

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

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

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 Baselines
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

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

- 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

Symptoms