

Upgrading Banner to Oracle 10g

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Evaluation Code 625

April 2-5 Orlando, Florida

Session Rules of Etiquette

- Please place your cell phone/pager on 'silent mode'.
- If you must leave the session early, to catch a flight home, etc...do so as quietly as possible.
- The presentation is about 45 minutes, leaving 15 minutes for questions at the end.

Thank you for your cooperation!

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Introduction

- This presentation will provide the Oracle DBA and other technical persons with an overview of setup, management, and tuning issues when upgrading a Banner Oracle 9i database to Oracle 10g release 2 (10.2.0.1).
- Since Oracle 10g requires the Cost Based Optimizer (CBO), this presentation will also include Banner specific CBO setup procedures.

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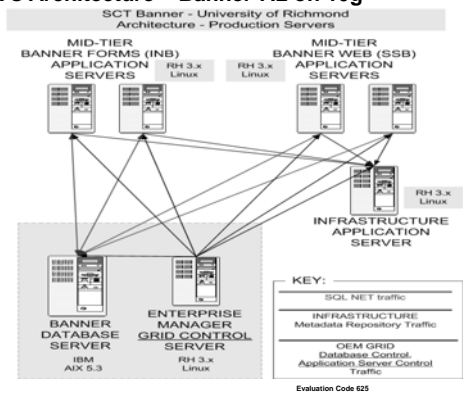
Topics of Discussion

- Overall architecture of Banner 7 on Oracle 10g
- Installing Oracle Enterprise Manager (OEM) Grid Control
- Installing Oracle 10g database software and OEM grid control agent
- Choosing a Database Upgrade Method
- Database Initialization Parameters
- Gathering Statistics
- Optional Database Performance Tuning Procedures
- Tuning individual SQL statements via OEM (Database Control)
- Midtier Modifications
- Known Problems
- Overall Summary of Banner 7.2 on an Oracle 10g R2 Database

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UR's Architecture – Banner 7.2 on 10g



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Installing Oracle Enterprise Manager 10g – pg 1

- The OEM Server will be running a database, many apache and java processes and OEM managed agents, thus 2 GB or more of RAM will be required. Use a dedicated server for OEM Grid Control.
- OEM – Grid Control includes – Database Control so that you do not need to run Database Control on the database server, but you can run it on both if you desire.
- Installation procedures will create an OEM repository database (remember to add it to your backup procedures).
- OEM GRID allows management of multiple Oracle databases and Oracle application servers from a central console like Oracle 9i OEM , but is 100% web based.
- OEM GRID is far superior to 9i OEM, but will require different techniques to accomplish the same tasks. You will NOT be able to utilize 9i OEM with a 10g database !

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Installing Oracle 10g R2 Database Software – pg 2

- Depending upon your hardware platform you may need to run a script as root to initialize the environment **before** installing the Oracle software.

```
# pwd
/oradist/AIX/db10_2_0_1/Disk1
# cd rootpre
# ./rootpre.sh
```

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Installing Oracle 10g R2 Database Software – pg 3

- Install Oracle 10g into a new ORACLE_HOME
- Install Oracle 10g software (as oracle not root)
- Install the database software only, do not create a database during the install (usually one CDROM).
- Install the Oracle COBOL pre-compilers from the 10g Client CDROM
- Install critical 10.2.0.1 patches (ask SCT for the list of required patches) !!!
- Install Oracle GRID control agent (select your Grid Control Server during the installation)

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Choosing a Database Upgrade Method

- Method 1 – Upgrade the Database in place (fastest method – no database reorganization performed). Perform a FULL, COLD physical backup of the database before upgrading the database. Remember to install a new 10g specific SPFILE for the upgraded database.
- Method 2 – Upgrade the Database by using Oracle Import/Export procedures into a new 10g database. (lot's of planning, lot's of testing, lot's of scripts, lot's of work).
- For both methods, before applying the Banner 7 upgrades, recompile ALL Banner database objects to insure that you are starting with a functional Banner instance.

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10g Database Initialize Parameters (for CBO)

- SCT (CBO) Recommended Settings (FAQ 1-9508T)
Also review FAQ (CMS-13006)
optimizer_mode = 'FIRST_ROWS'
optimizer_index_caching = 90
optimizer_index_cost_adj = 30
session_cached_cursors = 50
- U.R. (CBO) Specific Settings
optimizer_mode = 'ALL_ROWS'
optimizer_index_caching = 90
optimizer_index_cost_adj = 80
session_cached_cursors = 144
- **Important**, start with SCT's recommendation and adjust if necessary for your specific environment. U.R. has lots of SQR reports which require ALL_ROWS to run quickly.

