Implementing a Database Design on Microsoft SQL Server 6.5

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First Edition

Overview of Microsoft SQL Server 6.5

Microsoft **SQL Server** 6.5 is a high-performance **client/server relational database management system** that is designed to meet the needs of organizations with distributed computing environments. It builds on the **Windows NT** operating system's power, scalability, and manageability.

Transact-SQL is the language provided by SQL Server, and is an enhancement to the ANSI-standard **structured query language**. You can execute Transact-SQL statements using the ISQL/w application. In addition, you can use the graphical interface tool called SQL Enterprise Manager to perform database administration tasks.

A number of enhancements have been introduced with the release of version 6.5, making it even more reliable, powerful, and easy to use than previous versions of SQL Server.

Relational database design basics

As a database developer, you may find yourself responsible for designing the structure of new databases. You may even need to set up and maintain the databases you design. This section will serve only as a quick introduction to some basic concepts about relational database design; you should pursue a much more in-depth understanding if you will be designing databases.

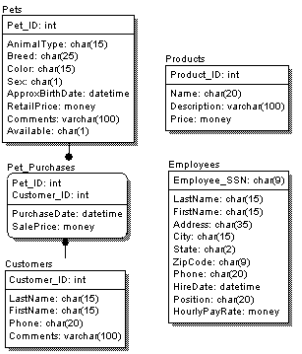
Relational databases are designed to logically reflect the relationships between the various **entities** about which data is stored. Columns represent the **attributes** of those entities.

Following is a brief overview of some concepts and terms you should be aware of.

- Table – often represents an entity in a relational data model. Tables store data organized into rows and columns. Each row represents a complete record, and therefore there may be any number of rows in a table. Each column stores a particular type of data about the record.
- Column – a particular attribute of a table. Each column has a datatype associated with it that defines the type of data that can be stored in that column.
- Decomposition – the process of breaking down a table's columns into the smallest logical columns possible. For example, rather than having one column for Name, it is better to have a FirstName and a LastName

column, so each column can be searched and sorted individually.

- Normalization – the process of designing tables as a stable representation of relationships while reducing redundancy and ensuring database consistency.
- Type of Relationship – describes how the tables relate to one another.
  - One-to-one: one record in Table A matches exactly one record in Table B.
  - One-to-many: one record in Table A can match more than one record in Table B, but each record in Table B can match only one record in Table A.
  - Many-to-many: one record in Table A can match more than one record in Table B, and one record in Table B can match more than one record in Table A.
- Primary Key (PK) – one or more columns in a table which uniquely identify rows within the table, ensuring that no two rows have the same primary key value.
- Foreign Key (FK) – one or more columns in a table which match the primary key of another table. A foreign key logically represents a relationship with the another table.
- Data Model – a visual representation of the way a database is organized, showing the tables, columns, keys, and relationships. Following is a sample data model for a pet store:



Sample Data Model

A to Z Reference

This section is a glossary of common terms associated with relational databases and Microsoft SQL Server 6.5.

aggregate function

A function used to calculate summary values from the values in a particular column. A value is returned for each set of rows to which the function applies. You can use aggregate functions to calculate values for all rows, or you can use them with GROUP BY or COMPUTE to calculate values for each group.

See also *GROUP BY*, *COMPUTE*.

alert

Can be defined on any SQL Server event, and can be configured to trigger a task for execution or send e-mail or pager notifications to specified operators. Alerts are managed by the SQL Executive service.

alerts management server

A SQL Server which acts as a central processing point for SQL Server events of multiple servers. Events are forwarded from servers in the alerts neighborhood, to the alerts management server, for processing and administration. This is known as event forwarding.

backup device

A device that can store backups of databases and/or transaction logs. Also known as a dump device.

batch

One or more SQL statements executed as a group. All statements in the batch are compiled once as a group. Batches are terminated by the GO statement.

TIP

A syntax error in any statement in the batch, or an object that does not exist but is referenced in the batch, will cause the entire batch to fail.

There are several rules that restrict the way statements can be combined in batches. Certain CREATE statements must be submitted separately (DEFAULT, PROCEDURE, RULE, TRIGGER, VIEW). Rules and defaults cannot be bound to columns and then invoked by INSERT or UPDATE statements in the same batch. CHECK constraints cannot be created and enforced in the same batch. You cannot drop an object and then recreate or refer to it in the same batch. You cannot modify columns and then refer to them in the same batch. There are additional restrictions when using the SET statement.

BEGIN...END

See *statement block*.

BEGIN TRANsaction

A SQL statement that marks the starting point of a user-defined transaction.

See also *transaction*, *COMMIT TRANsaction*, *ROLLBACK TRANsaction*, *SAVE TRANsaction*.

BREAK

A control-of-flow clause that causes the WHILE loop to be exited, transferring the flow of execution to the first statement after the WHILE loop.

See also *WHILE block*, *CONTINUE*.

bulk copy program (bcp)

A command-line utility that copies data to or from an operating system file using a format specified by the user. There are two modes available: fast bcp and slow bcp. The bcp utility automatically selects the appropriate mode to use based on the table(s) that are to be copied.

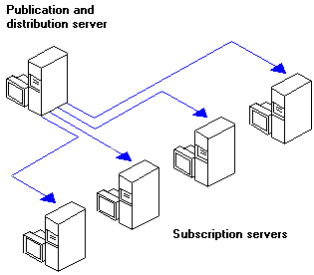
CASE expression

A control-of-flow feature that provides a way to return a value based on whether a particular expression is true.

