HZ BOOKS

Oracle 技术系列丛书

ORACLE®

AUTHORIZED ORACLE PRESS™—EXCLUSIVELY FROM OSBORNE

# OCP Oracle9*i* Database Performance Tuning 考试指南（英文版）

(Exam 1Z0-033)

## OCP Oracle9*i* Database: Performance Tuning Exam Guide

（美） Charles A. Pack 著

附赠 CD-ROM

机械工业出版社
China Machine Press

McGraw Hill

Oracle技术系列丛书

# OCP Oracle9*i* Database: Performance Tuning 考试指南

（英文版）

## OCP Oracle9*i* Database: Performance Tuning Exam Guide (Exam 1Z0-033)

（美） Charles A. Pack 著

机械工业出版社
China Machine Press

Charles A. Pack: OCP Oracle9i Database: Performance Tuning Exam Guide (Exam 1Z0-033) ISBN: 0-07-219527-4.

Copyright © 2002 by the McGraw-Hill Companies, Inc.

Original language published by The McGraw-Hill Companies, Inc. All rights reserved. No part of this publication may be reproduced or distributed in any means, or stored in a database or retrieval system, without the prior written permission of the publisher.

Authorized English language reprint edition jointly published by McGraw-Hill Education (Asia) Co. and China Machine Press. This edition is authorized for sale in the People's Republic of China only, excluding Hong Kong, Macao SAR and Taiwan. Unauthorized export of this edition is a violation of the Copyright Act. Violation of this Law is subject to Civil and Criminal Penalties.

本书英文影印版由机械工业出版社和美国麦格劳-希尔教育出版(亚洲)公司合作出版。此版本仅限在中华人民共和国境内（不包括香港、澳门特别行政区及台湾）销售。未经许可之出口，视为违反著作权法，将受法律制裁。

未经出版者预先书面许可，不得以任何方式复制或抄袭本书的任何部分。

本书封面贴有McGraw-Hill公司防伪标签，无标签者不得销售。

版权所有，侵权必究。

**本书版权登记号：图字：01-2002-3609**

**图书在版编目（CIP）数据**

OCP Oracle9*i* Database: Performance Tuning考试指南（英文版）/（美）派克（Pack, C.A.）著. -北京：机械工业出版社，2002.8

（Oracle技术系列丛书）

ISBN 7-111-10449-8

Ⅰ. O… Ⅱ. 派… Ⅲ. 关系数据库-数据库管理系统，Oracle9*i*-工程技术人员-资格考核-自学参考资料-英文 Ⅳ. TP311.138

中国版本图书馆CIP数据核字（2002）第040879号

机械工业出版社（北京市西城区百万庄大街22号 邮政编码 100037）

责任编辑：华 章

北京忠信诚印刷厂印刷·新华书店北京发行所发行

2002年8月第1版第1次印刷

787mm × 1092mm 1/16 · 30.75印张

印数：0 001-3 000册

定价：78.00元（附光盘）

凡购本书，如有倒页、脱页、缺页，由本社发行部调换

This book is dedicated to my wife Donna and our daughter Jenny.

## About the Author

Charles A. Pack is an Oracle Certified Professional DBA with over 15 years of IT experience. His range of experiences includes COBOL, C/C++, Basic, Visual Basic, Clipper, FoxPro, dBase, Prolog, Java, and PL/SQL programming; HP 3000 operations and database administration; network design and construction; Unix and Windows NT administration; and MS-SQL Server and Sybase administration. He earned a bachelor of science degree from Oklahoma State University, an MBA from the University of Oklahoma, and a master of science in computer science from Texas A&M University, Corpus Christi. He teaches Oracle DBA classes at Florida Community College, Jacksonville, and is a regular contributor to the North Florida Oracle User Group. He works for CSX Technology as a DBA project manager responsible for data warehouse, Oracle financials, and PeopleSoft Oracle databases. And he likes to barbecue . . . .

此为试读,需要完整PDF请访问: www.ertongbook.com

ORACLE | CERTIFIED PROFESSIONAL

## About the Oracle Certification Exams

The expertise of Oracle database administrators (DBAs) is integral to the success of today's increasingly complex system environments. The best DBAs operate primarily behind the scenes, looking for ways to fine-tune day-to-day performance to prevent unscheduled crises and hours of expensive downtime. They know they stand between optimal performance and a crisis that could bring a company to a standstill. The Oracle Certified Database Administrator Track provides DBAs with tangible evidence of their skills with the Oracle database.

