Oracle Database 11g: Performance Tuning DBA Release 2

Duration: 5 Days

What you will learn

This Oracle Database 11g Performance Tuning training starts with an unknown database that requires tuning. You'll then learn the steps a DBA performs to identify problem areas, diagnose common problems and fix them.

Learn To:

Describe Oracle tuning methodology.
Use Oracle supplied tools for monitoring and diagnosing SQL and Instance tuning issues.
Use database advisors to correct performance problems proactively.
Identify problem SQL statements & tune SQL performance problems.
Monitor the Instance Performance using Enterprise Manager.
Tune instance components, primarily using Instance parameters.

Benefits to You

Ensure fast, reliable, secure and easy to manage performance. Optimize database workloads, lower IT costs and deliver a higher quality of service by enabling smooth and rapid consolidation within your Datacenter.

Course Methodology

The methodology used in the practices is primarily reactive. After configuring monitoring tools and reviewing the available reports, you'll be presented with the Oracle architecture based on the SQL statement processing of SELECT and DML.

SQL Tuning

The SQL tuning section assumes that the DBA has little or no ability to change the code. The DBA will influence the SQL performance with available tools, and will be introduced to various methods of identifying the SQL statements that require tuning (as well as the diagnostic tools needed to find ways to change the performance).

This will include the use of statistics, outlines and profiles to influence the optimizer, adding and rebuilding indexes and using the SQL Advisors. This course introduces the DB Replay and SQL Performance Analyzer tools to help you test and minimize the impact of change.

Instance Tuning

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 class 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 Oracle documentation.

Final Lessons

The last lesson of this course is a recap of the best practices discovered in the previous lessons, along with miscellaneous recommendations. The goal is to finish the course with a best practices list for students to take away.

Database Administrators
Support Engineer
Technical Consultant

Related Training

Required Prerequisites

Oracle Database 11g: Administration Workshop II Release 2

Oracle Database 11g: Administration Workshop I Release 2

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
This lesson introduces the Performance Tuning course objectives and agenda

Basic Tuning Tools
Monitoring tools overview
Enterprise Manager
V$ Views, Statistics and Metrics
Wait Events

Using Automatic Workload Repository
Managing the Automatic Workload RepositoryCreate AWR Snapshots
Real Time SQL Monitoring (a 11.1 feature new lesson in NF L-15)

Defining Problems

Defining the Problem
Limit the Scope & Setting the Priority
Top SQL Reports
Common Tuning Problems & Tuning During the Life Cycle
ADDM Tuning Session
Performance Versus Business Requirements
Performance Tuning Resources & Filing a Performance Service Request
Monitoring and Tuning Tools: Overview

Using Metrics and Alerts

Metrics, Alerts, and Baselines
Limitation of Base Statistics & Typical Delta Tools
Oracle Database 11g Solution: Metrics
Benefits of Metrics
Viewing Metric History Information & Vsing EM to View Metric Details
Statistic Histograms & Histogram Views
Database Control Usage Model & Setting Thresholds
Server-Generated Alerts, Creating and Testing an Alert & Metric and Alert 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 & Baseline Views
Performance Monitoring and Baselines & Defining Alert Thresholds Using a Static Baseline
Using EM to Quickly Configure & Changing Adaptive Threshold Settings

Using AWR Based Tools

Automatic Maintenance Tasks
ADDM Performance Monitoring
Active Session History: Overview

Monitoring an Application

What Is a Service? Service Attributes & Service Types
Creating Services & Managing Services in a Single-Instance Environment
Everything Switches to Services.
Using Services with Client Applications & Using Services with the Resource Manager
Services and Resource Manager with EM & Using Services with the Scheduler
Using Services with Parallel Operations & Metric Thresholds
Service Aggregation and Tracing & Service Aggregation Configuration.
Client Identifier Aggregation and Tracing & Service Performance Views

Identifying Problem SQL Statements

SQL Statement Processing Phases & Role of the Oracle Optimizer
Identifying Bad SQL, Real Time SQL Monitoring (a 11.1 feature new lesson in NF L-15) & TOP SQL Reports
What Is an Execution Plan? Methods for Viewing Execution Plans & Uses of Execution Plans
DBMS_XPLAN Package: Overview & EXPLAIN PLAN Command
Reading an Execution Plan, Using the V$SQL_PLAN View & Querying the AWR
SQL*Plus AUTOTRACE & SQL Trace Facility

