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Automatic Database Diagnostic Monitor (ADDM)

Oracle Tips by Burleson Consulting

The following Tip is from the outstanding book "[Oracle PL/SQL Tuning: Expert Secrets for High Performance Programming](#)" by Dr. Tim Hall, Oracle ACE of the year, 2006:

The Automatic Database Diagnostic Monitor (ADDM) analyzes data in the Automatic Workload Repository (AWR) to identify potential performance bottlenecks. For each of the identified issues, it locates the root cause and provides recommendations for correcting the problem. An ADDM analysis task is performed and its findings and recommendations stored in the database every time an AWR snapshot is taken provided the statistics_level parameter is set to TYPICAL or ALL. The ADDM analysis includes:

- CPU Load
- Memory Usage
- I/O Usage
- Resource Intensive SQL
- Resource Intensive PL/SQL and Java
- RAC Issues
- Application Issues
- Database Configuration Issues
- Concurrency Issues
- Object Contention

The ADDM reports are much simpler to read than those of AWR or STATSPACK, making them a useful method for identifying resource intensive SQL and PL/SQL.

There are several ways to produce reports from the ADDM analysis which will be explained later, but all follow the same format. The findings (problems) are listed in order of potential impact on database performance, along with recommendations to resolve the issue and the symptoms which lead to its discovery. An example finding is shown below.

FINDING 1: 59% impact (944 seconds)

The buffer cache was undersized causing significant additional read I/O.

RECOMMENDATION 1: DB Configuration, 59% benefit (944 seconds)

ACTION: Increase SGA target size by increasing the value of parameter

□□

Oracle Tips

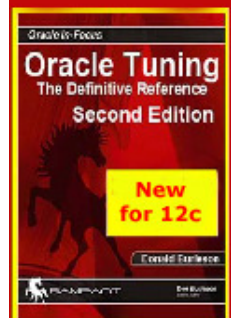
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"sga_target" by 28 M.

SYMPTOMS THAT LED TO THE FINDING:

Wait class "User I/O" was consuming significant database time. (83%

impact [1336 seconds])

The recommendations for a particular finding may include:

- Hardware changes
- Database configuration changes
- Schema changes
- Application changes
- Using other advisors

The analysis of I/O performance is affected by the dbio_expected parameter which should be set to the average time (in microseconds) it takes to read a single database block from disk with typical values range from 5000 to 20000 microseconds.

```
EXECUTE DBMS_ADVISOR.set_default_task_parameter('ADDM', 'DBIO_EXPECTED', 8000);
```

In Enterprise Manager DBConsole, the "Performance Analysis" section on the "Home" page is a list of the top five findings from the last ADDM analysis task. Specific reports can be produced by clicking on the "Advisor Central" link, then the "ADDM" link. The resulting page allows the selection of a start and end snapshot, the creation of an ADDM task and the display of the resulting report by clicking on a few links.

Alternatively, an ADDM report can be generated from SQL*Plus using the addmrpt.sql script located in the \$ORACLE_HOME/rdbms/admin directory. When run, the script lists all available snapshots and prompts the user to enter the start and end snapshot along with the report name.

It is also possible to create and execute ADDM advisor tasks using the dbms_advisor package, as shown below.

```
BEGIN
  -- Create an ADDM task.
  DBMS_ADVISOR.create_task (
    advisor_name => 'ADDM',
    task_name    => '970_1032_AWR_SNAPSHOT',
    task_desc    => 'Advisor for snapshots 970 to 1032.');
```

```
  -- Set the start and end snapshots.
  DBMS_ADVISOR.set_task_parameter (
    task_name => '970_1032_AWR_SNAPSHOT',
    parameter => 'START_SNAPSHOT',
    value     => 970);

  DBMS_ADVISOR.set_task_parameter (
    task_name => '970_1032_AWR_SNAPSHOT',
    parameter => 'END_SNAPSHOT',
    value     => 1032);

  -- Execute the task.

  DBMS_ADVISOR.execute_task(task_name => '970_1032_AWR_SNAPSHOT');
END;
/

-- Display the report.

SET LONG 100000
SET PAGESIZE 50000
SELECT DBMS_ADVISOR.get_task_report('970_1032_AWR_SNAPSHOT') AS report
FROM   dual;
SET PAGESIZE 24
```



The value for the SET LONG command should be adjusted to allow the whole report to be displayed.

The following views can be used to display the ADDM output without using Enterprise Manager or the get_task_report function:

- **dba_hist_snapshot** - Lists all valid snapshots.
- **dba_advisor_tasks** - Basic information about existing tasks.
- **dba_advisor_log** - Status information about existing tasks.
- **dba_advisor_findings** - Findings identified for an existing task.
- **dba_advisor_recommendations** - Recommendations for the problems identified by an existing task.

