebuild the database using the Unload Database wizard from Sybase Central.
  - There is no support for version 6 and earlier databases running on version 7 and older database servers.

Note
If you are connecting to a version 10.0.0 or later database with a version 9 client application such as Sybase Central or Interactive SQL, the connections use the iAnywhere JDBC driver by default, rather than jConnect. The iAnywhere JDBC driver is the recommended JDBC driver for connecting to SQL Anywhere databases.

Using the utilities

If you have multiple versions of SQL Anywhere on your computer, you must pay attention to your system path when using utilities. Since the installation adds the most recently installed version executable directory to the end of your system path, it is possible to install a new version of the software, and still inadvertently be running the previously installed version.

For example, if an Adaptive Server Anywhere version 8 executable directory is ahead of the SQL Anywhere 10 executable directory in your path and you use the dbinit command, you will use the version 8 utility, and consequently create a version 8 database.

There are five ways you can ensure that you are using the version 10 utilities:

- Modify your system path so that the SQL Anywhere 10 executable directory is before any previous version executable directory.
- Change to the SQL Anywhere 10 executable directory before executing your command.
- Specify a fully-qualified path name to the utility name that indicates the exact location of the utility you want to run.
- Create scripts to change your environment to use the correct version of the utilities.
- Uninstall the old software.

Upgrade quick start

For previous users of the software, the following steps summarize the process for upgrading your database to version 10.

♦ To upgrade a database (command line)

1. Back up the database. For example:

   ```
   dbbackup -c "DBF=mydb.db;UID=DBA;PWD=sql" old-db-backup-dir
   ```

   Note
   Make sure you use the correct version of dbbackup to back up your database. See “Using the utilities” on page 314.

2. If possible, defragment the drive where the new database will be stored because a fragmented drive can decrease database performance.

For an alternative procedure to defragmenting, see "Rebuilding a version 9 or earlier database without defragmenting" on page 325.

3. Shut down all SQL Anywhere and Adaptive Server Anywhere database servers because the version 10 dbunload utility cannot be used against a database that is running on a previous version of the database server. For example:

```
dbstop -c "DBF=mydb.db;UID=DBA;PWD=sql"
```

4. Unload and reload (rebuild) the old database into a new version 10 database. For example:

```
dbunload -c "DBF=mydb.db;UID=DBA;PWD=sql" -an mydb10.db -o
dbunload_log_mydb.txt
```

5. Shut down the new database and back it up before using it. For example:

```
dbstop -c "DBF=mydb10.db;UID=DBA;PWD=sql"

dbbackup -c "DBF=mydb10.db;UID=DBA;PWD=sql" new-db-backup-dir
```

See also

- "Rebuilding a version 9 or earlier database using the Unload utility" on page 324
- "Rebuilding a version 9 or earlier database from Sybase Central" on page 322

Important upgrade precautions

There are several precautions you should take before upgrading any application, and these apply to SQL Anywhere upgrades just as to any other software.

- **Check the behavior changes** Confirm that none of the documented behavior changes affect your application. If they do, you must update your application accordingly. See SQL Anywhere 10 - Changes and Upgrading on page 1.
- **Test your application** Test your application thoroughly in a SQL Anywhere 10 environment before upgrading any applications in production use.
- **Use the correct version of the utilities** Make sure you use the correct version of the database utilities with your new database. See "Using the utilities" on page 314.
- **Validate and back up the database** Validate your database, and back up your existing software and database. In addition, as recovery cannot happen across a database upgrade, make a backup after upgrading to ensure recoverability going forward.
- **Synchronize before upgrading** For databases involved in synchronization, such as UltraLite databases or SQL Anywhere remote databases in MobiLink installations, you must perform a successful synchronization before upgrading.
- **Test your upgrade procedure** Test your upgrade procedure carefully before carrying it out on a production system.

SQL Anywhere is used in many different configurations, and no upgrade guidelines can be guaranteed for all cases.

Upgrading version 10.0.0 databases

Upgrading a database adds and modifies system tables, system procedures, and database options to enable version 10 features. It does not change the file format used to store and access data on disk and so does not give access to all new features and performance enhancements in the latest version of the software.

For information about upgrading the database file format, see "Rebuilding version 10.0.0 databases" on page 317.

♦ To upgrade a database (Sybase Central)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Start Sybase Central.

   From the Start menu, choose Programs ► SQL Anywhere 10 ► Sybase Central.
3. Start a version 10 database server running the database you want to upgrade.
4. From the Tools menu, choose SQL Anywhere 10 ► Upgrade Database.

   The Upgrade Database wizard appears.
5. Follow the instructions in the wizard.
6. Stop the database and archive the transaction log before using the upgraded database.

   For more information about using the Upgrade Database wizard, see "Upgrading databases" [*SQL Anywhere Server - SQL Usage*].

♦ To upgrade a database (Command line)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Ensure that you have exclusive access to the database to be upgraded and ensure that the version 10 utilities are ahead of other utilities in your system path. See "Using the utilities" on page 314.
3. Run the Upgrade utility (dbupgrad) against the database:

   ```
   dbupgrad -c "connection-string"
   ```

   The database user specified in the *connection-string* must connect to the database to be unloaded with DBA authority.

   For more information, see "Upgrade utility (dbupgrad)" [*SQL Anywhere Server - Database Administration*].
4. Shut down the database and archive the transaction log before using the upgraded database.

♦ To upgrade a database (SQL)

1. Connect to the database from Interactive SQL or another application that can execute SQL statements.

2. Execute an ALTER DATABASE statement.

   For example, the following statement upgrades a database without changing the JDK level:

   ```
   ALTER DATABASE UPGRADE
   ```

   For more information, see "ALTER DATABASE statement" [*SQL Anywhere Server - SQL Reference*].

3. Shut down the database and archive the transaction log before using the upgraded database.

Rebuilding version 10.0.0 databases

You must unload and reload your database to upgrade its file format.

Caution
Unloading and reloading a large database can be time consuming and can require a large amount of disk space. The process may require disk space approximately twice the size of your database to hold the unloaded data and the new database file.

If you are upgrading the file format for a database that is involved in SQL Remote replication or that is a remote database in a MobiLink installation, and if you use the utility, you must be sure to use the -ar or -an option. The option ensures that the transaction log offsets for the new database are set to match those of the old database.

Note
It is recommended that you back up your database before you rebuild it.

♦ To upgrade the database file format (Sybase Central)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Start Sybase Central.

   From the Start menu, choose Programs ► SQL Anywhere 10 ► Sybase Central.
3. Start a version 10 database server running the database you want to upgrade.
4. From the Tools menu, choose SQL Anywhere 10 ► Unload Database.

   The Unload Database wizard appears.
5. Read the text on the first page of the wizard and then click Next.
6. Choose to unload the database to which you are connected. Click Next.
7. Choose to unload the database that is already running. Click Next.
8. Specify a new filename for the database. Click Next.

9. You can specify the page size for the new database. The default page size is 4096 bytes. You can encrypt the database file if you want. You need the encryption key each time you want to start the database.

   For more information about database file encryption, see "Encrypting a database" [*SQL Anywhere Server - Database Administration*].

10. Choose Unload Structure and Data. You can also select any other options you want for your database. Click Next.

11. Choose Unload All Database Objects. Click Next.

12. Specify whether you want to connect to the new database when the unload/reload is complete.

13. Click Finish to start the process. You should examine the new database to confirm that the rebuild completed properly.

    For more information about using the Unload Database wizard, see "Using the Unload Database wizard" [*SQL Anywhere Server - SQL Usage*].