The Oracle Certified Professional (OCP) Program was developed by Oracle to recognize technical professionals who can demonstrate the depth of knowledge and hands-on skills required to maximize Oracle's core products according to a rigorous standard established by Oracle. By earning professional certification, you can translate the impressive knowledge and skill you have worked so hard to accumulate into a tangible credential that can lead to greater job security or more challenging, better-paying opportunities.

Oracle Certified Professionals are eligible to receive use of the Oracle Certified Professional logo and a certificate for framing.

## Requirements for Certification

To become an Oracle Certified Professional Database Administrator for the Oracle9*i* track, you must pass four tests. These exams cover knowledge of the essential aspects of the SQL language, Oracle administration, backup and recovery, and performance tuning of systems. The certification process requires that you pass the following four exams:

Exam 1: Introduction to Oracle9*i*: SQL (1Z0-007)

Exam 2: Oracle9*i* Database: Fundamentals I (1Z0-031)

Exam 3: Oracle9*i* Database Fundamentals II (1Z0-032)

Exam 4: Oracle9*i* Database: Performance Tuning (1Z0-033)

## Recertification

Oracle announces the requirements for upgrading your certification based on the release of new products and upgrades. Oracle will give six months' notice announcing when an exam version is expiring.

## Exam Format

The computer-based exam is a multiple-choice test, consisting of 56 questions that must be completed in 90–120 minutes.

# Acknowledgments

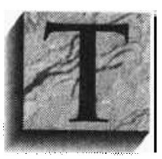
Thanks to my Oracle DBA coworkers Nirupam Majumdar, Gunjan Nath, Don Mongeon, Maritza Gonzalez, Yang Jiang, John King, Bill Sullivan, Bill Barker, Tim Stippler, Rich McClain, and Ron Grinam; my boss Nancy Von Dolteren for excusing my occasional outbursts; Bob Just, for your continuous support (no pun intended); and Robert Freeman for perpetually challenging me and making me a better DBA.

A great big special thanks to Janet Stern for her technical editing on this book: her contribution was tremendous!

Thanks to my friends at Osborne/McGraw-Hill, Athena Honore and Jeremy Judson, and Beth Brown, Jeanne Henning, and Barbra Guerra from MacAllister Publishing Services.

Without question, I must thank my parents Charlene and Gus, who didn't seem to mind too much that I brought my laptop computer to their 50th wedding anniversary, and to Christmas dinner, and so on, and so on. Most of all, thanks to my beautiful, wonderful, awesome wife Donna—the love of my life—who continues to encourage and support me, and to our daughter Jenny, who thinks Daddy lives in his office. Now we can go play in the Florida sun . . .

# Introduction



This book was specifically written to help you prepare for the Oracle Certified Professional (OCP) DBA Exam #1Z0-033: Oracle9*i* Performance Tuning. The book is designed to follow the published test content checklist for the Performance Tuning exam. Each chapter is dedicated to a section on the test content checklist, and each bullet item on the test content checklist is discussed in detail.

The caveat, of course, is that Oracle has the right to change the test content anytime they choose. This book was written with the test content checklist that was available to the public at the time. Please keep that in mind before you send me an e-mail detailing everything that was missed in the content of this book.

Each content chapter begins with a list of subjects that will be covered and ends with a chapter summary, a two-minute drill, test questions for the chapter, and answers to the test questions.

