



SQL Server 2000 开发宝库影印丛书

Microsoft® Press

复制与自然语言查询 (影印版)



Replication and English Query

David Iseminger
Series Editor

北京大学出版社

<http://cbs.pku.edu.cn>

SQL Server 2000 开发宝库影印丛书

复制与自然语言查询

(影印版)

[美] David Iseminger 著

北京大学出版社

内 容 简 介

本书可称作 SQL Server 2000 复制服务的系统资源宝库, 内容及其广泛, 涵盖复制工具、复制方式选择、复杂数据源、复制过程的管理和调控、复制性能的提高以及复制数据的备份和存储等方面的全面信息。本书还对 SQL Server 2000 的 EQ(自然语言查询)方面作了论述。书中还包括 EQ 概要和基础知识、EQ 应用程序的开发和部署、如何用 EQ 进行分析服务、EQ 目标模式参考等。

本书由微软公司专家编写, 实用性强, 是系统管理员和程序开发人员的必备参考书。

著作权合同登记号: 图字 01-2001-0714 号

图书在版编目(CIP)数据

复制与自然语言查询/美国微软公司著. 一影印本.

北京: 北京大学出版社, 2001. 3

(SQL Server 2000 开发宝库影印丛书)

ISBN 7-301-04875-0

I. 复... II. 美... III. 关系数据库-数据库管理系统, SQL Server 2000-英文
IV. TP311. 138

中国版本图书馆 CIP 数据核字(2001)第 10166 号

书 名: 复制与自然语言查询(影印版)

责任著作者: [美] David Iseminger 著

标准书号: ISBN 7-301-04875-0/TP·516

出版者: 北京大学出版社

地 址: 北京市海淀区中关村北京大学校内 100871

网 址: <http://cbs.pku.edu.cn>

电 话: 出版部 62752015 发行部 62765128 62754140 编辑部 62765126

电子信箱: wdzh@mail.263.net.cn

印刷者: 中国科学院印刷厂

发 行 者: 北京大学出版社

经 销 者: 新华书店

787 毫米×1092 毫米 16 开本 37.25 印张 903.5 千字

2001 年 3 月第 1 版 2001 年 3 月第 1 次印刷

定 价: 88.00 元

出版前言

如果用一个成语来概括国内计算机图书市场的现状，当谓之“汗牛充栋”。然而，如果您是一位从事计算机应用系统开发或管理的中、高级专业人士，很可能发现这貌似种类齐全的计算机图书中，为您量身定做的并不多见。

依据多年从事计算机图书工作所积累的经验，以及与 IT 领域广泛而深入的接触所获取的信息，我们认识到，具有相当的专业深度和技术前沿性的图书，是计算机专业人员的迫切需要，当然，也是我们从事计算机图书工作、服务专业领域的一人着眼点。

基于这一点，2000 年元月，我们与微软出版社(Microsoft Press)达成合作协议，成立微软图书影印中心，独家代理微软出版社图书影印版在中国大陆的出版、发行，为 IT 业界提供及时的专业技术服务。选题和策划上的匠心独运，使得我们的影印书成为计算机图书中的标新立异者。这里，有四大特色值得读者朋友予以关注：

首先，这是微软出版社第一次授权在中国大陆影印、发行它的版权书。在选题上，可以说独辟蹊径。在内容上，立足技术广度和深度，系统推介微软产品。所有这些，都是目前国内一般计算机图书所无法比拟的。

其次，我们的理念是为国内计算机专业人员学习前沿性的微软技术服务。为此，我们不但与微软公司紧密协作与沟通，及时掌握微软最新技术动向，而且组织了精干的工作人员，倾力于微软影印书的出版和发行。

再者，微软影印书主要面向中、高级专业人员，印量有限。这类书的读者对象有较强的针对性，一般来说，包括 IT 决策人员，中、高级开发人员，以及中、高级系统管理人员。因而，我们将每套书的印数控制在 1000~2000 册之间。

最后，微软图书影印版几乎与原版书保持同步发行，最大限度地满足了国内读者跟踪微软最新技术的需求。软件升级越来越快，新软件令人目不暇接。作为技术载体之一的图书，只有迅速作出反应，把新软件介绍给读者，才能赢得他们的青睐。总之，兵贵神速，这是我们的目标。

正应验了前人的预言，21 世纪是一个信息时代。软件作为信息系统的神经，在我们生活的这个时代里发挥着举足轻重的作用，而微软公司和它推出的各种软件，更是令世人为之瞩目。我们将立足图书，继续并扩大与微软公司的合作，在中国信息产业的发展道路上留下自己的足迹。

