Oracle Database 12c: Performance Management and Tuning NEW

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

Required Prerequisites

Oracle Database 12c: Administration Workshop NEW

Suggested Prerequisites
Oracle Database 12c: Install and Upgrade Workshop NEW

Course Objectives

Diagnose and tune common Instance related performance problems

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

Use the Oracle Database tuning methodology

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

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, Features, and Tools
DB Time
CPU and Wait Time Tuning Dimensions
Time Model
Dynamic Performance Views
Statistics
Wait Events
Log Files and Trace Files

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 and Limiting the Scope

Setting the Priority
Top SQL Reports
Common Tuning Problems
Tuning During the Life Cycle
ADDM Tuning Session
Performance Tuning Resource
Monitoring and Tuning Tools Overview

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
Moving Window Baseline
Baseline Templates
Creating AWR Baselines
Baselines Views
Performance Monitoring and Baselines
Defining Alert Thresholds Using a Static Baseline
Configuring Adaptive Thresholds

Using AWR-Based Tools
Automatic Maintenance Tasks
ADDM Performance Monitoring
Active Session History
Additional Automatic Workload Repository Views
Real-time ADDM

Real-Time Database Operation Monitoring
Overview and Use Cases
Defining a Database Operation
Database Operation Concepts
Enabling Monitoring of Database Operations
Identifying, Starting, and Completing a Database Operation
Monitoring the Progress of a Database Operation
Database Operation Views
Database Operation Tuning

Monitoring Applications
Service Attributes and Types
Creating Services
Using Services with Client Applications
Using Services with the Resource Manager
Services and Oracle Scheduler
Services and Metric Thresholds

Service Aggregation and Tracing
Top Services Performance Page

Identifying Problem SQL Statements
SQL Statement Processing Phases
SQL Monitoring
Execution Plans
DBMS_XPLAN Package
EXPLAIN PLAN Command
Reading an Execution Plan
Using the SQL Trace Facility
Generating an Optimizer Trace

Influencing the Optimizer
Functions of the Query Optimizer
Optimizer Statistics
Controlling the Behavior of the Optimizer by Using Parameters
Enabling Query Optimizer Features
Using Hints
Access Paths
Join Operations
Sort Operations

Reducing the Cost of SQL Operations
Index Maintenance
SQL Access Advisor
Table Maintenance and Reorganization
Extent Management
Data Storage
Migration and Chaining
Shrinking Segments
Table Compression

Using SQL Performance Analyzer
SQL Performance Analyzer Overview
Real Application Testing Overview and Use Cases
Capturing the SQL Workload
Creating a SQL Performance Analyzer Task
Comparison Reports
Tuning Regressing Statements
Guided Workflow Analysis
SQL Performance Analyzer Views

SQL Performance Management
Maintaining Optimizer Statistics
Automated Maintenance Tasks
Statistics Gathering Options and Preferences
Deferred Statistics Publishing
Automatic SQL Tuning
SQL Tuning Advisor
SQL Access Advisor
SQL Plan Management

Using Database Replay

Database Replay Architecture

Capture Considerations

Replay Options

Replay Analysis

Database Replay Workflow in Enterprise Manager

Database Replay Packages and Procedures

Database Replay Views

Calibrating Replay Clients

Tuning the Shared Pool

Shared Pool Architecture

Latch and Mutex

Diagnostic Tools for Tuning the Shared Pool

 Avoiding Hard Parses

Sizing the Shared Pool

Avoiding Fragmentation

Data Dictionary Cache

SQL Query Result Cache

Tuning the Buffer Cache

Database Buffer Cache Architecture

Working Sets

Buffer Cache Tuning Goals and Techniques

Buffer Cache Performance Symptoms

Buffer Cache Performance Solutions

Database Smart Flash Cache

Flushing the Buffer Cache

Tuning PGA and Temporary Space

SQL Memory Usage

Configuring Automatic PGA Memory

PGA Target Advice Statistics and Histograms

Automatic PGA and AWR Reports

Temporary Tablespace Management

Temporary Tablespace Group

Monitoring Temporary Tablespaces

Temporary Tablespace Shrink

Automatic Memory

Dynamic SGA

Automatic Shared Memory Management Overview

SGA Sizing Parameters

Enabling and Disabling Automatic Shared Memory Management

SGA Advisor

Automatic Memory Management Overview

Enabling Automatic Memory Management

Monitoring Automatic Memory Management

Tuning I/O

I/O Architecture

I/O Modes

Important I/O Metrics for Oracle Databases
I/O Calibration
I/O Statistics
I/O Diagnostics
Database I/O Tuning
Automatic Storage Management (ASM)

Performance Tuning Summary
Initialization Parameters and their Impact on Performance
Initial Memory Sizing
Tuning the Large Pool
Best Practices for Different Types of Tablespaces
Block Sizes
Sizing the Redo Log Buffer and Redo Log Files
Automatic Statistics Gathering
Commonly Observed Wait Events