Introduction to AWR and Tuning
Some New Things in 11g

Earl Shaffer
CTO/Oracle Practice Manager
OracleManConsulting@Gmail.com

OracleMan Consulting
OMC - Who are we?

- Oracle DBA on-site and remote services
- Systems DBA work – install, upgrade, patch
- Tuning – DB, IO, server, etc.
- Experience from 5.1, 6, 7, 8i, 9i, 10g, 11gR2
- Custom 'moving to 11gR2' projects
The Bad Old Days

- In 1988, V5.1 was out and 6.0 was coming
- Oracle v6 through v8.0 had BSTAT/ESTAT reports (but the tables were in SYSTEM)
- We tuned using “cache hit ratios”
- Wait info was captured, but hard to get to
- Before 8i, tuning was “an art” because it was subjective, and hard to repeat
Working hard to get any real Improvement

- No one wants to get the “DB is slow” call
- Management usually does not want to buy more RAM or a new, faster server
- In most cases, you have to make what you have run faster with no additional resources
- Performance Tuning = Magic Trick?
- HINT – make a list of things that work, where they work, and use it again next time
Work Smarter Not Harder

- Cache hit ratios are deceptive
- You really want to know: 'what is going on'
- Need info on all resources inside the DB
- Need stats on all the SQL recently run
- Need a way to compare 1pm to 9am
- Would be nice if the DB did this for us
AWR to the Rescue

- Automatic Workload Repository
- Auto gather of internal DB statistics
- Key – stats stored in DB managed tables
- Easy-to-use views help the DBA use the info
- Feeds into ADDM and the advisory suite
- Frequency of stats gather can be changed
- Statistics retention time can be changed
What about STATSPACK?

• Why not just use our friend STATSPACK?
• Was better than BSTAT/ESTAT
• Requires an external job to get a snapshot
• Physical tables need manual management
• Report is good, but limited
• Cannot easily compare REP4 to REP5
The Basics

- Each stat gather is called a SNAPSHOT
- A SNAPSHOT is specific to a point in time
- DBA_HIST_SNAPSHOT joins to the views
- Each DBA_HIST view has different kinds of stats, from different areas of the DB, but all are specific to a SNAPSHOT
- There are 40+ DBA_HIST views
Examples of the DBA_HIST Views

- DBA_HIST_SNAPSHOT - Displays snapshot information.
- DBA_HIST_SYSSTAT - Displays detailed system statistics
- DBA_HIST_FILESTATXS – Displays detailed datafile statistics
- DBA_HIST_SQL_SUMMARY – Displays summary and higher level SQL statistics
- DBA_HIST_SQLSTAT – Displays detailed SQL statistics
- DBA_HIST_WAITSTAT – Displays detailed wait statistics
AWR Reports

- AWR outputs reports like STATSPACK
- Based on the events between 2 snapshots
- Can be called from $ORACLE_HOME/rdbms/admin
  - awrrpt.sql statistics for a range of snapshot IDs.
  - awrsqrpt.sql statistics of a particular SQL statement for a range of snapshot IDs, to inspect the performance of a SQL statement.
  - awrddrpt.sql compares detailed performance attributes and configuration settings between two selected time periods.
AWR Reports (2)

- AWR reports can be run as PL/SQL call
  Call: `dbms_workload_repository.awr_sql_report_text`
- Lets look at “runawrreport1.sql”
- Take report file and email it, or compress it and move it to a filesystem for later review

Another example: www.dba-oracle.com/art_orafaq_awr_sql_tuning.htm
AWR Reports (3)

- AWR reports can be run via VARIABLES
  - Define the variables, then call the report:

    define begin_snap = &1
    define end_snap = &2
    define report_name = &3
    define report_type = 'text';
    define db_name = 'SALES3';
    define dbid = 994285834;
    @/ora/product/11106/rdbms/admin/awrrpti
Too Much Info?

• With all the DBA_HIST views there, it can get confusing as to which to use, and when
• Look at these general categories:
  
  File statistics
  General system statistics
  Concurrency statistics
  Instance tuning statistics
  SQL statistics
  Segment Statistics
  Undo Statistics
  Time-model statistics
  Recovery Statistics
Some Real Query Examples

- HISTBUFPOOLSTAT.SQL
- GETSQLFROM2SNAPS.SQL
- HISTBUFPOOLSTAT.SQL
- LOGONHIST.SQL
Learn, Learn and Learn More

- Oracle Doc – CD, online
- Books by well-regarded authors
- On-line websites and Blogs
- National conferences and training classes
- Local Oracle User Groups
- Email with other local DBAs
What Never Changes

- End users cannot explain what 'seems slow' really means
- You won't get more money for RAM
- More work, fewer people, multiple projects
- Fixing AA can break BB
- Everything affects everything else – other DBs, other applications, other programs/systems, SAN use, etc.
Using these new Powers

- Looking for SQL which consumes the most resources in your environment
- See which areas use the same SQL
- See IO Problems 'over time'
- See the 'hottest' datafile this week
- Explore the 'system metrics'
- Use Enterprise Manager to 'dig in'
Everyone Needs to Have this Data

- That includes the SAs, DBAs, and Developers
- SAs can see IO and OS statistics
- Developers can see SQL and PL/SQL plans
- Data modelers can see Table/View use
- Others DBAs can see the statistics and compare them to issues they have seen elsewhere, learn, and share their 'fixes'
Things To Watch Out For

- Watch the size of SYSAUX
- Don't test fixes in PROD, 'test in test'
- Don't change the snapshot interval, it is a good balance between too often/too few
- Unless you run reports and save the output, you can't diagnose a 'down DB'
Final Tips

- Use AWR in 10g and 11g, and remove STATSPACK from the DB entirely
- Set the retention to 60 or 90 days
- Develop your own set of scripts that you can run regularly, OEM 'steps' are often forgotten/lost
- Review the reports at least once a week
- Look into ASH also for more information