♦ **To upgrade the database file format (Command line)**

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.

2. Ensure that you have exclusive access to the database to be upgraded and ensure that the version 10 utilities are ahead of other utilities in your system path. See "Using the utilities" on page 314.

3. Execute the Unload utility (dbunload) using the -ar option to create a new database.

   ```
   dbunload -c "connection-string" -an new-db-file
   ```

   The database user specified in the *connection-string* must connect to the database to be unloaded with DBA authority.

   This command replaces the existing database with an upgraded database. To use the -ar option, you must connect to a personal server, or to a network server on the same computer as the Unload utility (dbunload).

   For information about other Unload utility (dbunload) options, see "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].

4. Shut down the database and archive the transaction log before using the reloaded database.

   If you want to change the characteristics of the database during unload and reload (for example, change a case-sensitive database to a case-insensitive database), the procedure is more involved. For more information, see "Rebuilding databases" [*SQL Anywhere Server - SQL Usage*].

Upgrading SQL Anywhere software and databases in a database mirroring system

When you are using database mirroring, extra steps are required to apply a SQL Anywhere maintenance release or EBF, or upgrade the database file.

- For information about applying a maintenance release, see "Installing SQL Anywhere maintenance releases in a database mirroring system" on page 319.
- For information about applying an EBF, see "Applying SQL Anywhere EBFs in a database mirroring system" on page 319.
- For information about upgrading or rebuilding the database file, see "Upgrading databases in a database mirroring system" on page 319.

Installing SQL Anywhere maintenance releases in a database mirroring system

All servers in a database mirroring system must be using the same maintenance release of SQL Anywhere. If you use the following procedure to apply a SQL Anywhere maintenance release, the only time the database is not available is during steps 3 and 4.

♦ To apply a SQL Anywhere maintenance release to a database mirroring system

1. Shut down the mirror server by issuing a dbstop command.
2. Install the new version of SQL Anywhere on the mirror server.
3. Shut down the primary and arbiter servers by issuing a dbstop command for each server.
4. Install the new version of SQL Anywhere on the primary server.
5. Restart the primary and mirror servers.
6. Install the new version of the software on the arbiter.
7. Restart the arbiter.

Applying SQL Anywhere EBFs in a database mirroring system

To install an EBF, you must do the following for each database server in the mirroring system (primary, mirror, and arbiter servers):

1. Stop the database server by issuing a dbstop command.
2. Install the EBF.
3. Restart the server.

The only downtime occurs during the failover caused by shutting down the primary server.

See also

- "Stopping a database server in a mirroring system" [*SQL Anywhere Server - Database Administration*]
- "Initiating failover on the primary server" [*SQL Anywhere Server - Database Administration*]

Upgrading databases in a database mirroring system

There are two procedures you can use to upgrade or rebuild a database that is participating in a database mirroring system. The first process is simpler, but it has a longer database downtime than the second procedure.

♦ To upgrade or rebuild a database in a database mirroring system

1. Shut down the mirror server.
2. Shut down the primary server.
3. Upgrade or rebuild the database using the copy on the primary server. See "Upgrading version 10.0.0 databases" on page 316 or "Rebuilding version 10.0.0 databases" on page 317.
4. Copy the upgraded or rebuilt database and transaction log to the mirror server.
5. Restart the primary server.
6. Restart the mirror server.

> **Note**
> Any renamed transaction log files should be moved because they are incompatible with the new database. An initial transaction log file is required on both servers for mirroring to start. You can create a transaction log file by executing a dbping command against the database.

♦ To minimize downtime while upgrading or rebuilding a database in a database mirroring system

1. Make a backup of the database and rename the transaction log.
2. Run the dbtran utility to display the starting offset and ending offset of the database's current transaction log file.

   For information about using dbtran to obtain transaction log offsets, see "Rebuilding databases involved in synchronization or replication" [*SQL Anywhere Server - SQL Usage*].

   You need to save and reset the transaction log offsets so you can apply any transactions that occur during Steps 2 through 6 to the upgraded or rebuilt database.
3. Upgrade or rebuild the backup copy of the database on a different computer. See "Upgrading version 10.0.0 databases" on page 316, or "Rebuilding version 10.0.0 databases" on page 317.
4. Use the dblog utility to reset the log offset information to correspond to the settings obtained in Step 2. For example:

   ```
   dblog -x 0 -z 137829 database-name.db
   ```

   For more information about using dblog to reset transaction log offsets, see "Rebuilding databases involved in synchronization or replication" [*SQL Anywhere Server - SQL Usage*].
5. The following steps are optional:

   a. Back up and rename the transaction log on the primary server.

   b. Apply the transaction log obtained in Step 5.a to the rebuilt database using dbeng10 -a.
6. Shut down both the primary and mirror servers.

7. Save the current copy of the transaction log on the primary database.
8. Copy the upgraded or rebuilt database to the primary and mirror servers.
9. Copy the transaction log from Step 7 to both the primary and mirror server.
10. Start the primary server.
11. Start the mirror server.

Rebuilding version 9 and earlier databases for version 10.0.0

This section describes how to unload and reload your database into a new version 10 database.

For information about upgrading Windows CE databases, see "Rebuilding databases on Windows CE" [*SQL Anywhere Server - Database Administration*].

Rebuilding Mac OS X databases
You must use SQL Anywhere 9.0.2 or earlier software to unload a version 9.0.2 or earlier database on Mac OS X. If you want to unload a Mac OS X database using SQL Anywhere 10 software, you must unload the database on a different platform. The reload can be performed on Mac OS X using the version 10 software.

Caution
Unloading and reloading a large database can be time consuming and can require a large amount of disk space. The process requires access to disk space approximately twice the size of your database to hold the unloaded data and the new database file.

Upgrade restrictions

There are some restrictions to note when rebuilding version 9.0.2 or earlier databases using the 10.0.0 tools:

- You must disconnect the database from any earlier versions of the database server, and you must shut down any earlier database servers running on the computer. You must also shut down any version 10 database servers that are running on the computer. If dbunload detects any of these cases, it issues an error and fails.
- Do not include the ENG, START, or LINKS connection parameters in the dbunload connection string for the old database (specified in the -c option). If you specify these parameters, they are ignored and a warning appears. In the Sybase Central Connect dialog, do not enter values in the Server Name and Start Line fields.
- You must run dbunload on the computer where the old database is located (dbunload *must* be able to connect to the database using shared memory).
- You cannot run a database server named dbunload_support_engine on the computer where the rebuild is taking place.

- If you are using NetWare, you must rebuild the database on a Windows or Unix computer. You can then connect to the new version 10.0.0 database on a database server running on the NetWare computer.

Special considerations

- **Password case sensitivity** In newly-created SQL Anywhere 10 databases, all passwords are case sensitive, regardless of the case-sensitivity of the database. The default DBA password for new databases is **sql**.

  When you rebuild an existing database, SQL Anywhere determines the case sensitivity of the password as follows:

  - If the password was originally entered in a case-insensitive database, the password remains case-insensitive.
  - If the password was originally entered in a case-sensitive database, uppercase and mixed case passwords remain case sensitive. However, if the password was entered in all lowercase, then the password becomes *case-insensitive*.
  - Changes to both existing passwords and new passwords are case sensitive.

- **Page sizes** The default database page size for SQL Anywhere 10 databases has been changed to 4096 bytes from 2048 bytes. The supported page sizes in version 10 are 2048 bytes, 4096 bytes, 8192 bytes, 16384 bytes, and 32768 bytes. If your old database uses an unsupported page size, the new database has a page size of 4096 bytes by default. You can use the dbinit -p option to specify a different page size. See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*].