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10g Database Initialize Parameters – pg 2

- U.R. specific settings (note, example for single block size)
 1. compatible = '10.2.0.1.0'
 2. cursor_sharing = 'EXACT'
 3. open_cursors = 2048
 4. session_cached_cursors = 144 -- UR; for complex Banner Forms (regs)
 5. db_file_multiblock_read_count = 16 -- too high causes Full Table Scans
 6. db_block_size = 8192
 7. db_cache_size = 1073741824 -- this is the 8K buffer cache
 8. java_pool_size = 16000000
 9. pga_aggregate_target = 1073741824
 10. shared_pool_size = 1073741824
 11. sort_area_size = 524288
 12. log_buffer = 2097152
 13. optimizer_mode = 'ALL_ROWS' -- UR specific
 14. optimizer_index_caching = 90 -- UR specific
 15. optimizer_index_cost_adj = 80 -- UR specific
 16. query_rewrite_enabled = 'FALSE' -- we have NO materialized views.
 17. star_transformation_enabled = 'FALSE'
 18. recyclebin = 'OFF' -- ON breaks some Ban. upgrade procs.
 19. undo_management = 'AUTO' -- ON breaks some Ban. upgrade procs.
 20. undo_retention = 3600 -- One Hour
 21. timed_statistics = TRUE
 22. _kg1_large_heap_warning_threshold = 8388608 - prevent many alert warnings

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Gathering Database Statistics - pg 1

- Gather Banner Table, Index, and Column statistics (histograms). There are several methods for doing this:

- Manual Method (used by U.R)

```
For each BANNER schema:  
  analyze table SCHEMA.TABLE_NAME  
    compute statistics for table  
    for all indexes  
    for all indexed columns size 128;
```

- Oracle provided method (via DBMS_STATS package)

```
DBMS_STATS.gather_schema_stats  
(ownname => 'SCHEMA_NAME'  
 ,estimate_percent => NULL  
 ,block_sample => FALSE  
 ,method_opt => 'FOR ALL INDEXED COLUMNS SIZE 128'  
 ,degree => 1  
 ,granularity => 'ALL'  
 ,cascade => TRUE  
 ,options => 'GATHER'  
 ,no_invalidate => TRUE /* dont invalidate active cursors */  
 );
```

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Gathering Database Statistics - pg 2

- Gather SYS (I/O Load) Statistics
Gather the I/O work load during a typical production load on the system, i.e. not saturated or under utilized.

```
DBMS_STATS.GATHER_SYSTEM_STATS  
( gathering_mode => 'INTERVAL'  
  , interval      => 10 /* 10 minutes */  
  );
```

- Delete SYS (I/O Load) Statistics

```
DBMS_STATS.DELETE_SYSTEM_STATS;
```

- Gather SYS Schema Statistics

```
DBMS_STATS.GATHER_SCHEMA_STATS('SYS');
```

- Delete SYS Schema Statistics

```
DBMS_STATS.DELETE_SCHEMA_STATS('SYS');
```

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Optional Performance Settings

- Use ONE listener per midtier (each listener uses a dedicated port, 1522, 1523, etc...) U.R. has five listeners running on the database server. This prevents contention between mid-tier requests for database access, especially for SSB mid-tiers.

- Also setup standard listener port 1521 for non-midtier servers and processes.

- Consider using multiple block sizes

There is a significant advantage when separating TABLE and INDEX buffers. A FULL table scan will no longer push INDEX blocks out of the INDEX buffer cache. U.R. index cache hit percentage is around 99%.

Block Size Suggestions:

- 8,192 for tablespaces with TABLES
- 16,384 for tablespaces with INDEXES
- Put tables which are always empty into a new tablespace BAN_ZERO with block size of 2,048.

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Tuning SQL statements - pg 1

- OEM 10g includes facilities to easily capture high utilization SQL statements from a running database, and perform tuning of these SQL statements.

- The "Performance" table, includes a link to "Top SQL". Clicking this link displays a list of the top running SQL statements.

- You can select one or more SQL statements and tune them in groups, or one at a time (my preference).

- The next slide shows this screen. If time permits I will also be showing a 'live' screen capture of this process.