The next section will explain how Enterprise Manager relates to the previous sections.

Using Oracle Enterprise Manager

Over the last few versions of the database, Oracle has pushed Oracle Enterprise Manager (OEM) as the main administration tool for the database. Depending on the version used, it provides either a Java GUI or HTML browser-based console that allows simplified access to a number of the features discussed above.

I do not dislike Enterprise Manager, but it does mask some detail of the underlying mechanisms. I prefer to understand the technology, rather than be shielded from it.

Rather than launch into a lengthy discussion of the features that are supported by each version of OEM, I will simply say that if you understand the material discussed above, using OEM to access the features will be simple and intuitive.

ADDM

ADDM, or the Automatic Database Diagnostic Monitor, works in conjunction with the Automatic Workload Repository, or AWR. The AWR stores performance statistics, and these statistics are then used for problem detection and self-tuning. Much like STATSPACK, which is essentially what it is but better, snapshots are taken at regular intervals.

After the performance data has been collected, ADDM analyzes it. AWR is the hunter-gatherer, and ADDM is the thinker. The built-in functionality includes automated tasks which run in maintenance windows. One well-known maintenance window is the Oracle after-hours GATHER_STATS_JOB. The name of the job is GATHER_STATS_JOB.

Referencing the Performance Tuning Guide, this job is “created automatically at database creation time and is managed by the Scheduler. The Scheduler runs this job when the maintenance window is opened. By default, the maintenance window opens every night from 10 P.M. to 6 A.M. and all day on weekends.”

The automated tasks infrastructure, known as AutoTask, schedules routine maintenance tasks. These tasks include steps needed to perform or update optimizer statistics gathering, the Automatic Segment Advisor, and the SQL Tuning Advisor. A list of common problems ADDM can detect include:

- CPU bottlenecks
- Poor connection management
- Excessive parsing
- Lock contention
- I/O capacity
- Undersizing of Oracle memory structures
- High load SQL statements
- High PL/SQL and Java time
- High checkpoint load and causes
- RAC-specific issues

Running an ADDM or AWR report (the difference in the names is analogous to how users blur the difference between database and instance at times) can be accomplished via Database Control click and point functionality or by manually running one or more SQL scripts located in \$ORACLE_HOME/rdbms/admin.

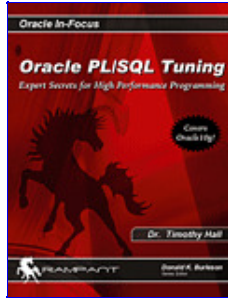
The Diagnostic Pack scripts, of which ADDM falls under for licensing, can all be run as a command-line API. Many will prompt for input related to instance, dates, times, output format and snapshot coverage. The script file names and purposes are shown below. All scripts are .sql files.

Name	Purpose
awrrpt	Creates the main AWR report, based on STATSPACK
awrrpti	Comparison between snapshots
addmrpt	Runs ADDM analysis on pair of AWR snapshots
addmrpti	Same as above, but used for RAC instances
ashrpt	Runs the Active Session History report, calls ashrpti
ashrpti	Worker script that supports ashrpt
awrddrpt	Runs Workload Respository Compare Periods report
awrddrpi	Worker script that supports awrddrpt
awrsqrpt	Runs Workload for a particular SQL statement
awrsqrpi	Worker script that supports awrsqrpt
awrextr	Extracts AWR info, for use with/by Oracle Support
awrload	Loads AWR data, for use with/by Oracle Support
awrinfo	Outputs general AWR info
spawrrac	Server Performance RAC report

Table 8.2: *ADDM Scripts*

The pattern on the scripts is that a script ending in -rpt typically defaults to the current DBID and instance, collects information via prompts, and passes that input to its corresponding -rpi script. The -rpi scripts can be run directly, but one will have to sort out the required/expected parameters. Some of the scripts are for overall and some are for comparison between snapshots

or the repository. Many of the scripts also expect to be run as the SYS user.



This is an excerpt from the bestselling book "[Oracle PL/SQL Tuning: Expert Secrets for High Performance Programming](#)" by Dr. Tim Hall, Oracle ACE of the year, 2006.

You can buy the book for only \$23.95 (30%-off) when you buy directly from the publisher, and you also get instant access to the [code depot of PL/SQL tuning scripts](#):

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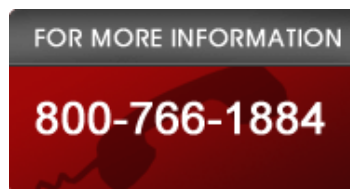
Burleson is the American Team



Note: This Oracle documentation was created as a support and Oracle training reference for use by our DBA performance tuning consulting professionals. Feel free to ask questions on our [Oracle forum](#).

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