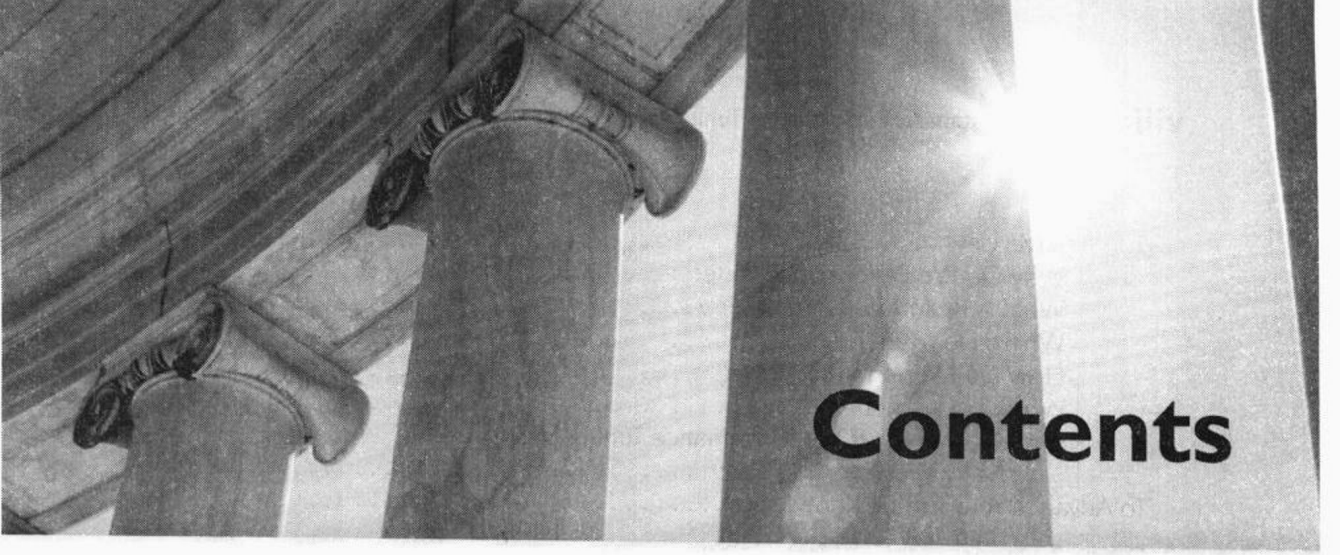
I have also included two separate practice exams that are approximately the same length as the actual OCP exam. You'll find a third practice exam on the CD. Answers with explanations are provided immediately following each practice exam. I have attempted to make the exam questions similar in format and difficulty to the OCP exam questions; some questions will seem trivial, while others may seem impossible. Any occurrence of one of my questions on the actual exam or vice versa is purely coincidental.

If you need additional resources to help you prepare for the exam, I suggest you start with the Oracle documentation set, freely available at http://technet.oracle.com. Click on the Documentation link, then click on the Oracle9*i* Database link. You can drill down to the "Oracle9*i* Database Performance Methods," "Application Developer's Guide—Fundamentals," "Database Concepts," and "Database Reference." These documents provide the foundation material that you should use when you exercise performance tuning and will give you an edge when preparing for the exam.

Also, Oracle University provides excellent instructor-led training; the Oracle9*i* Database Performance Tuning class is a great place to gain detailed performance tuning information and practice database performance tuning in a laboratory environment.

If you have any questions, please feel free to e-mail me at charlesapack@yahoo.com.

Enjoy, and good luck!



# Contents


ACKNOWLEDGMENTS ..... xv
INTRODUCTION ..... xvii

PART I
**OCP Tuning Exam Guide**

1 Database Tuning Overview ..... 3
How This Book Is Organized ..... 4
Topics Covered in the OCP DBA Tuning Exam ..... 5
The Oracle Performance Tuning Methodology ..... 5
Diagnostics and Tuning Tools ..... 5
Sizing the Shared Pool ..... 6
Sizing the Buffer Cache ..... 6
Sizing Other SGA Structures ..... 7
Database Configuration and I/O Issues ..... 7
Optimizing Sort Operations ..... 8
Diagnosing Contention for Latches ..... 8
Tuning Rollback or UNDO Segments ..... 9
Monitoring and Detecting Lock Contention ..... 9
Tuning Oracle Shared Server ..... 9
Application Tuning ..... 10
Using Oracle Blocks Efficiently ..... 10
SQL Statement Tuning ..... 11
OS Considerations ..... 12

Tuning Overview . . . . . 12
Why Do We Performance Tune? . . . . . 12
What Is Performance Tuning? . . . . . 13
Where Do I Tune? . . . . . 13
How Do I Performance Tune? . . . . . 14
When Do I Tune? . . . . . 14
How Do I Know If My Performance Tuning Efforts Are Actually Working? . . . . . 14
To Advance Your Tuning Knowledge . . . . . 15

**2 Oracle Performance Tuning Methodology** . . . . . 17
Oracle Performance Tuning Method . . . . . 18
Describe the Roles Associated with the Database Tuning Process . . 21
Describe the Dependency Between Tuning in Different Development Phases . . . . . 22
Describe SLAs . . . . . 25
Describe the Tuning Goals . . . . . 26
Describe the Most Common Tuning Problems . . . . . 27
Describe Tuning Goals Associated with Different Types of Applications . . . . . 29
Performance and Safety Trade-Offs . . . . . 30
Chapter Summary . . . . . 31
Two-Minute Drill . . . . . 31
Chapter Questions . . . . . 33
Answers to Chapter Questions . . . . . 34

