OR5490 - Oracle Database Performance Tuning for Administrators

Course ID#: 0370-232-DB-W

Hours: 28

Powered by ⇒Themis

Course Content

Course Description:

In this course students will clearly define the various methodologies one can use to tune an Oracle Database. The course covers the various components of an Oracle Database where potential performance bottlenecks could occur and how to monitor and tune them.

Throughout the course, students experience hands-on exercises in tuning a database.

Objectives:

Upon successful completion of this course, the student will be able to:

- Identify the potential performance bottlenecks in an Oracle database
- Understand which database parameters are important to performance
- Query various data dictionary and dynamic performance views for performance information
- Use various utilities to help diagnose database performance problems
- Understand and use the database advisors
- Set up an Oracle database for efficient performance

Audience:

Oracle Database Administrators.

Prerequisites:

Oracle Database Administration or Oracle DBA experience.

Topics

Module 1: Database Tuning Overview

- Set appropriate tuning goals
- Apply a tuning methodology
- Identify potential tuning problems

Module 2: Database Architecture

- Understand all database architecture components

- The Database Architecture
  - Memory Structures
  - The SGA
- The Database Buffer Cache
- The Shared Pool
- Other Buffer Caches

- The KEEP Cache
- The RECYCLE Cache
- Non-Standard Block Size Caches
- The Large Pool
- The Java Pool
- The Streams Pool
- The Result Cache
  - Background Processes
  - Checkpoints
  - Server Process
  - Client Processes
  - Database Files
  - Database Objects
  - Blocks
- Understand potential performance bottlenecks

Module 3: Automatic Memory Management (AMM and ASMM)

- Enable Automatic Shared Memory
  - The SGA_TARGET and STATISTICS_LEVEL Parameters
  - The MEMORY_TARGET parameter
- The MMAN Background Process
- Areas Managed by AMM and ASMM
- Monitoring AMM and ASMM Events
  - Dynamic Performance Views
    - V$SGA_DYNAMIC_COMPONENTS
    - V$MEMORY_DYNAMIC_COMPONENTS
    - V$SGA_RESIZE_OPS
    - V$MEMORY_RESIZE_OPS

Module 4: Tuning the Shared Pool

- Diagnose shared pool problems
- Size the shared pool
- Size the reserved area
- Keep objects in the shared pool
- SQL Tuning and the Shared Pool
- Listing the SQL Statement Processing Steps
  - Parsing
  - Syntax Check

- Semantic Check
- Hard Parse vs. Soft Parse
- Identifying Means to Minimize Hard Parsing
  - SQL Coding Standards
  - Identifying Identical Statements
  - The CURSOR_SHARING Parameter
    - EXACT, SIMILAR, FORCE Values
  - Using Bind Variables
  - Sizing the Shared Pool Memory Structure
  - Pinning SQL in the Shared Pool
- Monitoring SQL Usage and Parsing
  - Data Dictionary Views
  - VSQL, VSQLAREA, V$SQLTEXT
  - V$SYSSTAT, V$SESSTAT

Module 5: Tuning the Buffer Cache

- Describe the buffer cache architecture
- Size the buffer cache
  - The DB_CACHE_SIZE Parameter
- Resolve common performance issues related to the buffer cache
- Use common diagnostic indicators to suggest a possible solution
- Other Buffer Caches
  - When to use
  - KEEP, RECYCLE, Non-Standard Block Sizes
  - Setting up

Module 6: Tuning PGA and Temporary Space

- Private PGA vs Public PGA
- Diagnose PGA memory issues
- Size the PGA memory
  - SORT_AREA_SIZE vs PGA_AGGREGATE_TARGET
- Diagnose temporary space issues
- Specify temporary tablespace parameters for efficient operation
- Temporary Tablespace Groups (TTG)
  - What they do and what they don't do for you

- – Creating a TTG
- Monitoring Sort Efficiencies
- – Dynamic Performance Views
  - ▪ V$SYSSTAT
  - ▪ V$SESSTAT
  - ▪ AUOTRACE Output

Module 7: Checkpoint and Redo Tuning

- Diagnose Checkpoint and Redo Issues
- Setting Checkpoint Performance Goals
- Checkpoint Frequency Issues
  - – Too Often
  - – Not Often Enough
- The FAST_START_MTTR_TARGET Parameter
- Other Parameters
  - – LOG_CHECKPOINT_TIMEOUT
  - – LOG_CHECKPOINT_INTERVAL
  - – LOCK_CHECKPOINTS_TO_ALERT
  - – FAST_START_IO_TARGET
- Multiple database writers
- Parameters
  - – DB_WRITERS
  - – DBWR_IO_SLAVES
- Tune the redo chain
- Monitor Redo Log Group Switches
- When should we switch
  - – Size the redo log files
  - – Size the redo log buffer
    - ▪ Latch Issues

Module 8: Tuning Block Space Usage

- Tune segment space management
  - – Dictionary vs Locally managed tablespaces
  - – Automatic vs Manual segment space management
- Tune block space management
- Diagnose and correct row chaining
- Choosing a Block Size
- Using Multiple Block Sizes in a Database

Module 9: Statistics and Wait Events

- Identify dynamic performance views useful in tuning
- Identify key tuning components of the alert log file
- Identify key tuning components of user trace files
- Use dynamic performance views to view statistics and wait events

Module 10: The Automatic Workload Repository (AWR) and the Advisory Framework

- The Advisory Framework Architecture
  - – OEM and Non-OEM Usage
  - – Performance Statistics Sources
  - – ASH
  - – The AWR
  - – The Advisors
    - ▪ SGA Advisor
    - ▪ UNDO Advisor
    - ▪ SQL Tuning Advisor
    - ▪ The Segment Advisor
    - ▪ SQL Access Advisor
- Create and Manage AWR Snapshots
- Generate AWR reports
  - ▪ The awrinfo.sql script
  - ▪ The awrrpt.sql script
  - ▪ AWR Data Dictionary Views
- Create snapshot sets (baselines) and compare periods
- Generate ADDM reports
  - – The addmrpt.sql script

Module 11: Additional SQL Tuning Topics

- Indexing
  - – Types of Indexes
  - – Negating the use of indexes
  - – Invisible Indexes
  - – Virtual Indexes
- Object Statistics
  - – Automatic Statistics Gathering Job / Task

 – Publishing Statistics / Private Statistics
 – Extended Statistics
 – Expression Statistics

Module 12: Miscellaneous Tuning Tips