ORACLE

Performance Fundamentals for Oracle Database 10g and 11g

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Oracle Corporation

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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.
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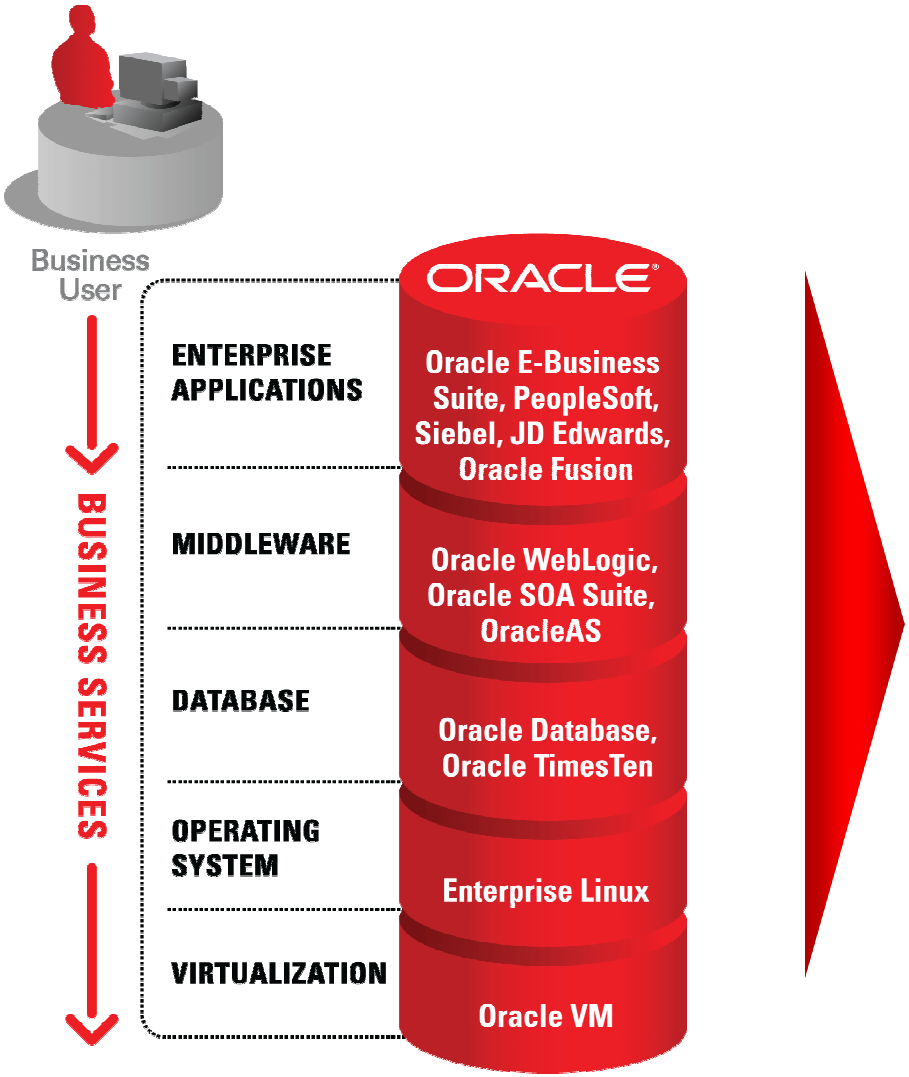
Oracle's Complete Enterprise Software Stack