- **Collations** Unless you specify a new or different collation for the rebuilt database, the collation from the old database is unloaded and reused in the rebuilt database.

  If you are rebuilding a database with a custom collation, the collation is preserved if you rebuild in a single step. If you choose to unload the database, and then load the schema and data into a database that you create, then you must use one of the supplied collations.

Rebuilding a version 9 or earlier database from Sybase Central

You can use the Unload Database wizard to rebuild an old database. The wizard lets you choose whether you want to unloading into a reload file and data files, unload and reload into a new database, or unload and reload into an existing database. It is strongly recommended that you back up your database before rebuilding it.

Sybase Central upgrade notes

- The database file must be located on the same computer as the SQL Anywhere 10 installation.
- You cannot unload a subset of tables from a database. You must use the dbunload utility to do this.
- If the Unload Database wizard determines that the database file is already running, then the database will be stopped before the unload proceeds.

♦ To upgrade the database file format (Sybase Central)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. If possible, defragment the drive where the new database will be stored because a fragmented drive can decrease database performance.

   For an alternative procedure to defragmenting, see "Rebuilding a version 9 or earlier database without defragmenting" on page 325.
3. Back up the database. For example:

   ```
   dbbackup -c "DBF=mydb.db;UID=DBA;PWD=sql" old-db-backup-dir
   ```

   Note
   Make sure you use the correct version of dbbackup to back up your database. See "Using the utilities" on page 314.
4. Ensure that you have exclusive access to the database to be unloaded and reloaded. No other users can be connected.
5. Start Sybase Central.

   From the Start menu, choose Programs ► SQL Anywhere 10 ► Sybase Central.

   The Sybase Central dialog listing SQL Anywhere tasks appears. (If this dialog does not appear, use the alternative method described below using the Tools menu.)
6. Click Prepare a Version 9 or Earlier Database for SQL Anywhere 10. Or, from the Tools menu, choose SQL Anywhere 10 ► Unload Database.

   The Unload Database wizard appears.
7. Read the introductory page of the wizard, and then click Next.
8. Select Unload a Non-running Database and enter the connection information for the database. Click Next.
9. Select Unload and Reload into a New Database. Click Next.
10. Specify a new file name for the database. Click Next.

    You can specify the page size for the new database. In version 10, the default (and recommended) page size is 4096 bytes.

    You can encrypt the database file if you want. You need the encryption key each time you want to start the database. See "Encrypting a database" [*SQL Anywhere Server - Database Administration*].
11. Choose to unload structure and data. Click Next.
12. Specify whether you want to connect to the new database when the unload/reload is complete.

13. Click Finish to start the process. Examine the new database to confirm that the upgrade completed properly.

Rebuilding a version 9 or earlier database using the Unload utility

You can use the Unload utility (dbunload) -an or -ar option to rebuild an old database:

- *The -an option is recommended because it creates a new database.*
- The -ar option replaces your old database with a new version 10 database.

It is recommended that you back up your database before rebuilding it.

Note
The page size for a database can be (in bytes) 2048, 4096, 8192, 16384, or 32768, with the default being the page size of the original database.

♦ To upgrade the database file format (command line)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. If possible, defragment the drive where the new database will be stored because a fragmented drive can decrease database performance.

   For an alternative procedure to defragmenting, see "Rebuilding a version 9 or earlier database without defragmenting" on page 325.
3. Back up the database. For example:

   ```
   dbbackup -c "DBF=mydb.db;UID=DBA;PWD=sql" old-db-backup-dir
   ```

   Note
   Make sure you use the correct version of dbbackup to back up your database. See "Using the utilities" on page 314.
4. Ensure that you have exclusive access to the database to be unloaded and reloaded. No other users can be connected.
5. Ensure that the version 10 utilities are ahead of other utilities in your system path. See "Using the utilities" on page 314.
6. Shut down all SQL Anywhere and Adaptive Server Anywhere database servers because the version 10 dbunload utility cannot be used against a database that is running on a previous version of the database server. For example:

   ```
   dbstop -c "DBF=mydb.db;UID=DBA;PWD=sql"
   ```
7. Execute the Unload utility (dbunload) using the -an or -ar option to create a new database.

   ```
   dbunload -c "connection-string" -an database-filename
   ```


For example:

```
dbunload -c "DBF=mydb.db;UID=DBA;PWD=sql" -o dbunload_log_mydb.txt -an
mydb10.db
```

The database user specified in the *connection-string* must connect to the database to be unloaded with DBA authority. This command creates a new database (by specifying -an). If you specify the -ar option, the existing database is replaced with an upgraded database. To use the -ar option, you must connect to a personal server or to a network server on the same computer as the Unload utility (dbunload).

For information on other Unload utility (dbunload) options, see "Unload utility (dbunload)" [*SQL Anywhere Server - Database Administration*].

8. Shut down the database and back up the transaction log before using the reloaded database.

Rebuilding a version 9 or earlier database without defragmenting

As an alternative to defragmenting the drive where the new database will be located, you can use the following procedure.

♦ To rebuild the database without defragmenting

1. Shut down all SQL Anywhere and Adaptive Server Anywhere database servers because the version 10 dbunload utility cannot be used against a database that is running on a previous version of the database server. For example:

   ```
   dbstop -c "DBF=mydb.db;UID=DBA;PWD=sql"
   ```

2. Ensure that the version 10 utilities are ahead of other utilities in your system path. See "Using the utilities" on page 314.

3. Back up the database. For example:

   ```
   dbbackup -c "DBF=mydb.db;UID=DBA;PWD=sql" old-db-backup-dir
   ```

4. Use dbunload to create a *reload.sql* file. For example:

   ```
   dbunload -c "connection-string" directory-name
   ```

5. Create a new database file using the Initialization utility (dbinit) or the Create Database wizard in Sybase Central. For example:

   ```
   dbinit new.db
   ```

6. Connect to the new database from Interactive SQL

   ```
   dbisql -c "DBF=new.db;UID=DBA;pwd=sql"
   ```

7. Execute the following statement to add disk space to the database that can be used when loading the data into the database. Add enough space to accommodate the size of your database file. This disk space should be contiguous, which can improve the performance of the reload. For example:

   ```
   ALTER DBSPACE system
   ADD 200MB
   ```

8. Apply the *reload.sql* file to the database from Interactive SQL.


```
dbisql -c "DBF=new.db;UID=DBA;pwd=sql" reload.sql
```

Known issues

If the rebuild process fails when you run dbunload or the Unload Database wizard, you can use the following steps to help diagnose the reason for the failure.

♦ To diagnose a rebuild failure

1. Run dbunload -n on your old database.

   ```
   dbunload -c "connection-string" -n directory-name
   ```

2. Create a new, empty version 10 database.

   ```
   dbinit test.db
   ```

3. Apply the *reload.sql* file to the empty database.

   ```
   dbisql -c "DBF=test.db;UID=DBA;pwd=sql" reload.sql
   ```

4. Make changes to the *reload.sql* file or the original database based on the messages you receive when applying the *reload.sql* file to the new database.

The following table lists issues that are known to cause a rebuild to fail, as well as their solutions.

Known problem	Solution
A DECLARE LOCAL TEMPORARY TABLE statement in a procedure or trigger causes a syntax error if the table name is prefixed with an owner name.	Remove the owner name.
If a CREATE TRIGGER statement does not include an owner name for the table on which the trigger is defined, and the table must be qualified with an owner when referenced by the user executing the *reload.sql* file, the statement fails with a `Table 'table-name' not found` error.	Prefix the table name with the owner name.