**3 Diagnostic and Tuning Tools** . . . . . 37
Diagnostic and Tuning Tools . . . . . 38
The Data Dictionary and Dynamic Performance Views Related to Tuning . . 39
Data Dictionary Views . . . . . 39
How the ANALYZE Command Is Used with Data Dictionary Views . . . . . 43
Dynamic Performance Views . . . . . 44
Current State Views . . . . . 44
Accumulator Views . . . . . 44
Informational Views . . . . . 44
Statistics in the Dynamic Performance Views . . . . . 45
Instance/Database Performance Views . . . . . 45
Memory . . . . . 46
Disk . . . . . 48
Contention . . . . . 48
Session-Related . . . . . 49

此为试读,需要完整PDF请访问: www.ertongbook.com

What Is Statspack? ..... 51
Installing and Configuring Statspack ..... 51
Interactive or Batch Installations ..... 52
Statspack Maintenance ..... 52
Configuring Statspack Statistics Gathering ..... 52
Collect Statistics Using Statspack ..... 53
Take a Snapshot ..... 53
Automating Snapshots ..... 53
Producing a Performance Report ..... 53
Contents of the Statspack Performance Report ..... 54
Other Tools That Can Be Used for Tuning ..... 55
UTLBSTAT/UTLESTAT ..... 55
OEM Oracle Expert ..... 56
Custom Tools ..... 56
The Alert Log and Trace Files ..... 56
Instance Alert Log ..... 56
Trace User SQL ..... 56
Chapter Summary ..... 57
Two-Minute Drill ..... 57
Chapter Questions ..... 58
Answers to Chapter Questions ..... 62

**4 Sizing the Shared Pool ..... 65**
Sizing the Shared Pool ..... 66
Shared Pool Concepts ..... 66
Measure and Tune the Library Cache Hit Ratio ..... 68
Size and Pin Objects in the Shared Pool ..... 72
Tune the Shared Pool Reserve Space ..... 74
Measure and Tune the Dictionary Cache Hit Ratio ..... 75
Describe UGA and Session Memory Considerations ..... 79
Setting the Large Pool ..... 80
Chapter Summary ..... 83
Two-Minute Drill ..... 85
Chapter Questions ..... 87
Answers to Chapter Questions ..... 90

**5 Sizing the Buffer Cache ..... 93**
Sizing the Buffer Cache ..... 94
Describe How the Buffer Cache Is Used by Different Oracle Processes ..... 95
Describe the Tuning Issues Related to the Buffer Cache ..... 96
Getting Advice about the Buffer Cache Size ..... 99
Implement Dynamic SGA Allocation ..... 101

Monitor the Use of the Buffer Cache and the Different Pools Within the Buffer Cache ... 103
Create and Size Multiple Buffer Pools ... 106
Make Appropriate Use of Table Caching ... 109
Diagnose LRU Latch Contention ... 110
Diagnose Freelist Contention ... 110
Deprecated Buffer Cache Parameters ... 112
Chapter Summary ... 112
Two-Minute Drill ... 113
Chapter Questions ... 116
Answers to Chapter Questions ... 120

**6 Sizing Other SGA Structures** ... **123**
Sizing Other SGA Structures ... 124
Monitor and Size the Redo Log Buffer ... 124
Monitor and Size the Java Pool ... 129
Limit the Amount of Java Session Memory Used by a Session ... 130
Configuring I/O Slaves ... 131
Configuring Multiple DBW Processes ... 132
Chapter Summary ... 132
Two-Minute Drill ... 133
Chapter Questions ... 135
Answers to Chapter Questions ... 137

**7 Database Configuration and I/O Issues** ... **139**
Database Configuration and I/O Issues ... 140
Describe Reasons for Distributing Different Oracle File Types ... 140
Diagnose Inappropriate Use of Tablespaces ... 146
Tune Full Table Scan Operations ... 148
Describe How Checkpoints Work ... 150
Monitor and Tune Checkpoints ... 151
Monitor and Tune Redo Logs ... 153
Chapter Summary ... 157
Two-Minute Drill ... 159
Chapter Questions ... 160
Answers to Chapter Questions ... 163