Built-in & Integrated Manageability

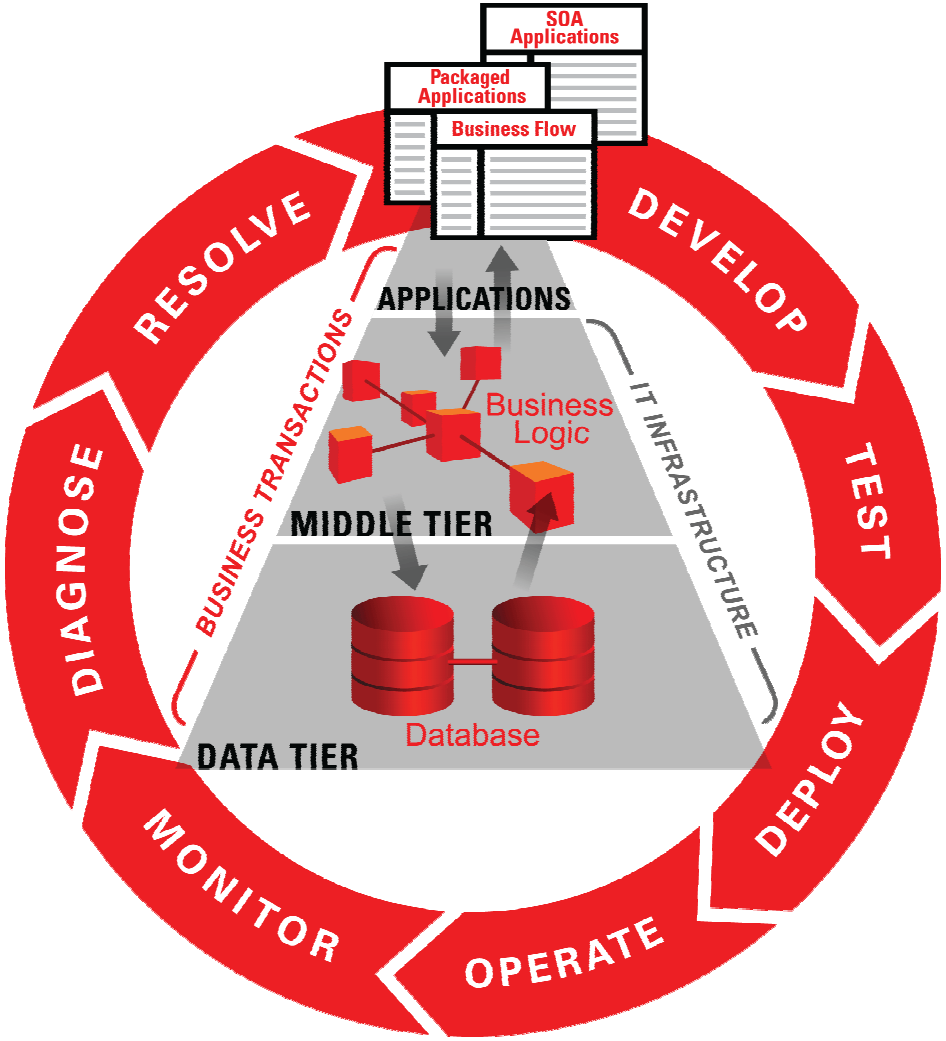


- Leader in the complete enterprise application stack
- Built-in manageability in every tier
- Integrated manageability across the entire stack

Oracle Enterprise Manager

Increases Business Efficiency

- **Manage applications top-down, from the business perspective** by understanding user experiences and business impact of IT issues
- **Manage entire application lifecycle to increase business agility** with comprehensive application quality management and compliance solutions
- **Reduce operational costs** through intelligent diagnostics and automated IT processes



Agenda

- Time
  - Database Time and Average Active Sessions
- Techniques
  - The DB Time Method
- Tools
  - ADDM
  - EM Performance User Interface
  - Reports

Oracle Tuning Methods: A History

- Prehistoric (v5)
  - Debug code
- Dark Ages (v6)
  - Counters/Ratios
  - BSTAT/ESTAT
  - SQL*Trace
- Renaissance (v7/v8)
  - Introduction of Wait Event instrumentation
  - Move from counters to timers
  - STATSPACK
- Modernity (v10)
  - DB Time Tuning – Tuning using fundamental notion of time spent in database
  - Multiple scoping levels
  - Always on, non-intrusive
  - Built into infrastructure: instrumentation, ASH, AWR, ADDM, EM

Why Do We Care About Time?