If an object name (such as a table, column, variable or parameter name) corresponds to a reserved word introduced in a later version of SQL Anywhere (such as NCHAR), then the reload fails. For example:
`CREATE PROCEDURE p( )`
`BEGIN`
`DECLARE NCHAR INT;`
`SET NCHAR = 1;`
`END`
	Change all references to the reserved word to use a different name. For variable names, prefixing the name with @ is a common convention that prevents naming conflicts.
	For a complete list of reserved words, see "Reserved words" [*SQL Anywhere Server - SQL Reference*].

Known problem	Solution
If a database is unloaded with version 9 or earlier copy of dbunload, the *reload.sql* file can contain calls to the ml_add_property system procedure, but this procedure is not present in a new version 10 database.	Unload the database with the version 10 dbunload utility. For information about ensuring you are using the correct verison of the database utilities, see "Using the utilities" on page 314.
If you unload a database using a version 9 or earlier version of dbunload, views that use Transact-SQL outer joins (by specifying *= or =*) may not be created properly when they are reloaded.	Add the following line to the reload script: `SET TEMPORARY OPTION tsql_outer_joins='on'` You should later rewrite any views that use Transact-SQL outer joins.

Upgrading MobiLink

Compatibility with existing software

- New MobiLink clients are incompatible with versions of the MobiLink server before 10.0.0.
- The version 10 MobiLink server can be used with clients that are version 8, 9, or 10. To use version 10 clients, start the MobiLink server with the -x option. To use version 8 or 9 clients, start the MobiLink server with the -xo option. If you need to support earlier clients, you should keep an earlier version of the MobiLink server to support them.
- Confirm that none of the documented behavior changes affect your application. If they do, you must update your application accordingly. See SQL Anywhere 10 - Changes and Upgrading on page 1.

Upgrade order

If you are upgrading an existing MobiLink installation, you must upgrade the components in the following order:

1. Shut down the MobiLink server.
2. Upgrade the consolidated database.

   See "Upgrading your consolidated database" on page 328.
3. Upgrade the MobiLink server.

   See "Upgrading the MobiLink server" on page 332.
4. Start the MobiLink server.
5. Upgrade the MobiLink clients.

   For information about SQL Anywhere remote databases, see "Upgrading SQL Anywhere MobiLink clients" on page 333. For information on UltraLite applications, see "Porting pre-10.0.0 UltraLite application code to version 10.0.1" on page 342.

Before upgrading, check for behavior changes that may affect you and carry out standard upgrade precautions.

For more information, see:

- "Behavior changes and deprecated features" on page 98
- "Important upgrade precautions" on page 315

Upgrading your consolidated database

Before you can use the new MobiLink server with a pre-existing consolidated database, you must run upgrade scripts that install new system objects. The upgrade scripts must be run by the owner of the currently installed MobiLink system tables.

Notes

- If you have authenticate_user_hashed scripts that were created prior to version 10.0.0, you must change them to accept BINARY(32) instead of BINARY(20), using the binary equivalent type of your RDBMS.

Upgrading SQL Anywhere version 10.0.0

See "Upgrading version 10.0.0 databases" on page 312.

Upgrading SQL Anywhere prior to version 10.0.0

- Prior to version 10.0.0, MobiLink system tables were owned by DBO. To run the setup scripts for a SQL Anywhere database, you must be logged in to the consolidated database as the owner of the MobiLink system tables. It is not sufficient to run these scripts as a user with permission to change the tables. To run the upgrade scripts, you can use the SETUSER SQL statement to impersonate DBO. For example:

  ```
  SETUSER "dbo";
  ```

  To upgrade a consolidated database in Sybase Central, you should use the GRANT CONNECT statement to create a password for DBO and then connect as DBO. For example:

  ```
  GRANT CONNECT TO "dbo" IDENTIFIED BY 'password';
  ```

  In the latter case, after you have upgraded you should use GRANT CONNECT to remove the DBO password. For example:

  ```
  GRANT CONNECT TO "dbo";
  ```

- If you have set up a SQL Anywhere consolidated database but never synchronized with it, then you must run the setup script (not the upgrade script). This only applies to SQL Anywhere consolidated databases.

♦ To upgrade a consolidated database (SQL Anywhere prior to 10.0.0)

1. If you are upgrading a SQL Anywhere consolidated database that is prior to version 10.0.0, you must first upgrade the database to version 10:

   a. Shut down the database server.

   b. Upgrade the database to version 10.

      For instructions, see "Upgrading version 9 and earlier databases" on page 312.

   c. Start the database server, logging in as DBA.

      Note: You must log in as DBA to upgrade.

2. If you are upgrading from version 6.0.x, run the MobiLink setup script, located in the *MobiLink\setup* subdirectory of your SQL Anywhere installation. Do not run the setup script if you are upgrading from a later version.

   For more information about setup scripts, see "MobiLink Consolidated Databases" [*MobiLink - Server Administration*].

3. Run the appropriate upgrade script for the version you are upgrading from.

The upgrade scripts are called *upgrade_asa.sql*. They are located under your SQL Anywhere installation in *MobiLink\upgrade\version*, where *version* is the SQL Anywhere version you are upgrading from.

To run the upgrade scripts, you must impersonate the DBO user. You can do this with the SETUSER SQL statement.

For example, to upgrade a SQL Anywhere version 9.0.2 consolidated database, connect to the database in Interactive SQL and run the following command:

```
SETUSER "dbo";
READ 'c:\Program Files\SQL Anywhere 10\MobiLink\upgrade\9.0.2
\upgrade_asa.sql'
```

4. Remove the DBO password. For example:

```
GRANT CONNECT TO "dbo"
```

5. If you are running the MobiLink server as a user other than DBA, you must grant execute permission for that user to the new MobiLink system objects. Which system objects are new depends on which version you are upgrading from. The following code grants the necessary permissions to all MobiLink system objects. Before executing the code, you must change the user name my_user to the name of the user who is running the MobiLink server.

```
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_column to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_connection_script to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_database to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_device to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_device_address to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_listening to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_property to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_clients to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_delivery to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_global_props to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_notifications to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_repository to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_repository_props to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_repository_staging to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_status_history to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_qa_status_staging to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_script to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_script_version to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_scripts_modified to
my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_sis_sync_state to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_subscription to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_table to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_table_script to my_user;
GRANT SELECT, INSERT, UPDATE, DELETE ON dbo.ml_user to my_user;
GRANT EXECUTE ON dbo.ml_qa_get_agent_network_property to my_user;
GRANT EXECUTE ON dbo.ml_qa_get_agent_object_property to my_user;
GRANT EXECUTE ON dbo.ml_qa_get_agent_property to my_user;
GRANT EXECUTE ON dbo.ml_qa_get_message_property to my_user;
```



```
GRANT EXECUTE ON dbo.ml_add_column to my_user;
GRANT EXECUTE ON dbo.ml_add_connection_script to my_user;
GRANT EXECUTE ON dbo.ml_add_dnet_connection_script to my_user;
GRANT EXECUTE ON dbo.ml_add_dnet_table_script to my_user;
GRANT EXECUTE ON dbo.ml_add_java_connection_script to my_user;
GRANT EXECUTE ON dbo.ml_add_java_table_script to my_user;
GRANT EXECUTE ON dbo.ml_add_lang_conn_script_chk to my_user;
GRANT EXECUTE ON dbo.ml_add_lang_connection_script to my_user;
GRANT EXECUTE ON dbo.ml_add_lang_table_script to my_user;
GRANT EXECUTE ON dbo.ml_add_lang_table_script_chk to my_user;
GRANT EXECUTE ON dbo.ml_add_property to my_user;
GRANT EXECUTE ON dbo.ml_add_table_script to my_user;
GRANT EXECUTE ON dbo.ml_add_user to my_user;
GRANT EXECUTE ON dbo.ml_delete_device to my_user;
GRANT EXECUTE ON dbo.ml_delete_device_address to my_user;
GRANT EXECUTE ON dbo.ml_delete_listening to my_user;
GRANT EXECUTE ON dbo.ml_delete_sync_state to my_user;
GRANT EXECUTE ON dbo.ml_delete_sync_state_before to my_user;
GRANT EXECUTE ON dbo.ml_delete_user to my_user;
GRANT EXECUTE ON dbo.ml_qa_add_delivery to my_user;
GRANT EXECUTE ON dbo.ml_qa_add_message to my_user;
GRANT EXECUTE ON dbo.ml_qa_handle_error to my_user;
GRANT EXECUTE ON dbo.ml_qa_stage_status_from_client to my_user;
GRANT EXECUTE ON dbo.ml_qa_staged_status_for_client to my_user;
GRANT EXECUTE ON dbo.ml_qa_upsert_global_prop to my_user;
GRANT EXECUTE ON dbo.ml_reset_sync_state to my_user;
GRANT EXECUTE ON dbo.ml_set_device to my_user;
GRANT EXECUTE ON dbo.ml_set_device_address to my_user;
GRANT EXECUTE ON dbo.ml_set_listening to my_user;
GRANT EXECUTE ON dbo.ml_set_sis_sync_state to my_user;
GRANT EXECUTE ON dbo.ml_upload_update_device_address to my_user;
GRANT EXECUTE ON dbo.ml_upload_update_listening to my_user;
```

