

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. In this course, you will be introduced to Oracle Database Cloud Service.

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.

Gain an understanding of the Oracle Database Cloud Service.

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

Gain an understanding of the Oracle Database Cloud Service

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

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

Oracle Database Cloud Service: Overview

Database as a Service Architecture, Features and Tooling

Software Editions: Included Database Options and Management Packs

Accessing the Oracle Database Cloud Service Console & Automated Database Provisioning

Managing the Compute Node Associated With a Database Deployment

Managing Network Access to Database as a Service & Scaling a Database Deployment

Performance Management in the Database Cloud Environment

Performance Monitoring and Tuning

What Can be Tuned in a DBCS Environment?