- Human time is critical to the enterprise
- Systems performance affects business goals
  - Human time + technology resource time
- “Time is money”
- Performance improvement means doing things faster

Performance is always and only about time

Database Time and Average Active Sessions

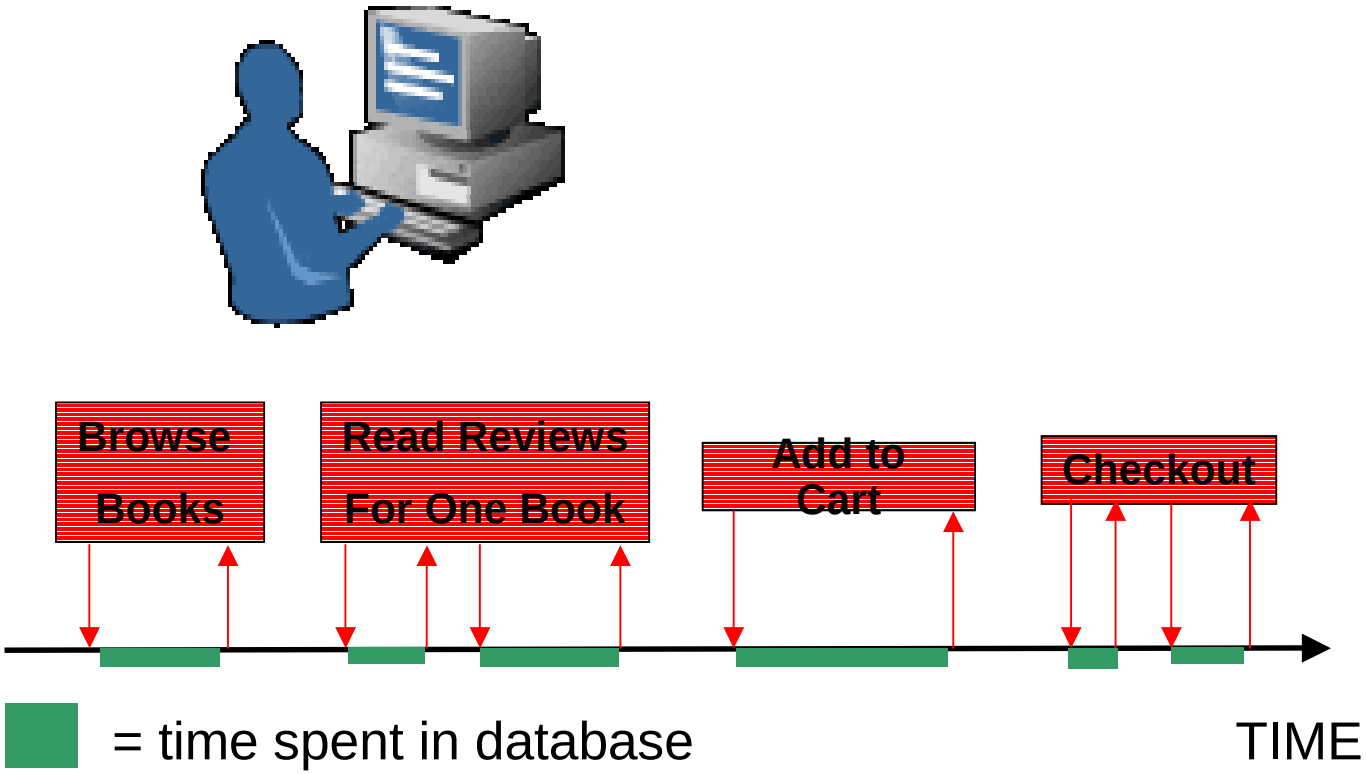
Database Time (DB Time)

- Total time in database calls by foreground sessions
- Includes CPU time, IO time and non-idle wait time
- DB Time <> response time
- New lingua franca for Oracle performance analysis

Database time is total time spent by user processes either actively working or actively waiting in a database call.