Upgrading Adaptive Server Enterprise, Oracle, or Microsoft SQL Server

You only need to upgrade your Adaptive Server Enterprise, Oracle, or Microsoft SQL Server consolidated database if your version of the MobiLink server is prior to version 10.0.0.

♦ To upgrade a consolidated database (Adaptive Server Enterprise, Oracle, or Microsoft SQL Server)

1. If you are upgrading from version 6.0.x, run the MobiLink setup script, located in the *MobiLink \setup* subdirectory of your SQL Anywhere installation. Do not run the setup script if you are upgrading from a later version.

   For more information about setup scripts, see "MobiLink Consolidated Databases" [*MobiLink - Server Administration*].

2. For Adaptive Server Enterprise databases, you must set "select into" permission. Run the following command in Sybase Interactive SQL:

   ```
   USE MASTER
   go
   sp_dboption your-database-name, "SELECT INTO", true
   go
   USE your-database-name
   go
   checkpoint
   go
   ```


3. Run the appropriate upgrade script for the version you are upgrading from.

   The upgrade scripts are called *upgrade_XXX.sql*, where *XXX* indicates the RDBMS of your consolidated database. They are located under your SQL Anywhere installation in *MobiLink\upgrade\version*, where *version* is the SQL Anywhere version you are upgrading from.

   For example:

   ```
   READ 'c:\Program Files\SQL Anywhere 10\MobiLink\upgrade\902
   \upgrade_asa.sql'
   ```

Upgrading DB2

You only need to upgrade your DB2 consolidated database if your version of the MobiLink server is prior to version 10.0.0.

♦ **To upgrade a DB2 consolidated database**

1. Copy the *MobiLink\setup\SyncDB2Long.class* file to the *SQLLIB\FUNCTION* directory on the DB2 server computer. You probably need to restart the instance of DB2. For details, see your DB2 documentation.
2. If you are upgrading from MobiLink version 6, create the MobiLink system tables and stored procedures by running the setup SQL script *MobiLink\setup\syncdb2long.sql*.

   For information about how to run the DB2 setup script, see "IBM DB2 UDB consolidated database" [*MobiLink - Server Administration*].
3. Locate the DB2 upgrade script.

   The upgrade script is called *upgrade_db2tolong.sql* and is held in the *MobiLink/upgrade/version* subdirectory of your SQL Anywhere installation. The *version* directory refers to the version of MobiLink from which you are upgrading.
4. Copy *upgrade_db2tolong.sql* and modify the copy. Change the CONNECT statement at the start of the script so it will work with the instance you want to connect to. Apply the copied SQL script to the consolidated database.

Upgrading the MobiLink server

You do not need to upgrade from version 10.0.0 to version 10.0.1.

Before using a version 10 MobiLink server, check the behavior changes to see if any affect you. See SQL Anywhere 10 - Changes and Upgrading on page 1.

Version 10 of the MobiLink server only supports version 8 and 9 SQL Anywhere and UltraLite clients. If you need to support earlier clients, you should keep an earlier version of the MobiLink server for supporting them.

Upgrading SQL Anywhere MobiLink clients

In a production environment, only upgrade SQL Anywhere remote databases after you have upgraded both the consolidated database and the MobiLink server.

Note: In version 10.0.0, Adaptive Server Anywhere was renamed to SQL Anywhere.

There are several kinds of upgrade to consider:

- Upgrading the software.
- Upgrading the remote database itself.
- Upgrading the whole application.

Caution
You must complete a successful synchronization just before you upgrade a database involved in MobiLink synchronization. You should also validate and back up the database.

Upgrading the software

It is recommended that you upgrade the dbmlsync MobiLink client and the SQL Anywhere database server at the same time. You must upgrade the remote database before running the new dbmlsync utility.

Version 10 MobiLink clients require a MobiLink version 10 synchronization server for synchronization. Version 10 MobiLink clients do not synchronize with a MobiLink server earlier than version 10.

For information about upgrading MobiLink, see "Upgrading MobiLink" on page 328.

Upgrading the remote database

You can upgrade MobiLink SQL Anywhere remote databases as described for SQL Anywhere databases. For instructions, see "Upgrading SQL Anywhere" on page 312.

In some cases, such as when there is a schema change or other significant database change, you may need to perform a manual unload and reload.

♦ To unload/reload a remote SQL Anywhere database manually

1. Perform a successful synchronization and validate and back up the remote database.
2. Run the dbtran utility to display the starting offset and ending offset of the database transaction log. Make note of the ending offset.

   See "Log Translation utility (dbtran)" [*SQL Anywhere Server - Database Administration*].
3. Rename the transaction log. This ensures that it is not modified during the unload process. Move the renamed log file to a secure location, such as an offline directory.
4. Unload the database.

   See "Rebuilding version 9 and earlier databases for version 10.0.0" on page 321.
5. Initialize a new database.

See "Initialization utility (dbinit)" [*SQL Anywhere Server - Database Administration*].

6. Reload the data into the new database.

   See "Rebuilding version 9 and earlier databases for version 10.0.0" on page 321.

7. Shut down the new database.

8. Erase the new database's transaction log.

9. Run dblog on the new database, using the following options:

   - Use -z to specify the ending offset that you noted in Step 2.
   - Use -x to set the relative offset to zero.

   For example:

   ```
   dblog -x 0 -z 137829 database-name.db
   ```

   See "Transaction Log utility (dblog)" [*SQL Anywhere Server - Database Administration*].

10. Start dbmlsync, specifying the location of the original log file that you moved in Step 3.

    See "dbmlsync syntax" [*MobiLink - Client Administration*].

11. When you no longer need the old log file, set the database option delete_old_logs.

    See "delete_old_logs option [MobiLink client] [SQL Remote] [Replication Agent]" [*SQL Anywhere Server - Database Administration*].