出版者
2000 年 10 月

Contents

Acknowledgements	iii
Introduction	1
Part 1 Replication	5
Chapter 1 Introducing Replication.....	7
Replication Model	8
Introducing the Types of Replication	10
Introducing Replication Options	12
Typical Uses of Replication.....	14
Reporting, Decision Support, and Data Warehousing Applications	15
Online/Offline Applications	17
Web-Based Applications.....	19
Keeping Data Close to Users	20
How Replication Works	21
Methods of Implementation.....	23
Agents and Monitors.....	26
Chapter 2 Planning For Replication	29
Distributed Update Factors.....	29
Evaluating the Replication Environment.....	32
Business Objectives and Requirements	32
Network Considerations	34
Security Considerations.....	35
Data Needs and Characteristics	36
Planning for Application Development	39
Planning for Each Type of Replication.....	40
Planning for Snapshot Replication	41
Planning for Transactional Replication.....	42
Planning for Merge Replication.....	45
Planning for Replication Options	49
Merge Replication or Updateable Subscriptions	52
Designing a Replication Topology	52
Physical Replication Models	53

Chapter 3 Types of Replication.....	61
Snapshot Replication	62
How Snapshot Replication Works	63
Transactional Replication	66
How Transactional Replication Works.....	67
Merge Replication.....	73
How Merge Replication Works	74
Merge Replication Conflict Detection and Resolution.....	83
Chapter 4 Replication Tools.....	103
Replication and SQL Server Enterprise Manager	103
Replication Wizards	104
Replication Properties	107
Replication Icons.....	112
Replication Programming Interfaces	114
Programming Replication with ActiveX Controls	114
Programing Replication with SQL-DMO	115
Programming Replication with the Replication Distributor Interface.....	116
Transact-SQL System Stored Procedures	116
Windows Synchronization Manager	117
Active Directory Services	118
Chapter 5 Implementing Replication	121
Configuring Replication.....	122
Publishers, Distributors, and Subscribers	123
Disabling Publishing and Distribution	125
Publishing Data and Database Objects	125
Publishing Stored Procedure Execution	128
Using Custom Stored Procedures in Articles	131
Subscribing to Publications.....	133
Push Subscriptions	135
Pull Subscriptions.....	137
Anonymous Subscriptions.....	138
Applying the Initial Snapshot	139
Generating the Initial Snapshot	140
Alternate Snapshot Locations.....	141
Compressed Snapshot Files.....	141
Exploring Snapshots.....	143
Transferring Snapshots.....	143
Attachable Subscription Databases	145

Improving Performance While Generating and Applying Snapshots	147
Executing Scripts Before and After the Snapshot is Applied	149
Reinitializing Subscriptions	150
Synchronizing Data	151
Scripting Replication	153
Schema Changes on Publication Databases	154
Implementing Replication Over the Internet	158
Publishing Data Over the Internet Using VPN	159
Publishing Data Over the Internet Using Microsoft Proxy Server	159
Publishing Data Over the Internet Using TCP/IP and FTP	160
Replication Between Different Versions of SQL Server	162
SQL Server 7.0 Publisher/Distributor to SQL Server 6.5 Subscriber	163
SQL Server 7.0 Publisher/Distributor to SQL Server 6.0 Subscriber	165
SQL 6.5 Publisher/Distributor to SQL Server 7.0 Subscriber	165
SQL Server 6.5 Publisher to SQL Server 7.0 Distributor	165
Replication with SQL Server 2000 Windows CE Edition	166
Chapter 6 Replication Options	167
Filtering Published Data	169
Row Filters	169
Column Filters	172
Dynamic Filters	174
Join Filters	180
User-Defined Functions and Static Filters	183
User-Defined Functions and Dynamic Filters	184
Updatable Subscriptions	185
Immediate Updating	186
Queued Updating	194
Immediate Updating with Queued Updating as a Failover	206
Transforming Published Data	207
Alternate Synchronization Partners	219
How Alternate Synchronization Partners Works	219
Optimizing Synchronization	220
Chapter 7 Replication Data Considerations	223
Using IDENTITY Values with Replication	223
Managing Identity Values	224
Identity Ranges with Immediate Updating and Queued Updating	227
Managing Replicated timestamp Data	228
Using NOT FOR REPLICATION	229