A Single Session

Single session with Database Black Box server

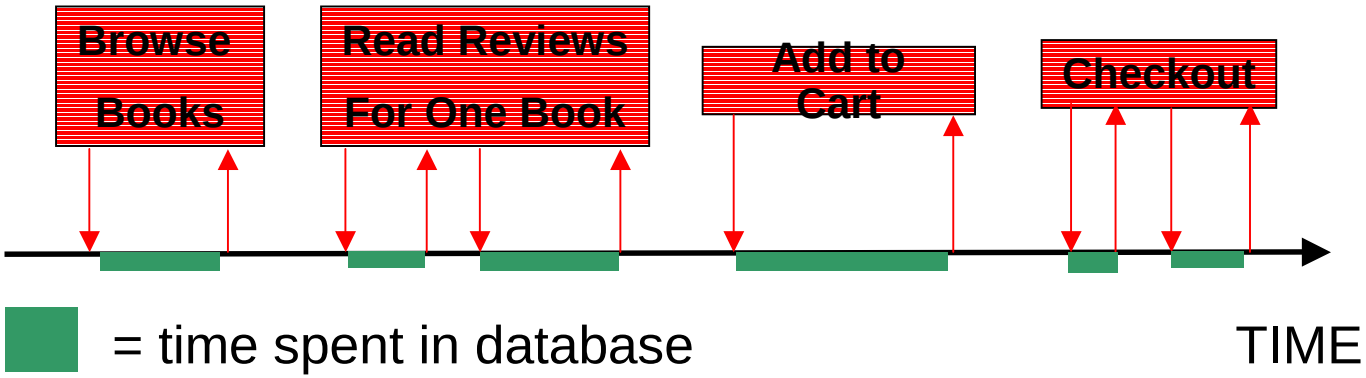


Fundamental Concepts

Database Time (DB Time) =
Total time session spent in all database calls

Active Session =
Session currently spending time in a database call

Average Activity of the Session (% Activity) =
The ratio of time active to total wall clock time



Oracle Enterprise Manager (GRAHAM.WOOD) - Session Details: 1869 (AFOTHERG) - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites

Address http://emi.oracle.com/em/console/database/instance/sessionDetails?SID=1869&serialNum=16111&pageNum=2&leftEdge=1193752570150&rightEdge=1193754370150&direction=&selectedE

ORACLE Enterprise Manager 10g
Grid Control

Setup Preferences Help Logout

Home | Targets | Deployments | Alerts | Compliance | Jobs | Reports

Hosts | Databases | Application Servers | Web Applications | Groups | All Targets | Collaboration Suites

Cluster: dbs232_crs > Cluster Database: BUGAP.US.ORACLE.COM > Top Sessions > Database Instance: BUG1AP_DBS232 > Top Activity > Logged in As JSARICOS

Session Details: 1869 (AFOTHERG)

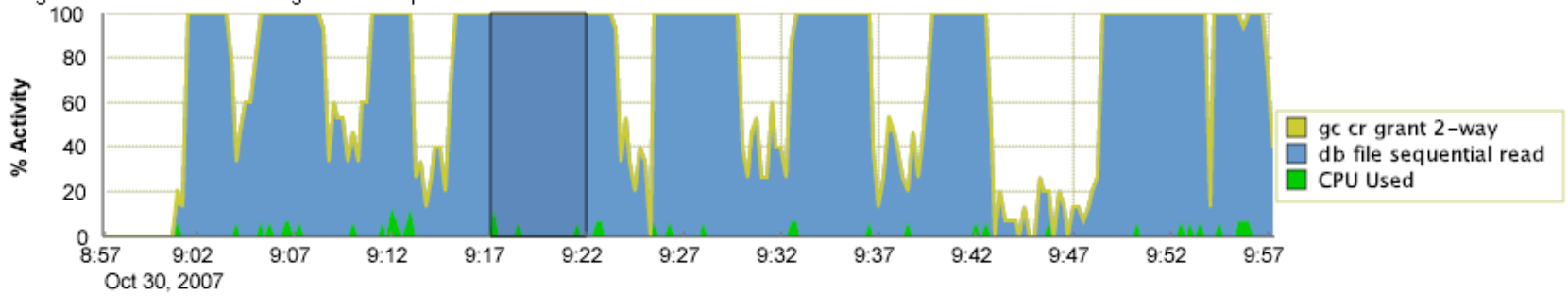
Collected From Target **Oct 30, 2007 9:49:37 AM CDT**