Upgrading applications

When deploying a new version of a MobiLink application, it is recommended that you use a new version name for the synchronization scripts. For example, if the existing application uses a script version called **v1**, then the upgraded application could use a script version called **v2**. Both script versions can be in use at the same time. This makes it easier to upgrade the remote databases incrementally, rather than all at once.

For versions 9.0.0 and later, the MobiLink server -zd option has been removed. If your deployment uses the -zd option and you want to upgrade, you must change your download scripts to accept the last download timestamp as the first parameter.

Upgrading QAnywhere

To upgrade a QAnywhere application, you can upgrade your consolidated database, application, and client message stores.

To upgrade the consolidated database, see "Upgrading your consolidated database" on page 328.

To upgrade your applications, you should review the new features and behavior changes in this release.

See SQL Anywhere 10 - Changes and Upgrading on page 1.

♦ To upgrade QAnywhere message stores

1. Deploy QAnywhere files.

   See "Deploying QAnywhere applications" [*MobiLink - Server Administration*].

2. Upgrade the message store:

   Run the QAnywhere Agent with the -su option or the -sur option. See:

   - "-su option" [*QAnywhere*]
   - "-sur option" [*QAnywhere*]

Upgrading UltraLite

When upgrading previous versions of UltraLite you should consider which upgrade path is required for your database and application code.

Compatibility with existing software

- The UltraLite 10.0.1 runtime and the UltraLite 10.0.1 engine do not work with database files and application code created with pre-10.0.0 versions of UltraLite.
- UltraLite 10.0.1 will not support connections from client applications from any other version of UltraLite except UltraLite 10.0.0.
- Management of old databases and client applications from the current version of Sybase Central is provided as follows:
  - Full management of version 10 databases only. You cannot manage databases from previous versions.
  - You can only connect to a version 5, 6, 7, 8, or 9 database to upgrade the database file format.
  - You can upgrade the source files for version 7, 8, or 9 C/C++ applications with the Migrate C++ API wizard.

Early versions of Palm OS
Early versions (for example, version 4.X) of Palm devices only have approximately 200 KB of RAM. This limitation can cause problems due to the dynamic memory requirements of UltraLite 10.0.1. For details on how to optimize these early versions of Palm for UltraLite 10.0.1, see "Platform specific optimization strategies for UltraLite" [*UltraLite - Database Management and Reference*].

Using UltraLite 10.0.1 utilities

If you have multiple versions of SQL Anywhere on your computer, you must pay attention to your system path when using UltraLite utilities from version 10.0.1. See "Using the utilities" on page 314.

Upgrading your UltraLite database

Upgrading previous versions of UltraLite databases, requires that you:

- Synchronize the data.
- Disconnect all applications and administration tools.
- Copy the database to your desktop computer.

Note
You cannot connect to an older version of the database with any UltraLite 10.0.1 administration tools until you have upgraded the database.

Special database upgrade considerations

- The UltraLite schema is now part of the database rather than in a separate *.usm* file. This means that applications can no longer create a new database when a database connection cannot be made. Applications must deploy an initial database or programmatically create a database using new CreateDatabase functionality.
- File formats have been consolidated as of version 10 of UltraLite. This means that most platforms can now share a database and as a result, Unicode characters are no longer required.

  If you need characters that are not included in your chosen collation, you should encode your database with UTF-8. See "UltraLite platform requirements for character set encoding" [*UltraLite - Database Management and Reference*] and "UltraLite utf8_encoding property" [*UltraLite - Database Management and Reference*].

  Windows CE and desktop databases
  If you are upgrading databases for either of these platforms and no longer need Unicode characters, do not UTF-8 encode the database. UTF-8 encoding can unnecessarily increase the size of your database.

- As of version 10, all database passwords are case sensitive, regardless of the case-sensitivity of the database. Consequently, user IDs, passwords, and even trusted root certificates may not be preserved as you upgrade your database. You must add former user IDs, passwords, and trusted root certificates to new UltraLite database. The default DBA password for new databases is **sql**.

UltraLite database upgrade paths

Because database creation approaches can vary in UltraLite, the upgrade process also varies according to the approach taken. The following table captures the approach required depending on what you need to upgrade.

If you need to upgrade a previous version of...	Use this tool...
♦ A schema file (*.usm*). ♦ A database file (*.udb*). ♦ Palm OS database records (*.pdb*).	Upgrade Database wizard or Unload Old Database utility (ulunloadold) together with Load Database utility (ulload)
An UltraLite database sourced from a SQL Anywhere reference database.[1]	Extract Database wizard or Initialize Database utility (ulinit)

1 Ensure you have upgraded the SQL Anywhere database first. See "Upgrading SQL Anywhere" on page 312.

For a step-by-step upgrade walkthrough using the tools described in this section, see "UltraLite database upgrade tools" on page 338.

UltraLite database upgrade tools

You can upgrade an existing UltraLite database or schema with either the Upgrade Database wizard or the Upgrade Old Database utility (ulunloadold).

- Choose the wizard if you want to be guided through the process and have help choosing available properties/options.
- Choose the utility if you have either of the following requirements:
  - You only want to upgrade named tables into a new database.
  - You want to implement a batch-oriented process.

♦ To upgrade an existing UltraLite database to version 10.0.1 (Sybase Central)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Start Sybase Central by choosing Start ► Programs ► SQL Anywhere 10 ► Sybase Central.
3. Upgrade your database by choosing Tools ► UltraLite ► Upgrade Database.

   The Upgrade Database wizard appears. Before continuing ensure you have decided:

   - What the source is. You can choose either a database or a schema file.
   - Where to output the upgraded database. You can choose from either:
     - **A new UltraLite 10.0.1 database** Choose this option to create the database and connect to it.
     - **An existing UltraLite 10.0.1 database** Choose this option to change some database options or the collation using settings from the SQL Anywhere reference database. Ensure you choose a character set and collation appropriate for the data in the existing UltraLite database and its internal schema.
4. Choose your upgrade source by selecting the appropriate option:
   - **An Old Database** Browse for a UltraLite database (*.*udb* or *.*pdb*).
   - **An Old Schema File** Browse for an UltraLite schema file (*.*usm*).
5. Connect to the file you selected and then click Next.
6. Choose your output destination:
   - **New Database** You must create a new database file and set the database properties you require. Follow the instructions in the wizard.

- **Use an Already Connected Database** You can choose a connected database from the list provided for you.
- **Use an Existing Database That You Are Not Connected to** Click Database to open the Connect dialog and connect to the existing UltraLite 10.0.1 database.

7. Follow the instructions of the wizard to make additional choices relating to your output destination. If you had trusted root certificates included in your previous version of UltraLite, ensure you add them back into the new UltraLite database.
8. Click Finish to upgrade the database.
9. If you had users in the previous version of the UltraLite database, and if you do not see them in the new database you have created, remember to add them. See "Working with UltraLite users" [*UltraLite - Database Management and Reference*].

♦ To upgrade an existing UltraLite database to version 10.0.1 (command line)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Ensure that the 10.0.1 version of UltraLite utilities are ahead of older UltraLite utilities in your system path. See "Using the utilities" on page 314.
3. Open a command prompt and run the Unload Old Database utility (ulunloadold) to create an XML intermediary file using the following syntax:

   ulunloadold -c "*connection-string*" [*options*] *xml-file*

   Ensure that you have:

   - Named the XML file that the ulunloadold utility is to create.
   - Used either the DBF or schema_file parameter in your *connection-string*, depending on whether or not you want to upgrade an old UltraLite database (**.udb* or **.pdb*) or an old UltraLite schema file (**.usm*).