Chapter 8 Administering and Monitoring Replication	231
Tools for Administering and Monitoring Replication.....	231
Replication Monitor	232
Replication Agent Utilities.....	233
ActiveX Controls for Replication.....	233
Windows NT Performance Monitor and Windows 2000 System Monitor	235
Setting Agent Parameters	235
Agent Profiles.....	236
Replication Agents.....	236
SQL Server Agent	237
Snapshot Agents.....	237
Distribution Agents	238
Log Reader Agents.....	240
Queue Reader Agents.....	241
Merge Agents	242
Miscellaneous Agents	245
Viewing Agent History.....	246
Handling Agent Errors	248
Remote Agent Activation.....	250
Replication Alerts	253
Automating a Response to an Alert.....	255
Predefined Response Jobs	256
Subscription Deactivation and Expiration	256
Validating Replicated Data	259
Chapter 9 Replication and Heterogeneous Data Sources	267
Heterogeneous Subscribers	268
Access Subscribers.....	270
Oracle Subscribers.....	272
IBM DB2/AS400 Subscribers	275
IBM DB2/MVS Subscribers	277
Other Heterogeneous Subscribers	278
Implementing Merge Replication to Access Subscribers.....	283
Heterogeneous Publishers	285
Chapter 10 Replication Security	287
Role Requirements.....	288
Connecting to the Distributor.....	290
Snapshot Folder Security	290
Publication Access Lists	291

Agent Login Security	292
Security and Replication Options	293
Security and Replication Over the Internet	296
Chapter 11 Enhancing Replication Performance	299
Enhancing Snapshot Replication Performance.....	304
Enhancing Snapshot and Transactional Replication Performance	305
Enhancing Transactional Replication Performance.....	307
Enhancing Merge Replication Performance.....	309
Chapter 12 Backing Up and Restoring Replication Databases.....	317
Strategies for Backing Up and Restoring Snapshot Replication	319
Strategies for Backing Up and Restoring Transactional Replication	321
Transactional Replication and Log Shipping	326
Strategies for Backing Up and Restoring Merge Replication.....	328
Restoring Backups of Replicated Databases to the Same Server and Database.....	334
Restoring Backups of Replicated Databases to a Different Server or Database.....	335
Part 2 English Query	337
Chapter 13 English Query Overview	339
What's New In English Query	339
Installation Requirements and Considerations	340
Chapter 14 English Query Fundamentals	343
English Query Fundamentals	343
SQL Database Normalization Rules	347
Updating or Replacing Models.....	354
Importing and Exporting Models to Meta Data Services	354
Chapter 15 Developing and Deploying English Query Applications.....	355
Creating an English Query Model.....	356
Expanding an English Query Model	357
Creating a Mixed English Query Model.....	358
Enabling Analysis Services for an English Query Model.....	359
Enabling SQL for an English Query Model	359
Enabling Full-Text Search for an English Query Model	360
Defining Entities in an English Query Model.....	361
Defining Relationship Phrasings	365
Using Command Relationships in an English Query Model	369
Authoring with Semantic Modeling Format	372

Testing an English Query Model	373
Compiling an English Query Application.....	375
Deploying an English Query Application.....	376
Adding Question Builder to an English Query Application.....	377
Automatic Clarification of Questions.....	379
Run-Time Environment for English Query Applications.....	380
Redistributing the English Query Run-time DLLs.....	381
Sample Applications and Client Interfaces	383
Chapter 16 Analysis Services in English Query.....	385
Naming Entities in the OLAP Project Wizard	386
Creating Relationships in the OLAP Project Wizard.....	387
Level-Level Relationships.....	389
Additional Relationships	389
Analysis Services Requirements for (All) Level	390
Chapter 17 Object Model Reference.....	391
Authoring Object Model.....	391
Authoring Object Model Diagram	392
Authoring Objects Summary.....	392
Authoring Properties Summary.....	396
Authoring Methods Summary.....	402
Authoring Sample Script.....	413
Engine Object Model.....	415
Engine Object Model Diagram.....	418
Engine Objects Summary.....	418
Engine Methods Summary	467
Engine Collections Summary	473
Engine Collections Methods Summary	478
Question Builder Object Model	479
Question Builder Object Model Diagram.....	480
Question Builder Objects Summary.....	480
Question Builder Properties Summary.....	484
Question Builder Methods Summary	493
Question Builder Collections Summary	495
Question Builder Collections Methods Summary	498