View Data Real Time: 15 Second Refresh Refresh

Kill Session Enable SQL Trace

General | Activity | Statistics | Open Cursors | Blocking Tree | Wait Event History

Drag the shaded box to change the time period for the detail section below.



Detail for Selected 5 Minute Interval

Start Time **Oct 30, 2007 9:17:05 AM** View Show Aggregated Data Run ASH Report

Activity (%)	SQL ID	SQL Command	Plan Hash Value	Module	Action	Client ID
100.00	gkmd7xwuz1na0	SELECT	64730335	oraclealan@ap103fam (TNS V1-V3)	AFOTHERG	

General | Activity | Statistics | Open Cursors | Blocking Tree | Wait Event History

Kill Session Enable SQL Trace

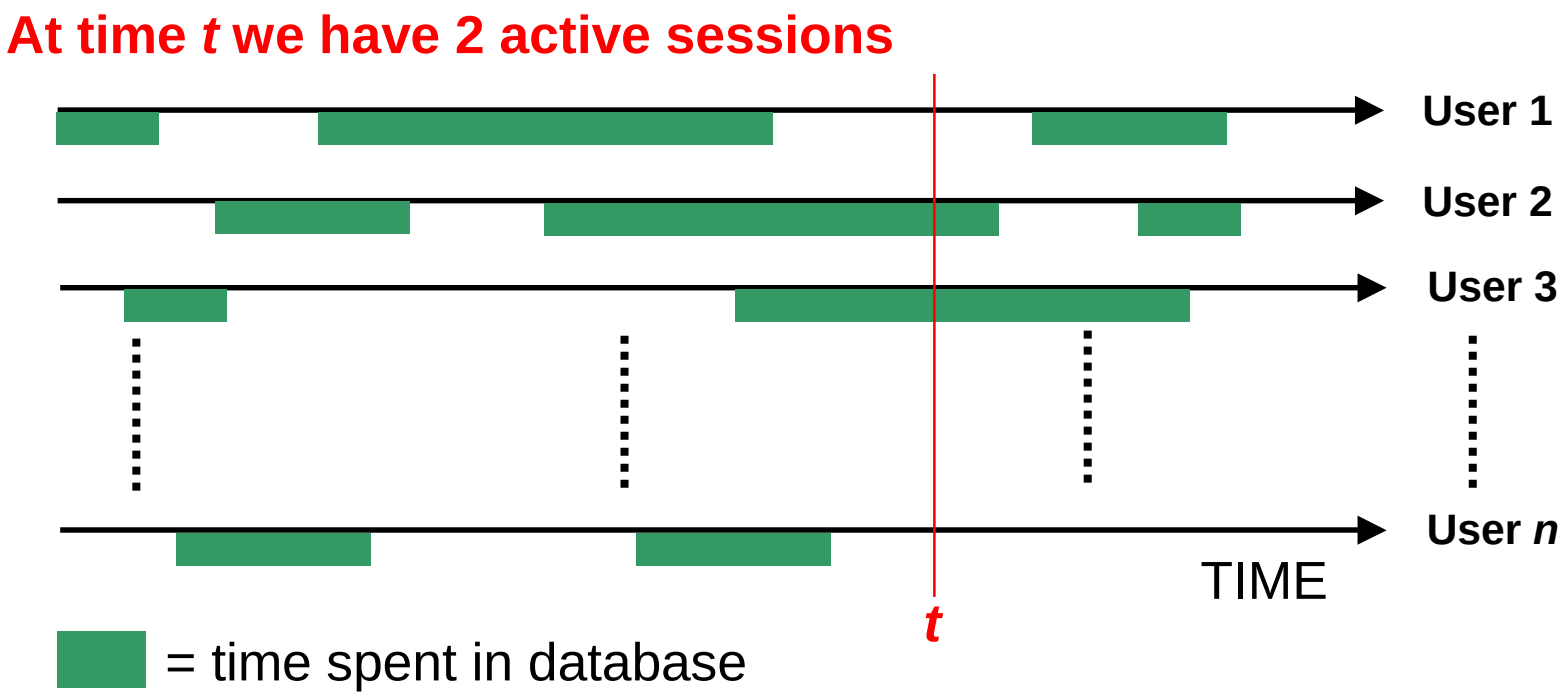
Home | Targets | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