   All other options are discretionary.

   For a complete reference for this utility see "UltraLite Unload Old Database utility (ulunloadold)" [*UltraLite - Database Management and Reference*].
4. Execute the Load XML to Database utility (ulload) to reload the XML into a new or existing UltraLite database.

   If you are loading the XML into a new database, the **-c** *connection-string* option sets the connection parameters for that database (for example, the UID and PWD required to authenticate the UltraLite user).

   The **-o** [*extended-options*] you set depends on whether or not you are changing the characteristics/properties of the database (for example, changing a case-sensitive database to a case-insensitive database).

For a complete reference, see "UltraLite Load XML to Database utility (ulload)" [*UltraLite - Database Management and Reference*].

For example, upgrade an UltraLite 8.x schema file named *dbschema8.usm* into an existing UltraLite version version 10.0.1 database named *db.udb* with an intermediary XML file named *dbschema.xml* requires these two commands:

```
ulunloadold -c schema_file=dbschema8.usm dbschema.xml

ulload -c DBF=db.udb dbschema.xml
```

Initialization/extraction tools

You can extract an UltraLite database from a version 10.0.1 SQL Anywhere database with either the Extract Database wizard or the Initialize Database utility (ulinit).

Set reference database properties with UltraLite usage in mind
The UltraLite database is generated with the same property settings as those in the SQL Anywhere reference database. By setting these options in the reference database, you also control the behavior of your UltraLite database.

- Choose the wizard if you want to be guided through the process and have help choosing available properties/options.
- Choose the utility if you have either of the following requirements:
  - You only want to upgrade named tables into a new database.
  - You want to implement a batch-oriented process.

♦ To initialize/extract an UltraLite database from a SQL Anywhere reference (Sybase Central)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Ensure you have already upgraded your existing SQL Anywhere database and prepared it with UltraLite usage in mind. If you need to update publications, be sure to do that before re-creating the UltraLite database.

   For SQL Anywhere upgrade procedures, see "Using the utilities" on page 314. For details on how to prepare SQL Anywhere for use with UltraLite, see "Creating an UltraLite database from a SQL Anywhere reference database" [*UltraLite - Database Management and Reference*].
3. Start Sybase Central by choosing Start ► Programs ► SQL Anywhere 10 ► Sybase Central.
4. Extract an UltraLite version of the SQL Anywhere database by choosing Tools ► UltraLite ► Extract Database.

   The Extract Database wizard appears.
5. Follow the instructions in the wizard.

♦ To initialize/extract an UltraLite database from a SQL Anywhere reference database (command line)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Ensure that the version 10.0.1 UltraLite utilities are ahead of older UltraLite utilities in your system path. See "Using the utilities" on page 314.
3. Ensure you have already upgraded your existing SQL Anywhere database and prepared it with UltraLite usage in mind. If you need to update publications, be sure to do that before re-creating the UltraLite database.

   For SQL Anywhere upgrade procedures, see "Using the utilities" on page 314. For details on how to prepare SQL Anywhere for use with UltraLite, see "Creating an UltraLite database from a SQL Anywhere reference database" [*UltraLite - Database Management and Reference*].
4. Open a command prompt and run the Initialize Database utility (ulinit) to extract an UltraLite database using the following syntax:

   ```
   ulinit -a "SAconnection-string" -c "ULconnection-string"
   -n pubname [ options ]
   ```

   Ensure that you have:

   - Provided connection strings for both the upgraded SQL Anywhere reference database and the new UltraLite database you are creating with this command.
   - Named the publications that contain the tables that your UltraLite database requires. To extract all tables, use **-n***.

   All other options are discretionary.

   Note
   Because you are creating a new database, parameters like **UID** and **PWD** are used to create the initial user ID and password for authentication purposes. The SQL Anywhere database is not referenced in this case. However, to override other SQL Anywhere reference database property defaults use **-o** [*extended-options*]. See "Supported extended options" [*UltraLite - Database Management and Reference*] for a complete list.

For a complete reference, see "UltraLite Load XML to Database utility (ulload)" [*UltraLite - Database Management and Reference*]. For more information on UltraLite database properties you can configure, see "UltraLite Database Settings Reference" [*UltraLite - Database Management and Reference*].

Porting pre-10.0.0 UltraLite application code to version 10.0.1

Previous UltraLite applications must be rebuilt with new version 10.0.1 APIs. Since the introduction of UltraLite 10.0.0, these APIs have undergone significant enhancements which require that you first make code changes (if applicable) and then rebuild the application.

Before you begin, however, ensure you have closely reviewed "UltraLite new features" on page 147 to see what changes have been made to the API you have employed.

Special application upgrade considerations

- *Your connection code needs to be updated*. For most APIs, you should try to use the connection parameter control. Only UltraLite for AppForge requires that you use the new control. For example, in UltraLite for MobileVB projects version 9.x, the ULDatabaseManager *WithParms methods that took a ULConnectionParms object are no longer supported. Instead, you must rewrite this code to use the ULConnectionParms.ToString() method.

  A connection parameter control assembles a set of connection parameters conveniently. The UltraLite runtime in turn transforms the assembled parameters into a connection string. For all APIs other than the UltraLite for AppForge API, you can still use a connection object. However, the connection parameter control provides better diagnosis of connection string errors. For API specific details see:

  - UltraLite for C/C++: "Connecting to a database" [*UltraLite - C and C++ Programming*]
  - UltraLite for embedded SQL: "Connecting to a database" [*UltraLite - C and C++ Programming*]
  - UltraLite for AppForge: "Connecting to an UltraLite database" [*UltraLite - AppForge Programming*]
  - UltraLite.NET: "Connecting to a database" [*UltraLite - .NET Programming*]
  - UltraLite for M-Business Anywhere: "Connecting to an UltraLite database" [*UltraLite - M-Business Anywhere Programming*]

- The UltraLite schema is now integrated into the database as tables, rather than as a separate *.usm* file. This means you cannot create a database on device using this file. Instead, a new database creation function/method has been added. However, this method can increase the size of your application. To avoid application bloat, use an administration tool to create the database on the desktop first and deploy it to your application at a later time. See "UltraLite desktop creation" [*UltraLite - Database Management and Reference*].

- UltraLite always has authentication enabled in this version and can support up to four user IDs and passwords. However, if you do not want to maintain authentication in your database, do not create or supply any user IDs and passwords. UltraLite always supplies the defaults of **UID**=**DBA** and **PWD**=**sql** if none are supplied. See "Interpreting user ID and password combinations" [*UltraLite - Database Management and Reference*].

- The 10.0 UltraLite for AppForge component replaces previous versions of UltraLite for MobileVB. You cannot use more than one version of the component on the same machine. If you try to do so, AppForge cannot compile your VB project and generates this error:

  ```
  "Error importing ulmvbctl9.dll. Unable to load"
  ```

  Consequently you must unregister 9.x versions of this component. See the table in "UltraLite application code upgrade paths" on page 343 for details.

Additionally, if a user has a 9.x UltraLite UltraLite for MobileVB client on their device, they must remove it before trying to install and use the 10.0.1 UltraLite for AppForge client.

- If you have multiple embedded SQL files, you must still preprocess each one of them using the SQL preprocessor (sqlpp) to create your C/C++ source files. However, you no longer need to use a reference database. UltraLite databases now support embedded SQL directly.
- Unicode characters are not supported in the same way as in previous versions. Instead, version 10.0.1 UltraLite databases use UTF-8 encoding for multi-byte characters. As a result, you no longer need to plan for a Unicode database running on a non-Unicode runtime.