Chapter 18 How To Perform Common English Query Tasks	501
Working with Projects	501
How to add a new project to a solution	501
How to add an existing project to a solution	502
How to create a new project	503
How to create a new project using the SQL Project wizard	504
How to remove a database from a project	506
How to remove a project from the solution	506
How to create and modify project properties	506
How to add a module	507
How to remove a module	507
How to modify the data source in a project	507
Working with Models	508
How to add entities and relationships using the Create Semantics command	508
How to add or change a SQL connection	509
How to add or change an Analysis Services (formerly OLAP) connection	510
How to create a mixed model	510
How to delete a field from a model	511
How to edit a field in a model	511
Working with Joins	512
How to add a join	512
How to delete a join	513
How to edit a join	513
Working with Tables	514
How to add a field to a table	514
How to add a table	514
How to add tables and views from a SQL data source	515
How to change the table options for a relationship	516
How to delete a table	516
How to edit a table	517
How to enable full-text searching for a field	517
How to refresh all tables in a project	518
Working with Entities	518
How to add an entity to a relationship	518
How to create an entity	519
How to delete an entity	520

How to delete an entity from a relationship	521
How to edit an entity	521
How to edit the entity's role in a relationship.....	522
Working with Relationships.....	522
How to add a relationship.....	523
How to add phrasings to a relationship	524
How to add time and location options to a relationship	524
How to create a relationship using the Canvas pane	525
How to create relationships from the Model Test Window	526
How to create relationships using the Create Relationships command.....	526
How to associate English Data values with a relationship.....	527
How to delete a relationship.....	527
How to modify a relationship.....	528
Working with Dictionary Entries	528
How to add a dictionary entry	529
How to delete a dictionary entry	529
How to edit a dictionary entry	529
Working with Command Relationships	530
How to add a phrasing to a command relationship	530
How to create a command relationship	531
How to create time and location options for command relationships	532
How to delete a command relationship	532
How to edit a command relationship.....	533
Working with Analysis Services (formerly OLAP Services).....	533
How to add an Analysis Services (formerly OLAP) cube to a model.....	534
How to edit an Analysis Services (formerly OLAP) cube	534
How to edit Analysis Services levels	535
How to edit Analysis Services (formerly OLAP) measures.....	535
How to edit Analysis Services (formerly OLAP) properties.....	536
How to enable Analysis Services (formerly OLAP)	536
How to manually map OLAP objects to the underlying SQL database objects.....	537
How to remove an Analysis Services (formerly OLAP) cube	538
Testing and Building a Model.....	538
How to add a new or existing regression test file to a project.....	539
How to build an application	539
How to edit a regression test file	540

How to remove a regression test file	540
How to rename a regression test file.....	541
How to save model test information to a regression test file	541
How to save the regression output to a regression test file	541
How to set the Sample Data option	542
How to test a model	542
How to view the differences between the current regression test file and the regression output file	543
How to view the output of a regression test created using the Run Regression command	544
How to deploy an application to the Web	544
Index A Topics in the SQL Server 2000 Reference Library	545
Index B Index of English Query Elements	577

Introduction

Imagine fitting a cruise ship into your recreational boat slip on Lake Notverybig—that's how I felt while putting together the *SQL Server 2000 Reference Library*. All told, there was about three times as much SQL Server 2000 Books Online reference material as there was room in the *SQL Server 2000 Reference Library*, so I had to figure out the most widely used, appropriate, and pertinent parts of Books Online, and have included those parts in the library you now have in your possession.

Despite those woes, I believe you'll find the *SQL Server 2000 Reference Library* full of must-have information about SQL Server 2000. From architecture and XML, to Analysis Services (formerly OLAP) and T-SQL, this reference library contains the essential reference information you need to program, administer, deploy, or optimize your SQL Server 2000 solution... without monitor-induced eyestrain.

The SQL Server 2000 Reference Library is part of the Windows Programming Reference Series (WPRS), a series of libraries dedicated to providing printed development and IT material in a timely, intelligently organized, and well-conceived manner. You can find out more about WPRS and other available reference libraries (including the *COM+ Developer's Reference Library* and the *Active Directory Developer's Reference Library*) at www.iseminger.com—a website dedicated to providing additional information about the series, and other books also by yours truly.

How the SQL Server 2000 Reference Library is Structured

The *SQL Server 2000 Reference Library* consists of six volumes, each of which focuses on one or more specific areas of SQL Server 2000. These guides and programming reference volumes have been divided into the following:

Volume 1: SQL Server 2000 Architecture and XML/Internet Support

Volume 2: Database Creation, Warehousing, and Optimization

Volume 3: Analysis Services

Volume 4: Replication and English Query

Volume 5: T-SQL Language Reference

Volume 6: T-SQL Stored Procedures and Tables Reference

Dividing the *SQL Server 2000 Reference Library* into these categories enables you, the reader, to quickly identify the volume you need, based on your task, and facilitates your maintenance of focus for that task. This approach allows you to keep one reference book open and handy, or tucked under your arm while running between server racks.