- The Automatic Database Diagnostic Monitor (ADDM) analyzes your database based on existing Workload Repository snapshots, which are captured automatically at predefined intervals. The ADDM snapshots can also be used to tune groups of SQL statements.

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Tuning SQL statements - pg 5 - Advisor Central

- SQL Tuning Advisor is used to analyze individual SQL statements and makes recommendations for improving its performance. You can select from one of the following sources, which will lead you to a data source where you can tune the SQL statements.
 - Top SQL
 - SQL Tuning Sets
 - (ADDM) Snapshots
 - Preserved Snapshot Sets

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Tuning SQL statements - pg 6 - Access Advisor

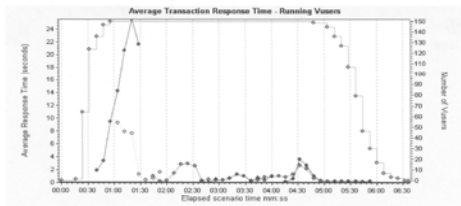
- Use the SQL Access Advisor wizard to determine the indexes, materialized views, or materialized view logs to use to improve the underlying access methods chosen by the Oracle optimizer for a given set of SQL statements.
- Note, we have not added any materialized views to BANNER . You can bypass this selection in the wizard.
- Use the SQL Access Advisor Wizard Workload page to provide a defined workload that allows the Access Advisor to make recommendations. Supported workload sources are:
 - **Current and recent SQL activity** -- The current SQL from the cache is used as the workload.
 - **User-defined Workload, Import SQL from a table** -- This allows you to receive recommendations for a workload that may not be running on the current database. This allows for access recommendations to be provided and implemented before an application goes live.
 - **Create a hypothetical workload from the following schemas** -- Provide a schema that allows the advisor to search for dimension tables and produce a workload.
 - **Import Workload from SQL Repository** -- This allows you to specify a previously created SQL Tuning set as the workload source.

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Banner 6 - Self Server Banner (SSB) Registration

Average Transaction Response Time - Running Vusers



Color	ScaleMeasurement	Graph's Minimum	Graph's Average	Graph's Maximum	Graph's Median	Graph's Std. Deviation
1	http_client_search	0.125	0.712	3.025	0.288	1.045
1	http_client_search	0.417	4.119	9.253	1.627	3.023
1	http_client_search	0.27	0.576	2.453	0.389	0.719
1	http_client_search	0.3	1.292	2.97	1.011	1.057
1	Item_name	1.853	13.843	26.526	14.236	10.562
1	http_client_search	0.13	0.621	1.367	0.467	0.367
1	Plan	0	39	350	54	101.979

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Overall Summary of Banner 7.2 on Oracle 10g R2

- Moving from a Banner 6 to a Banner 7 environment will require a substantial amount of time learning the new Oracle Application Server setup, configuration, and maintenance procedures. Most configuration can take place via the Application Server Control Web Console, but command line experience will also be required (opmnctl, etc...)
- The OEM Grid Control Web Console should be considered an important element of your overall support tool set. The 10g OEM is 100% different than the earlier 9i OEM, so expect to spend several weeks learning the new OEM.
- SCT's modifications to Banner 7 to support an Oracle 10g database with the Cost Based Optimizer (CBO) has been proven to work very well. There are still a few open issues, for example with the Object Access Views, but overall performance is the same or in some cases much better than Banner 6 on Oracle 9i.

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Some Pertinent Oracle Metalink Articles

- 274496.1 - Session Cached Cursors
- 271886.1 - Differences Between Different Editions of Oracle Database 10G
- 284602.1 - 10g Listener: High CPU Utilization - Listener May Hang
- 330239.1- Memory Notification: Library Cache Object Loaded Into SGA
- 244092.1 - How to drop sample schemas
- 224270.1 - Trace Analyzer TRCANLZR - Interpreting Raw SQL Traces with Binds and/or Waits generated by EVENT 10046
- 215187.1 - SQLTXPLAIN.SQL - Enhanced Explain Plan
- 268117.1 - How to Stop Forms Session Information Appearing in OC4J_BI_Forms default-web-access.log
- 189702.1 - Rule Based Optimizer is to be Desupported in Oracle10g
- 316901.1 - 10.2.0.1 Base Release - Known Issues

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Questions & Answers

- Questions ...
- Optional Tuning Session Videos ...

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Thank You!

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