**8 Optimize Sort Operations** ... **167**
Optimize Sort Operations ... 168
Describe How Sorts Are Performed in Oracle ... 168
Set Old and New Sort Parameters ... 169
Describe the Operations That Cause Sorting ... 171

Differentiate Between Disk and Memory Sorts . . . . . 172
Create and Monitor Temporary Tablespaces . . . . . 174
Describe Ways to Reduce Total Sorts and Disk Sorts . . . . . 177
Chapter Summary . . . . . 178
Two-Minute Drill . . . . . 179
Chapter Questions . . . . . 180
Answers to Chapter Questions . . . . . 182

**9 Diagnosing Contention for Latches . . . . . 185**
Diagnosing Contention for Latches . . . . . 186
Describe the Purpose of Latches . . . . . 186
Describe the Different Types of Latch Requests . . . . . 188
Describe How to Diagnose Contention for Latches . . . . . 188
Identify the Resources to Be Tuned to Minimize Latch Contention . . 193
Chapter Summary . . . . . 194
Two-Minute Drill . . . . . 195
Chapter Questions . . . . . 196
Answers to Chapter Questions . . . . . 199

**10 Tuning Rollback or Undo Segments . . . . . 201**
Tuning Rollback/Undo Segments . . . . . 202
Use the Dynamic Performance Views to Check Rollback Segment Performance . . . . . 206
Define the Number and Size of Manual Rollback Segments . . . . . 210
Appropriately Allocate Rollback Segments to Transactions . . . . . 212
Understand and Explain the Concept of Automatic Undo Management . . . . . 216
Create and Maintain Automatically Managed Undo Tablespace . . . . 217
Chapter Summary . . . . . 219
Two-Minute Drill . . . . . 221
Chapter Questions . . . . . 224
Answers to Chapter Questions . . . . . 227

**11 Monitoring and Detecting Lock Contention . . . . . 231**
Monitoring and Detecting Lock Contention . . . . . 232
Define Levels of Locking . . . . . 235
Describe Possible Causes of Contention . . . . . 240
Use Oracle Utilities to Detect Lock Contention . . . . . 240
Resolve Contention in an Emergency . . . . . 243
Prevent Locking Problems . . . . . 244
Recognize Oracle Errors Arising from Deadlocks . . . . . 245
Chapter Summary . . . . . 247
Two-Minute Drill . . . . . 249
Chapter Questions . . . . . 251
Answers to Chapter Questions . . . . . 254

**12 Tuning Oracle Shared Server** ..... **257**
Tuning Oracle Shared Server ..... 258
Identifying Issues Associated with Managing Users in a Shared Server Environment ..... 258
Diagnosing and Resolving Performance Issues with Shared Server Processes ..... 260
Configure the Shared Server Environment to Optimize Performance ..... 265
Chapter Summary ..... 267
Two-Minute Drill ..... 269
Chapter Questions ..... 270
Answers to Chapter Questions ..... 272

**13 Application Tuning** ..... **275**
Application Tuning ..... 276
Describe the Role of the DBA in Tuning Applications ..... 277
Explain Different Storage Structures ..... 277
Explain and Describe Clustering Options ..... 278
Explain the Different Types of Indexes ..... 280
Explain IOTs ..... 282
Describe Materialized Views and the Use of Query Rewrites ..... 284
List Requirements for OLTP, DSS, and Hybrid Systems ..... 286
Chapter Summary ..... 289
Two-Minute Drill ..... 291
Chapter Questions ..... 292
Answers to Chapter Questions ..... 294

**14 Using Oracle Blocks Efficiently** ..... **297**
Using Oracle Blocks Efficiently ..... 298
Describe the Correct Usage of Extents and Oracle Blocks ..... 298
Explain Space Usage and the High Watermark ..... 302
Determine the High Watermark ..... 303
Recover Space from Sparsely Populated Segments ..... 303
Describe the Use of Oracle Block Parameters ..... 306
Describe and Detect Chaining and Migration of Oracle Blocks ..... 309
Perform Index Reorganization ..... 311
Monitor Indexes to Determine Usage ..... 314
Chapter Summary ..... 314
Two-Minute Drill ..... 317
Chapter Questions ..... 321
Answers to Chapter Questions ..... 326