About Oracle Enterprise Manager

Multiple Sessions

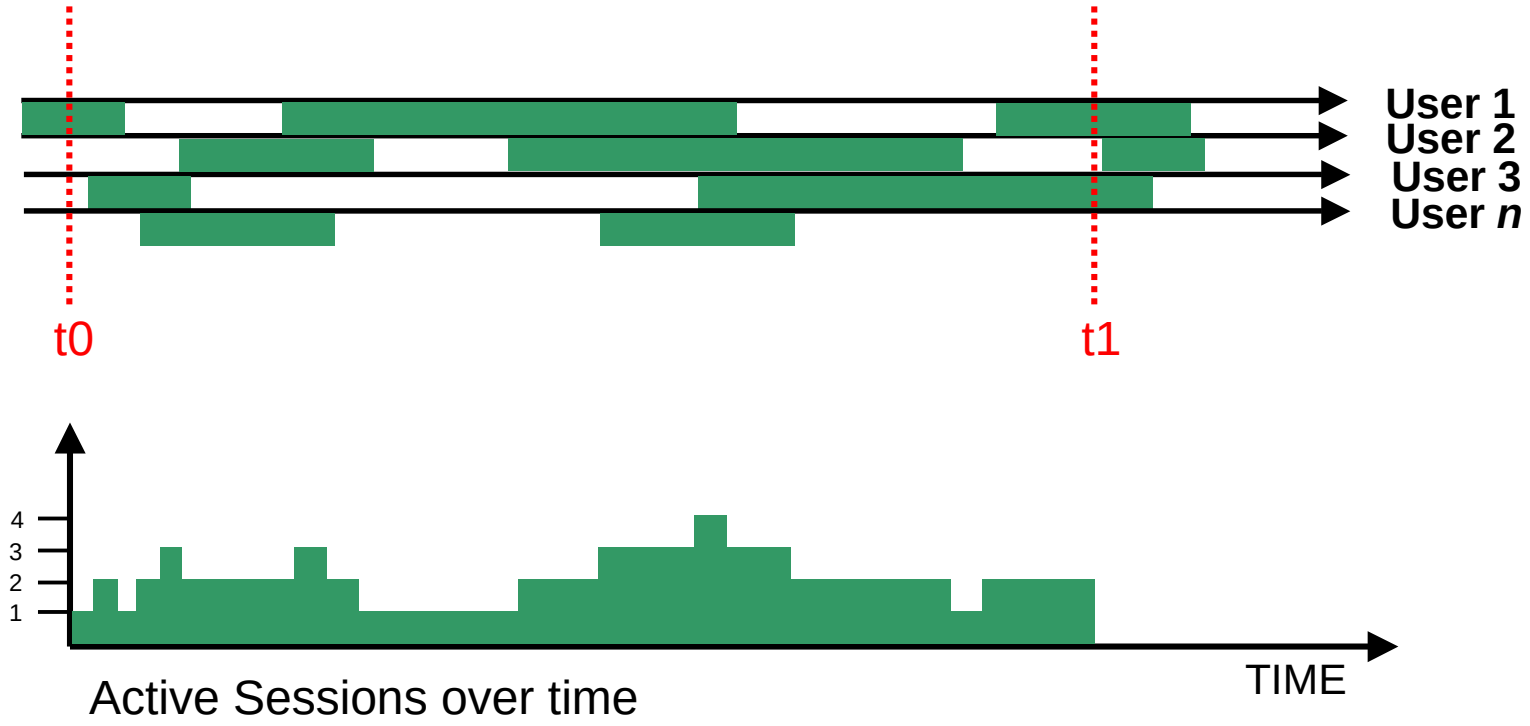
DB Time = Sum of DB Time Over All Sessions