In addition to the overall library structure, each volume in the *SQL Server 2000 Reference Library* is divided into parts that concentrate on a given subject. In order to provide a quick overview of a part's contents, each begins with a Part Introduction page that outlines what you'll find therein.

Finding Related Topics and Working With the Topic Index

Throughout this library, you're going to see references to related topics; some of them within the text of a given paragraph, and others placed in a special section called **Related Topics**. Since the entire body of SQL Server 2000 Books Online constitutes more topics than what you'll find in these volumes, you may occasionally come across a referenced topic that doesn't correspond to a section in this library. Don't worry; you can get to that information through the SQL Server 2000 Books Online. Most of the references *will* pertain to items in these volumes, but there might be some reference you're interested in that will lead you online.

To make locating topics as easy as possible, and to enable you to quickly identify which topics are found in this library (versus which are found only in Books Online), Volumes 1 through 4 include a special index called **Topics in the SQL Server 2000 Reference Library**. There's some good information about the topic index (as I'll refer to it from now on) that will help you understand how to get the most use out of it and out of the *SQL Server 2000 Reference Library*.

For starters, the topic index contains *topics only found in the SQL Server 2000 Reference Library*. So, say you're reading through a chapter in this library, and you come across text that refers you to another topic, such as the following:

Related Topics

Building and Processing Cubes, Updating Cubes and Dimensions

Or something like the following:

...For more information about which editions support which features, see Features Supported by the Editions of SQL Server 2000.

You can then look through this alphabetical listing of topics included in this library for the referenced topic, and when you find it, you'll be directed to the Volume and Chapter where that topic can be found, as shown here:

Building and Processing Cubes Volume 3, Chapter 5

Building and Processing Cubes Volume 3, Chapter 8

Features Supported by the Editions of SQL Server 2000 Volume 1, Chapter 11

If two topics with the same title exist (as shown here), each will be listed separately. As previously mentioned, most references refer to topics also found in this library, but for those that don't, you can go to Books Online to get more information.

There are important exceptions to topic references and the topic index: *T-SQL statements and other programming elements are **not** included in the topic index.* Each volume that contains programming elements (such as T-SQL stored procedures, or English Query statements) has its own index of programming elements. Rather than cluttering this index up with programming elements (or vice versa), I've provided separate indexes to help you find the information you need faster.

Since Volumes 5 and 6 are almost entirely dedicated to statement definitions, including the topic index in those volumes didn't seem like a good use of (precious) pages.

The Idea Behind SQL Server 2000 Reference Library

The *SQL Server 2000 Reference Library*, like all libraries in the Windows Programming Reference Series, is designed to deliver the most pertinent information in the most accessible way possible. The *SQL Server 2000 Reference Library* is also designed to integrate seamlessly with SQL Server 2000 Books Online (and with MSDN Online) by providing a look-and-feel that is consistent with the electronic means of disseminating SQL Server 2000 reference information. In other words, the way that a given function reference appears on the pages of this book has been designed specifically to emulate the way that Books Online presents its reference pages.

The reason for maintaining such integration is simple: make it easy for you—the administrator or developer of SQL Server 2000 solutions—to use the tools and get the ongoing information you need to do your job. By providing a “common interface” among reference resources, your familiarity with the *SQL Server 2000 Reference Library* reference material can be immediately applied to Books Online, and vice-versa. In a word, it means *consistency*.

You'll find this philosophy of consistency and simplicity applied throughout Windows Programming Reference Series publications. I've designed the series to go hand-in-hand with online resources. Such consistency lets you leverage your familiarity with electronic reference material, then apply that familiarity to enable you to get away from your computer if you'd like, take a book with you, and—in the absence of keyboards and e-mail and upright chairs—get your reading and research done. Of course, each of the *SQL Server 2000 Reference Library* volumes fits nicely right next to your mouse pad as well, even when opened to a particular reference page.

With any job, the simpler and more consistent your tools are, the more time you can spend doing work rather than figuring out how to use your tools. The structure and design of the *SQL Server 2000 Reference Library* provides you with a comprehensive, pre-sharpened toolset to quickly program, administer, or optimize SQL Server 2000 deployments.