**15 SQL Statement Tuning** ..... **329**
SQL Statement Tuning ..... 330
Describe How the Optimizer Is Used ..... 331
Explain the Concept of Plan Stability ..... 335
Use of Stored Outlines ..... 336
Describe How Hints Are Used ..... 339
Collect Statistics on Indexes and Tables ..... 340
Describe the Use of Histograms ..... 342
Copy Statistics Between Databases ..... 343
OLTP and DSS Considerations ..... 344
Use SQL Trace and TKPROF ..... 345
Chapter Summary ..... 348
Two-Minute Drill ..... 350
Chapter Questions ..... 353
Answers to Chapter Questions ..... 356

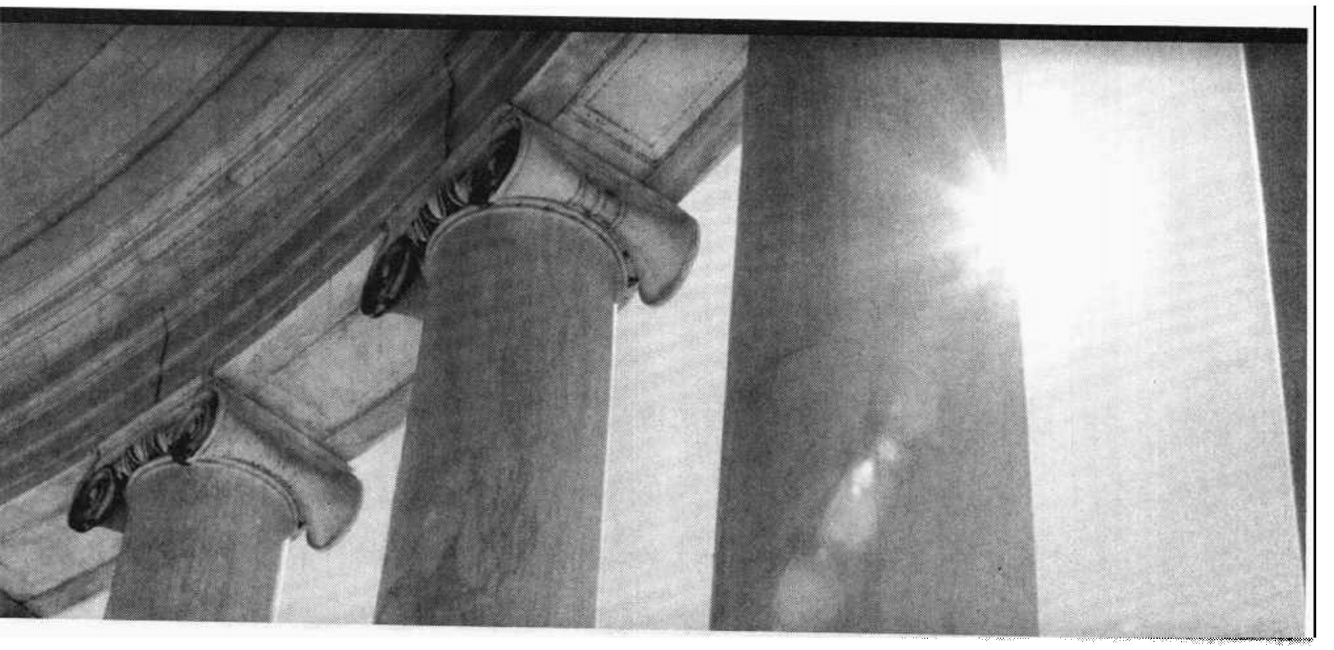
**16 OS Considerations and Oracle Resource Manager** ..... **359**
OS Considerations ..... 360
Describe Different System Architectures ..... 360
Understand Virtual Memory and Paging ..... 361
Describe the Primary Steps of OS Tuning ..... 362
Identify Similarities Between OS and DB Tuning ..... 363
Explain the Difference Between a Process and a Thread ..... 364
Database Resource Manager ..... 364
Configuring Resource Management ..... 366
Administer Resource Manager ..... 368
Chapter Summary ..... 372
Two-Minute Drill ..... 373
Chapter Questions ..... 377
Answers to Chapter Questions ..... 378

PART II
**Practice Exams**

**17 Practice Exam 1 and 2** ..... **383**
Practice Exam 1 Questions ..... 384
Answers to Practice Exam 1 Questions ..... 401
Practice Exam Two ..... 413
Practice Exam 2 Questions ..... 413
Answers to Practice Exam 2 Questions ..... 431

**Glossary** ..... **446**

**Index** ..... **457**



# PART I

# OCP Tuning Exam Guide

此为试读,需要完整PDF请访问: www.ertongbook.com