UltraLite application code upgrade paths

Because development APIs and approaches can vary in UltraLite, the upgrade process also varies according to the approach taken. The following table captures the approach required depending on what you need to upgrade.

If you need to upgrade a previous version of...	Do this...
A ulgen generated C/C++ application	1. Use the Extract Database wizard or run the UltraLite Initialization utility (ulinit) to create a version 10.0.1 UltraLite database. See "Initialization/extraction tools" on page 340.[1] 2. Use the Migrate C++ API wizard to read tables and statements from the SQL Anywhere 10 project for UltraLite to migrate the API accordingly. See "UltraLite application code upgrade tools" on page 344.

9.x versions of UltraLite for MobileVB	1. Unregister your 9.0.x version of UltraLite for MobileVB. At a command prompt, enter the following:
	`<ASA90-install>\ultralite\UltraliteForMobileVB\win32\ulafreg -u`
	2. Register the UltraLite for AppForge 10.0.1 component. At a command prompt, enter the following
	`<install-dir>\win32\ulafreg -r`
	Visual Basic displays a message for each subproject that uses ULConnectionParms:
	`Version 9.0 of ulmvbctl9.dll is not registered. The control will be updated to version 10.0.`
	3. Click OK to use the new version.

An embedded SQL application	Changes are trivial. No tool required.
A Java application	Since the introduction of UltraLite 10.0.0, Java is no longer included in UltraLite. You must re-write your application with a supported API.

If you need to upgrade a previous version of...	Do this...
UltraLite components	Major code rewrites include the following: ♦ **Schema re-writes** Because the schema has been integrated into the database with this version, all components need to rewrite the OpenWithCreate functions for ULConnection objects, as well as to remove all schema upgrade code. Instead, you can create a database on the device with ULDatabaseManager.CreateDatabase. However, to reduce the amount of code required to define the properties in the new database, you should create a database on desktop and deploy it to the device upon completion. For complete details, see "UltraLite on-device creation" [*UltraLite - Database Management and Reference*] and "UltraLite desktop creation" [*UltraLite - Database Management and Reference*]. ♦ **Connection re-writes** All interfaces that used a connection parameter object have been removed: this includes functions or methods that created, opened or dropped the database. Instead, you can use the string interface to pass in these connection parameters.

[1] Ensure you have upgraded the SQL Anywhere database first. See "Upgrading SQL Anywhere" on page 312.

UltraLite application code upgrade tools

You can only use the Migrate C++ API wizard to help you migrate your ulgen-generated C/C++ source code. This wizard helps you identify embedded SQL that may no longer conform to version 10 specifications. If you can not complete the migration process, you can stop and save the SQL statements that you have modified to a **.uag* file.

If this is your first time using the wizard, your table and statement source is the SQL Anywhere reference database. For subsequent iterations, you can use the saved **.uag* file instead.

♦ To migrate the UltraLite C/C++ API (Sybase Central)

1. Carry out the standard precautions for upgrading software. See "Important upgrade precautions" on page 315.
2. Ensure you have already upgraded your existing SQL Anywhere database and prepared it with UltraLite usage in mind. If you need to update publications, be sure to do that before re-creating the UltraLite database.

   For the SQL Anywhere upgrade procedures, see "Using the utilities" on page 314. For details on how to prepare SQL Anywhere for use with UltraLite, see "Creating an UltraLite database from a SQL Anywhere reference database" [*UltraLite - Database Management and Reference*] for details.
3. Ensure you have upgraded an UltraLite database. Otherwise you need to extract an UltraLite database from the SQL Anywhere reference database.

   This UltraLite database is be used as the validation database for this process.

4. Start Sybase Central by choosing Start ► Programs ► SQL Anywhere 10 ► Sybase Central.
5. Migrate your C/C++ API application by choosing Tools ► UltraLite ► Migrate C++ application.

   The Migrate C++ API wizard appears.
6. On the SQL Statement Source page, choose the source from which statements and tables are read.

   - If this is your first time running the wizard, choose Connect to reference SQL database then click Database to set the connection information for a SQL Anywhere reference database.
   - Otherwise, you can also open previous changes written to the **.uag* file you have created for that purpose by choosing Read Output From Previous Wizard Session and then clicking Browse.
7. Depending on the source you have selected, follow the instructions in the wizard and validate all SQL statements. Invalid statements have a red × next to the statement name. For a complete reference for each supported statement in UltraLite, see "UltraLite SQL Statement Reference" [*UltraLite - Database Management and Reference*].

   To correct invalid SQL statements:

   a. Select an invalid statement.

   b. Correct the statement in the text box provided.

   c. Click Validate All SQL Statements.

   If the statement is validated, it is placed at the bottom of the list and has a green checkmark next to the statement name. Click Cancel at any time to save your changes to the *.uag* file and exit the wizard.

Upgrading SQL Remote

If you are upgrading an existing SQL Remote installation from version 6 or later, you must upgrade each database server before or along with its Message Agent (dbremote). You can upgrade Message Agents in any order.

Version 5 users must follow the instructions in "Upgrading version 5 SQL Remote installations" on page 346.

- **Upgrade databases** You must upgrade the database file format by unloading and reloading your database. There is no need for all databases to be upgraded at the same time.

  For instructions on unloading and reloading the database, see "Upgrading SQL Anywhere" on page 312.

- **Software upgrades can be one site at a time** Older Message Agents can exchange messages with version 10 Message Agents.

- **Message Agent and database server can be upgraded separately** The database server can be upgraded before the Message Agent. It is, however, recommended that you upgrade your Message Agent at the same time as the database server for performance reasons.

- **Upgrading Adaptive Server Enterprise consolidated databases** SQL Remote no longer supports Adaptive Server Enterprise consolidated databases. To synchronize Adaptive Server Enterprise databases, you should upgrade to MobiLink.

  For information about migrating from SQL Remote to MobiLink, see http://www.ianywhere.com/whitepapers/migrate_to_ml.html.

Upgrading version 5 SQL Remote installations

SQL Remote installations include a consolidated database and many remote databases, together with a Message Agent at each site.

At each site, the Message Agent handles the sending and receiving of messages. The messages take the form of SQL statements, and the database server handles the actual execution of those SQL statements.

The upgrade requirements for SQL Remote are as follows:

- **Upgrade your databases** You must upgrade the database file format by unloading and reloading your database.

  See "Upgrading SQL Anywhere" on page 312.

- **Software upgrades can be one site at a time** Version 5 Message Agents can exchange messages with version 10 Message Agents, as long as the compression database option is set to a value of -1 (minus one). There is no need to upgrade software throughout the installation simultaneously.

  See "compression option [SQL Remote]" [*SQL Anywhere Server - Database Administration*].

- **Message Agent and server can be upgraded separately** The Message Agent is an embedded SQL application. Therefore, the database server can be upgraded before the Message Agent as long as the compatibility library is used. It is, however, recommended that you upgrade your Message Agent at the same time as the database server for performance reasons.

  The Message Agent cannot be upgraded before the database server, as a new client application cannot work with a version 5 server.

Example

One approach to upgrading is as follows:

1. Upgrade the consolidated database server and Message Agent. Set the compression database option to -1 so that all messages are compatible with the version 5 software at remote sites.
2. Upgrade remote database servers and Message Agents. You can set the compression database option to a value other than -1 to take advantage of compression and encoding on messages being sent to the consolidated database server.
3. When all remote database servers and Message Agents are upgraded, set the compression database option at the consolidated site to a value other than -1.

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