How to Use the SQL Trace Facility
Generate an Optimizer Trace

Influencing the Optimizer
Functions of the Query Optimizer, Selectivity, Cardinality and Cost & Changing Optimizer Behavior
Using Hints, Optimizer Statistics & Extended Statistics
Controlling the Behavior of the Optimizer with Parameters
Enabling Query Optimizer Features & Influencing the Optimizer Approach
Optimizing SQL Statements, Access Paths & Choosing an Access Path
Join & Sort Operations
How the Query Optimizer Chooses Execution Plans for Joins
Reducing the Cost

Using SQL Performance Analyzer
Real Application Testing: Overview & Use Cases
SQL Performance Analyzer: Process & Capturing the SQL Workload
Creating a SQL Performance Analyzer Task & SPA (NF Lesson 9) DBMS_SQLTUNE.CREATE_TUNING_TASK
Optimizer Upgrade Simulation & SQL Performance Analyzer Task Page
Comparison Report & Comparison Report SQL Detail
Tuning Regressing Statements & Preventing Regressions
Parameter Change Analysis & Guided Workflow Analysis
SQL Performance Analyzer: PL/SQL Example & Data Dictionary Views

SQL Performance Management
Maintaining SQL Performance and Optimizer Statistics & Automated Maintenance Tasks
Statistic Gathering Options & Setting Statistic Preferences
Restore Statistics
Deferred Statistics Publishing: Overview & Example
Automatic SQL Tuning: Overview
SQL Tuning Advisor: Overview
Using the SQL Access Advisor
SQL Plan Management: Overview

Using Database Replay
The Big Picture & System Architecture
Capture & Replay Considerations
Replay Options & Analysis
Database Replay Workflow in Enterprise Manager
Packages and Procedures
Data Dictionary Views: Database Replay
Database Replay: PL/SQL Example
Calibrating Replay Clients

Tuning the Shared Pool
Shared Pool Architecture & Operation
The Library Cache & Latch and Mutex
Diagnostic Tools for Tuning the Shared Pool
Avoiding Hard & Soft Parses
Sizing the Shared Pool & Avoiding Fragmentation
Data Dictionary Cache & SQL Query Result Cache
UGA and Oracle Shared Server
Large Pool & Tuning the Large Pool

Tuning the Buffer Cache
Oracle Database Architecture: Buffer Cache
Database Buffers
Buffer Hash Table for Lookups
Working Sets
Buffer Cache Tuning Goals and Techniques
Buffer Cache Performance Symptoms & Solutions
Automatically Tuned Multiblock Reads
Flushing the Buffer Cache (for Testing Only)

Tuning PGA and Temporary Space
SQL Memory Usage & Performance Impact
SQL Memory Manager
Configuring Automatic PGA Memory & Setting PGA_AGGREGATE_TARGET Initially
Monitoring & Tuning SQL Memory Usage
PGA Target Advice Statistics & Histograms
Automatic PGA and Enterprise Manager & Automatic PGA and AWR Reports
Temporary Tablespace Management: Overview & Monitoring Temporary Tablespace
Temporary Tablespace Shrink & Tablespace Option for Creating Temporary Table

Automatic Memory Management
Oracle Database Architecture, Dynamic SGA & Memory Advisories
Granule & Manually Adding Granules to Components
Increasing the Size of an SGA Component, SGA Sizing Parameters & Manually Resizing Dynamic SGA Parameters
Automatic Shared Memory Management & Memory Broker Architecture
Behavior of Auto-Tuned & Manually TunedSGA Parameters
Using the V$PARAMETER View & Resizing SGA_TARGET
Disabling, Configuring & Monitoring Automatic Shared Memory Management (ASMM)
Automatic Memory Management

Tuning Segment Space Usage
Space and Extent Management & Locally Managed Extents
How Table Data Is Stored & Anatomy of a Database Block
Minimize Block Visits
The DB_BLOCK_SIZE Parameter
Small & Large Block Size: Considerations
Block Allocation, Free Lists & Block Space Management with Free Lists
Automatic Segment Space Management
Migration and Chaining, Shrinking Segments & Table Compression: Overview

Tuning I/O
I/O Architecture, File System Characteristics, I/O Modes & Direct I/O
Bandwidth Versus Size & Important I/O Metrics for Oracle Databases
I/O Calibration and Enterprise Manager, I/O Calibration and the PL/SQL Interface & I/O Statistics and Enterprise Manage
Stripe and Mirror Everything
Using RAID
I/O Diagnostics
Database I/O Tuning
What Is Automatic Storage Management?

Performance Tuning Summary
Best practices identified throughout the course

Summarize the performance tuning methodology

Appendix B: Using Statspack
Installing Statspack
Capturing Statspack Snapshots
Reporting with Statspack
Statspack Considerations
Statspack and AWR Reports
Reading a Statspack Report
Statspack and AWR

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