

- Preface p. xix
- Part I Introduction to SQL Tuning
- 1 Introduction to SQL Tuning p. 3
 - Introduction p. 3
 - Why Tune SQL? p. 4
 - The Place of SQL Tuning in the Overall Tuning Process p. 7
 - When Should SQL be Tuned? p. 11
 - The Tuning Process p. 12
 - Constructing a Tuning Environment p. 14
 - Tuning SQL p. 16
 - Summary p. 17
- 2 SQL Tuning Quick Start p. 19
 - Introduction p. 19
 - Top Tips and Hints for SQL Tuning p. 19
 - SQL Tuning Quick Tips p. 31
- 3 Review of SQL p. 50
 - Introduction p. 50
 - The History of SQL p. 51
 - Types of SQL Statements p. 55
 - Query Operations: The Select Statement p. 57
 - Data Manipulation and Transaction Control p. 64
 - Summary p. 69
- Part II SQL Tuning Theory
- 4 SQL Processing Internals p. 73
 - Introduction p. 73
 - Overview of SQL Processing p. 74
 - Creating and Parsing Cursors p. 75
 - The Cursor_Sharing Option in Oracle 8.1.6 p. 79
 - Executing SQL p. 80
 - Types of Table Accesses p. 81
 - Joins p. 83
 - Sorting and Grouping p. 84
 - Modifying Data p. 84
 - Summary p. 87
- 5 The Optimizer p. 88
 - Introduction p. 88
 - Overview of Optimization p. 89
 - Collecting Optimizer Statistics p. 96
 - Using Plan Stability p. 103
 - Using Hints p. 107
 - Summary p. 113
- 6 Indexing and Clustering p. 114
 - Introduction p. 114
 - B*-tree Indexes p. 115

- Clustering p. 123
- Bitmap Indexes p. 127
- Index Organized Tables p. 129
- Summary p. 132
- 7 Tracing and Explaining SQL p. 134
 - Introduction p. 134
 - Explain Plan p. 135
 - SQL Trace p. 145
 - Using Tkprof p. 148
 - The SQL*Plus Autotrace Option p. 156
 - Summary p. 159
- Part III SQL Tuning in Practice
- 8 Tuning Table Access p. 163
 - Introduction p. 163
 - When to Use a Full-Table Scan p. 164
 - Avoiding "Accidental" Table Scans p. 171
 - Choosing the Best Indexing Strategy p. 179
 - Optimizing B*-tree Index Lookups p. 184
 - Optimizing Bitmap Index Access p. 201
 - Optimizing Hash Clusters p. 203
 - Optimizing Index Organized Tables p. 206
 - Optimizing Full Table Scans p. 210
 - Optimizing for the First Row p. 220
 - Summary p. 221
- 9 Tuning Joins and Subqueries p. 224
 - Introduction p. 224
 - Choosing the Best Join Method p. 225
 - Optimizing the Join p. 229
 - Special Joins p. 238
 - Subqueries p. 249
 - Semijoins p. 260
 - Antijoins p. 262
 - Summary p. 268
- 10 Sorts, Aggregates, and SET Operations p. 271
 - Introduction p. 271
 - Sort Operations p. 272
 - Aggregate Operations p. 278
 - SET Operations p. 287
 - Summary p. 293
- 11 Parallel SQL p. 295
 - Introduction p. 295
 - Understanding Parallel SQL p. 296
 - Using Parallel Query p. 304
 - Tuning Parallel Query p. 310

- Examples of Parallel Queries p. 314
- Other Parallel Operations p. 319
- Summary p. 320
- 12 Optimizing DML p. 322
 - Introduction p. 322
 - General Optimizations p. 323
 - Optimizing INSERTS p. 328
 - Optimizing Transactions p. 334
 - Parallel DML p. 340
 - Summary p. 342
- 13 VLDB and Warehousing p. 344
 - Introduction p. 344
 - Partitioning p. 344
 - Materialized Views and Snapshots p. 357
 - Summary p. 366
- 14 Using and Tuning PL/SQL p. 368
 - Introduction p. 368
 - Performance Characteristics of PL/SQL p. 369
 - Using PL/SQL in Place of Standard SQL p. 370
 - Optimizing PL/SQL p. 375
 - Dynamic SQL and PL/SQL p. 398
 - Using the PL/SQL Profiler p. 404
 - Summary p. 407
- 15 Using and Tuning Oracle Java p. 409
 - Introduction p. 409
 - Java as an Alternative to PL/SQL p. 410
 - Optimizing JDBC p. 416
 - Optimizing SQL p. 423
 - Looking into the Future p. 426
 - Summary p. 426
- 16 Oracle Object Types p. 428
 - Introduction p. 428
 - Object Type Alternatives to Master-Detail Tables p. 429
 - Performance Comparisons for Object Types p. 434
 - Summary p. 448
- 17 Miscellaneous Topics p. 450
 - Introduction p. 450
 - Optimizing Views p. 450
 - Distributed SQL p. 452
 - Sequences p. 460
 - Using DECODE p. 465
 - Optimizing Data Definition Language p. 467
 - Tuning Access to the V\$ Tables p. 469
 - Summary p. 478

- Part IV Beyond SQL Tuning
- 18 Application Design Issues p. 482
 - Introduction p. 482
 - Building Tuning into the Design Process p. 483
 - Establishing an Efficient Physical Model p. 484
 - Application Design p. 498
 - Summary p. 505
- 19 Oracle Server Design p. 508
 - Introduction p. 508
 - A Review of the Oracle Architecture p. 509
 - Sizing the Host Computer p. 511
 - Essential Considerations for Database Configuration p. 522
 - Optimizing Database I/O p. 524
 - Sizing the SGA p. 531
 - Multithreaded Servers p. 534
 - Parallel Query Processes p. 536
 - Summary p. 536
- 20 Oracle Server Tuning p. 539
 - Introduction p. 539
 - Evaluating Operating System Performance p. 540
 - Recognizing Oracle Database Bottlenecks p. 544
 - Identifying Resource Intensive SQL p. 568
 - Summary p. 569
- Appendix A Reference p. 572
- Appendix B Glossary p. 589
- Appendix C Configuring Development Tools p. 601
- Appendix D Oracle Server Configuration p. 608
- Appendix E Bibliography and Resources p. 619
- Index p. 624