Write your questions marked with A, B, C, D, E

A. SQL Tuning Advisor

B. SQL Monitoring

C. SQL Plan Management

D. Optimizer Statistics

E. Open topic
SQL Tuning Round Table
Oracle Database Development team
The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Participants

Panelists
• Benoit Dageville, Architect, SQL Tuning
• Graham Wood, Architect, Database Manageability
• Mohamed Ziauddin, Architect, Optimizer

Moderator
• Jagan Athreya, Director, Database Manageability
Topics

A. SQL Tuning Advisor

B. SQL Monitoring

C. SQL Plan Management

D. Optimizer Statistics

E. Open mic
SQL Tuning Challenges

Comprehensive tuning recommendations

- Challenge
  - SQL tuning is
    - Complex – requires significant domain expertise
    - Time consuming – requires considerable time even for experts
    - Repetitive – tuned SQL can regress and need to be tuned again
SQL Tuning Advisor
Comprehensive tuning recommendations

- SQL Tuning Advisor
  - NEW: Identifies alternate execution plans using real-time and historical performance data
  - NEW: Recommends parallel profile if it will improve SQL performance significantly (2x or more)
SQL Tuning Advisor

Comprehensive tuning recommendations

- SQL Tuning Advisor
  - **NEW:** Identifies alternate execution plans using real-time and historical performance data
  - **NEW:** Recommends parallel profile if it will improve SQL performance significantly (2x or more)

Administrator

Q&A

Automatic Tuning Optimizer

SQL Profiling

Statistics Analysis

Access Path Analysis

SQL Restructure Analysis

Alternative Plan Analysis

Parallel Query Analysis

Gather Missing or Stale Statistics

Create a SQL Profile

Add Missing Access Structures

Modify SQL Constructs

Adopt Alternative Execution Plan

Create Parallel Profile

Comprehensive SQL Tuning Recommendations
Topics

A. SQL Tuning Advisor

B. SQL Monitoring

C. SQL Plan Management

D. Optimizer Statistics

E. Open questions
• Challenge
  - SQL and PL/SQL execution is a black box
  - Difficult to determine if SQL will finish in 30 secs or 3 hours
  - Difficult to determine if execution plan is optimal
Real-Time SQL Monitoring
Looking Inside SQL Execution

- **NEW:** PL/SQL monitoring including associated high load SQL monitored recursively
- **NEW:** Exadata aware I/O performance monitoring and associated metric data
- **NEW:** Capture rich metadata such as bind values, session details e.g. user, program, client_id and error codes and error messages
- **NEW:** Save as Active Report for rich interactive offline analysis
Real-Time SQL Monitoring
Looking Inside SQL Execution

- Automatically monitors long running SQL
- Enabled out-of-the-box with no performance overhead
- Monitors each SQL execution
- Exposes monitoring statistics
  - Global execution level
  - Plan operation level
  - Parallel Execution level
- Guides tuning efforts
- NEW: PL/SQL Support
- NEW: Exadata-integrated metrics
- NEW: Rich program, session metadata
- NEW: Offline viewing using interactive Active Reports
Topics

A. SQL Tuning Advisor

B. SQL Monitoring

C. SQL Plan Management

D. Optimizer Statistics

E. Open questions
Preventing problems with SQL Plan Management

• Problem: changes in the environment cause plans to change

• Plan baseline is established

• SQL statement is parsed again and a **different plan is generated**

• New plan is **not executed** but marked for verification
SQL Plan Baseline Upgrade Scenario

Oracle Database 11gR2

Stored outlines automatically detected
DBA offered to migrate to SPM

After Migration
all stored outlines plans are plan baselines

Oracle Database 9i

Create stored outlines for all important SQL stmts

Well tuned plans

No plan regressions
Preventing problems with SQL Plan Management

- Problem: changes in the environment cause plans to change
- Plan baseline is established
- SQL statement is parsed again and a different plan is generated
- New plan is not executed but marked for verification
Topics

A. SQL Tuning Advisor

B. SQL Monitoring

C. SQL Plan Management

D. Optimizer Statistics

E. Open questions
Oracle Optimizer Statistics
Preventing SQL Regressions

- Automatic Statistics Collection Job (stale or missing)
  - Out-of-the-box, runs in maintenance window
  - Configuration can be changed (at table level)
  - Gathers statistics on user and dictionary objects

- Uses new collection algorithm with accuracy of compute and speed faster than sampling of 10%

- Incrementally maintains statistics for partitioned tables – very efficient
  - Set DBMS_STATS.SET_GLOBAL_PREFS

Nightly
Oracle Optimizer Statistics
Preventing SQL Regressions

• Extended Statistics
  • Extended Optimizer Statistics provides a mechanism to collect statistics on a group of related columns:
    • Function-Based Statistics
    • Multi-Column Statistics
  • Full integration into existing statistics framework
    • Automatically maintained with column statistics
      
      DBMS_STATS.CREATE_EXTENDED_STATS

• Pending Statistics
  • Allows validation of statistics before publishing
  • Disabled by default
  • To enable, set table/schema PUBLISH setting to FALSE
    
    DBMS_STATS.SET_TABLE_PREFS('SH','CUSTOMERS','PUBLISH','false')
  • To use for validation
    
    ALTER SESSION SET optimizer_pending_statistics = TRUE;
  • Publish after successful verification
Topics

A. SQL Tuning Advisor
B. SQL Monitoring
C. SQL Plan Management
D. Optimizer Statistics
E. Open questions