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.

Related Training

Required Prerequisites

Oracle Database 11g: Administration Workshop II Release 2

Oracle Database 11g: Administration Workshop I Release 2

Course Objectives

Use Database Statistics and Metrics to identify a performance problem

Interpret Tuning diagnostics

Identify and eliminate performance issues

Set tuning priorities and strategies

Identify problem SQL statements

Influence the optimizer

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 Repository
Create 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
- 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
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

Related Courses

Oracle Database 11g: Performance Tuning