See also *control-of-flow*.

central publisher

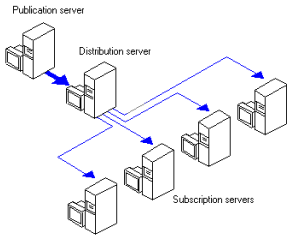
One of the four basic replication models. One server acts as the publisher and distributor, sending data to any number of subscribers. The figure below, from the SQL Server Books Online Administrator's Companion, shows the visual representation of this scenario:



Central Publisher Model

central publisher – remote distributor

One of the four basic replication models. One server acts as the publisher and another server acts as the distributor, sending data to any number of subscribers. The figure below, from the SQL Server Books Online Administrator's Companion, shows the visual representation of this scenario:



Central Publisher - Remote Distributor Model

Quick Reference

The Quick Reference includes the following sections:

- A list of acronyms
- Additional resources
- Related products & vendors
- SQL Server datatypes
- Syntax for common SQL statements
- Commonly used operators & functions

List of acronyms

ANSI
American National Standards Institute

API
application programming interface

BCP
bulk copy program

DBA
database administrator

DBCC
database consistency checker

DBO
database owner

DBOO
database object owner

DBMS
database management system

DDL
data definition language

DLL
dynamic-link library

Additional resources

The Microsoft Press SQL Server Training book/CD set used in this course is a great resource to use when learning SQL Server 6.5. Additional sources that may be helpful to you are listed below.

SQL Server Books Online

- *SQL Server Books Online*, which can be installed when you install SQL Server itself, provides an absolute abundance of information related to SQL Server. Developers will be particularly interested in the *Transact-SQL Reference* and *Database Developer's Companion* sections.

SQL Server Online Transact-SQL Reference Help

- This help system provides help specifically for the Transact-SQL language. It is a great resource for looking up (sometimes difficult to remember) SQL syntax, getting a complete list of all available system stored procedures, or querying the index for any particular topics of interest.

SQL Enterprise Manager Online Help

- This help system provides help specifically for the SQL Enterprise Manager environment, a place you'll be spending a lot of time if you do database administration tasks. It can be opened by selecting Help, Contents from the Enterprise Manager menu. It provides a vast amount of information useful in managing a server and its databases. There are numerous links from help topic to related help topic, which make it easy to find the information you are looking for.

Microsoft Technet CD-ROM

- This CD serves as a helpful technical reference for Microsoft products, including SQL Server. Look for SQL Server under MS BackOffice, MS SQL Server. There are usually product facts, technical notes, information on tools and utilities, and other valuable information about SQL Server on Technet. The query interface for finding information is the same familiar interface as Books Online uses. Technet is especially helpful for troubleshooting when problems arise.

Microsoft Developer Network CD-ROM

- MSDN is another a helpful technical reference for Microsoft products and technologies, including SQL Server. MSDN is targeted at developers, with lots of information and even a section full of code examples.

Microsoft's Web Site

- www.microsoft.com, which is the main Microsoft site, can direct you to a multitude of helpful information specifically for SQL Server, and also for related Microsoft products. You can also check out the Roadmap, which provides information about the Microsoft certification process.

Other Reference Books

- *SQL Server 6.5 Secrets*, by David K. Rensin & Andrew M. Fedorchek. IDG Books Worldwide.
- *Inside Microsoft SQL Server 6.5 (Microsoft Programming Series)*, by Ron Soukup. Microsoft Press.
- *Microsoft SQL Server: Planning and Building a High Performance Database*, by Robert D. Schneider. Prentice Hall Computer Books.
- *Microsoft SQL Server 6.5 Unleashed*, by David Solomon, Ray Rankins, et al. SAMS Publishing.
- Check out www.amazon.com, an online bookstore where you can find just about anything you're looking for. Not only do they have several SQL Server 6.5 books available, but they also have an entire section dedicated to certification preparation.

Related products & vendors

Front-end development tools

These companies offer graphical user interface software tools you can use to build front-end applications for a SQL Server back-end.

Borland International Inc.

World Wide Headquarters
100 Borland Way
Scotts Valley, CA 95066
(408) 431-1000
www.borland.com
Products: Delphi, C++Builder

Microsoft Corporation

Corporate Headquarters
One Microsoft Way
Redmond, WA 98052-6399
(425) 882-808
www.microsoft.com
Products: Access, Visual Basic, Visual C++

Sybase

Headquarters
6475 Christie Ave.
Emeryville, CA 94608
(800) 8-SYBASE
www.sybase.com
Product: PowerBuilder

Database administration tools

The following companies offer graphical user interface database administration and/or data modeling tools for use with SQL Server.

Cheyenne Software

Computer Associates International, Inc.
One Computer Associates Plaza
Islandia, NY 11788 USA
(516) 342-5224
(800) 243-9462
www.cheyenne.com
Products: ARCserve (backup/recovery tool)

Embarcadero Technologies, Inc.

400 Montgomery Street, Suite 300
San Francisco, CA 94104 USA
(415) 834-3131
Fax: (415) 434-1721
www.embarcadero.com
Products: DBArtisan (administration tool), ER/Studio (data modeling tool)

Logic Works

University Square at Princeton
111 Campus Drive
Princeton, New Jersey 08540
1-800-78-ERwin
www.logicworks.com
Products: ERwin (data modeling tool)

SQL Server datatypes

Binary

binary[(n)]	fixed-length binary
	(n = up to 255 bytes)
varbinary[(n)]	variable-length binary
	(n = up to 255 bytes)

Character

char[(n)]	fixed-length character
	(n = up to 255 characters)
varchar[(n)]	variable-length character
	(n = up to 255 characters)

Date and Time

datetime	(8 bytes)
smalldatetime	(4 bytes)