Oracle Database 12c: Performance Management and Tuning

Duration: 5 Days

What you will learn

In the Oracle Database 12c: Performance Management and Tuning course, learn about the performance analysis and tuning tasks expected of a DBA: proactive management through built-in performance analysis features and tools, diagnosis and tuning of the Oracle Database instance components, and diagnosis and tuning of SQL-related performance issues.

Learn To:
Use the Oracle tuning methodology.
Use Oracle-supplied tools for monitoring and diagnosing SQL and instance performance issues.
Use database advisors to proactively correct performance problems.
Identify and tune problem SQL statements.
Monitor instance performance by using Enterprise Manager.
Tune instance components.

Benefits To You:
The DBA will analyze the SQL performance with available tools. The DBA will be introduced to various methods of identifying the SQL statements that require tuning and the diagnostic tools used to find ways to improve performance. This will include the use of statistics, profiles to influence the optimizer, and using the SQL Advisors.

Maintain SQL Performance
A major task of DBAs is to maintain SQL performance across changes. This course introduces Database Replay and SQL Performance Analyzer which help the DBA test and minimize the impact of change.

Influence Instance Behavior
Instance tuning uses the same general method of observing a problem, diagnosing the problem, and implementing a solution. The instance tuning lessons cover the details of major tunable components and describe how you can influence the instance behavior. For each lesson, we will examine the relevant components of the architecture.
The course only discusses the architecture to the level required to understand the symptoms and solutions. More detailed explanations are left to other courses, reference material, and the Oracle documentation.

Audience

Data Warehouse Administrator
Database Administrators

Related Training

Suggested Prerequisites
Oracle Database 12c: Install and Upgrade Workshop

Copyright © 2013, Oracle. All rights reserved.

Course Objectives

Use the Oracle Database tuning methodology appropriate to the available tools

Utilize database advisors to proactively tune an Oracle Database Instance

Use the tools based on the Automatic Workload Repository to tune the database

Diagnose and tune common SQL related performance problems

Diagnose and tune common Instance related performance problems

Use Enterprise Manager performance-related pages to monitor an Oracle Database

Course Topics

Introduction
Course Objectives
Course Organization
Course Agenda
Topics Not Included in the Course
Who Tunes?
What Does the DBA Tune?
How to Tune
Tuning Methodology

Basic Tuning Diagnostics
Performance Tuning Diagnostics
Performance Tuning Tools
Tuning Objectives
Top Timed Events
DB Time
CPU and Wait Time Tuning Dimensions
Time Model
Dynamic Performance Views

Using Automatic Workload Repository
Automatic Workload Repository Overview
Automatic Workload Repository Data
Enterprise Manager Cloud Control and AWR
Snapshots
Reports
Compare Periods

Defining the Scope of Performance Issues
Defining the Problem
Limiting the Scope
Setting the Priority
Top SQL Reports
Common Tuning Problems
Tuning During the Life Cycle

Copyright © 2013, Oracle. All rights reserved.

ADDM Tuning Session
Performance Versus Business Requirements

Using Metrics and Alerts
Metrics and Alerts Overview
Limitation of Base Statistics
Benefits of Metrics
Viewing Metric History Information
Viewing Histograms
Server-Generated Alerts
Setting Thresholds
Metrics and Alerts Views

Using Baselines
Comparative Performance Analysis with AWR Baselines
Automatic Workload Repository Baselines
Moving Window Baseline
Baselines in Performance Page Settings
Baseline Templates
AWR Baseslines
Creating AWR Baselines
Managing Baselines with PL/SQL

Using AWR-Based Tools
Automatic Maintenance Tasks
ADDM Performance Monitoring
Using Compare Periods ADDM
Active Session History
New or Enhanced Automatic Workload Repository Views
Emergency Monitoring
Real-time ADDM

Real-Time Database Operation Monitoring
Overview
Use Cases
Defining a Database Operation
Scope of a Composite Database Operation
Database Operation Concepts
Identifying a Database Operation
Enabling Monitoring of Database Operations
Identifying, Starting, and Completing a Database Operation

Monitoring Applications
What is a Service?
Service Attributes
Service Types
Creating Services
Managing Services in a Single-Instance Environment
Where are Services Used?
Using Services with Client Applications
Services and Pluggable Databases

Copyright © 2013, Oracle. All rights reserved.

Identifying Problem SQL Statements
SQL Statement Processing Phases
Role of the Oracle Optimizer
Identifying Bad SQL
Top SQL Reports
SQL Monitoring
What is an Execution Plan?
Methods for Viewing Execution Plans
Uses of Execution Plans

Influencing the Optimizer
Functions of the Query Optimizer
Selectivity
Cardinality and Cost
Changing Optimizer Behavior
Optimizer Statistics
Extended Statistics
Controlling the Behavior of the Optimizer with Parameters
Enabling Query Optimizer Features

Reducing the Cost of SQL Operations
Reducing the Cost
Index Maintenance
SQL Access Advisor
Table Maintenance for Performance
Table Reorganization Methods
Space Management
Extent Management
Data Storage

Using SQL Performance Analyzer
Real Application Testing: Overview
Real Application Testing: Use Cases
SQL Performance Analyzer: Process
Capturing the SQL Workload
Creating a SQL Performance Analyzer Task
SQL Performance Analyzer: Tasks
Parameter Change
SQL Performance Analyzer Task Page

SQL Performance Management
Maintaining SQL Performance
Maintaining Optimizer Statistics
Automated Maintenance Tasks
Statistic Gathering Options
Setting Statistic Preferences
Restore Statistics
Deferred Statistics Publishing
Automatic SQL Tuning

Using Database Replay
Using Database Replay

Copyright © 2013, Oracle. All rights reserved.

The Big Picture
System Architecture
Capture Considerations
Replay Considerations: Preparation
Replay Considerations
Replay Options
Replay Analysis

Tuning the Shared Pool
Shared Pool Architecture
Shared Pool Operation
The Library Cache
Latch and Mutex
Diagnostic Tools for Tuning the Shared Pool
Avoiding Hard Parses
Reducing the Cost of Soft Parses
Sizing the Shared Pool

Tuning the Buffer Cache
Oracle Database Architecture: Buffer Cache
Buffer Cache: Highlights
Database Buffers
Buffer Hash Table for Lookups
Working Sets
Buffer Cache Tuning Goals and Techniques
Buffer Cache Performance Symptoms
Buffer Cache Performance Solutions

Tuning PGA and Temporary Space
SQL Memory Usage
Performance Impact
Automatic PGA Memory
SQL Memory Manager
Configuring Automatic PGA Memory
Setting PGA_AGGREGATE_TARGET Initially
Limiting the size of the Program Global Area (PGA)
SQL Memory Usage

Automatic Memory
Oracle Database Architecture
Dynamic SGA
Granule
Memory Advisories
Manually Adding Granules to Components
Increasing the Size of an SGA Component
Automatic Shared Memory Management: Overview
SGA Sizing Parameters: Overview

Performance Tuning Summary with Waits
Commonly Observed Wait Events
Additional Statistics
Top 10 Mistakes Found in Customer Systems

Copyright © 2013, Oracle. All rights reserved.

Symptoms

Copyright © 2013, Oracle. All rights reserved.