Avg. Active Sessions = Sum of Avg. Activity Over All Sessions

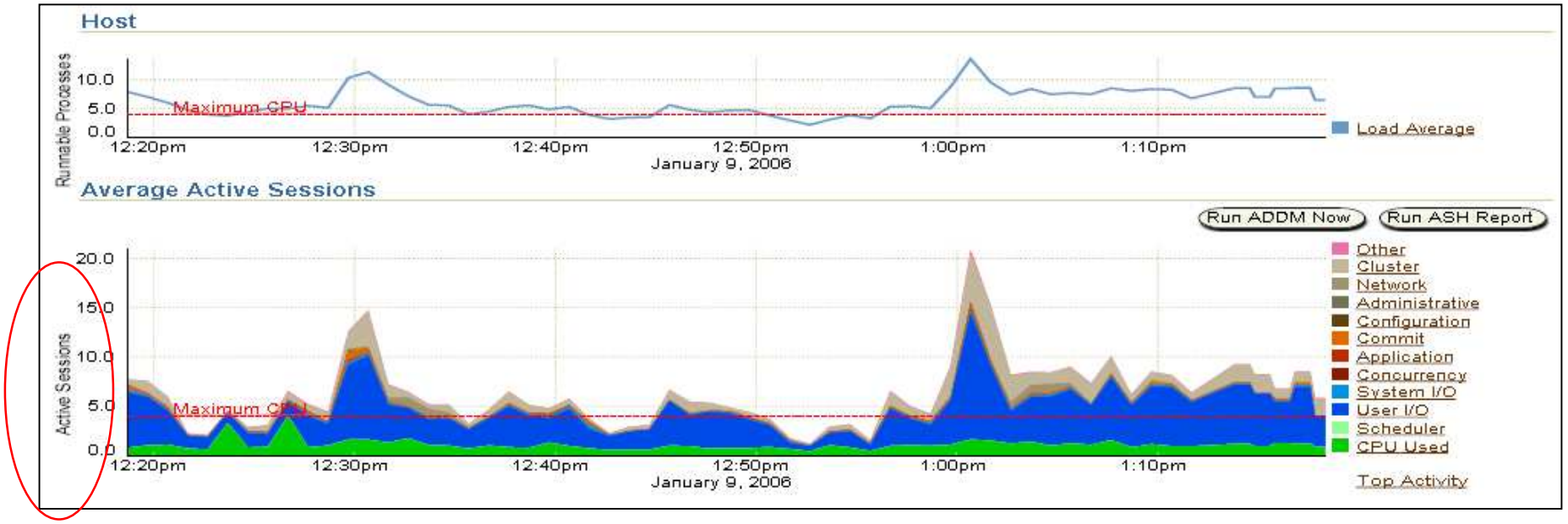


Visualizing DB Time

$$\text{Avg. Active Sessions} = \frac{\text{Total Database Time}}{\text{Wall Clock (Elapsed) Time}}$$



EM Performance Page



- Active Sessions by wait class over time
- Colored area = amount of DB time
- “Click on the big stuff”

DB Time and System Performance

System Load and DB Time

- More users
  - => More calls
    - => DB time increases
- Larger transactions
  - => Longer calls
    - => DB time increases

DB time increases as system load increases.

System Performance and DB Time

- IO performance degrades
  - => IO time increases
    - => DB time increases
- Application performance degrades
  - => Wait time increases
    - => DB time increases

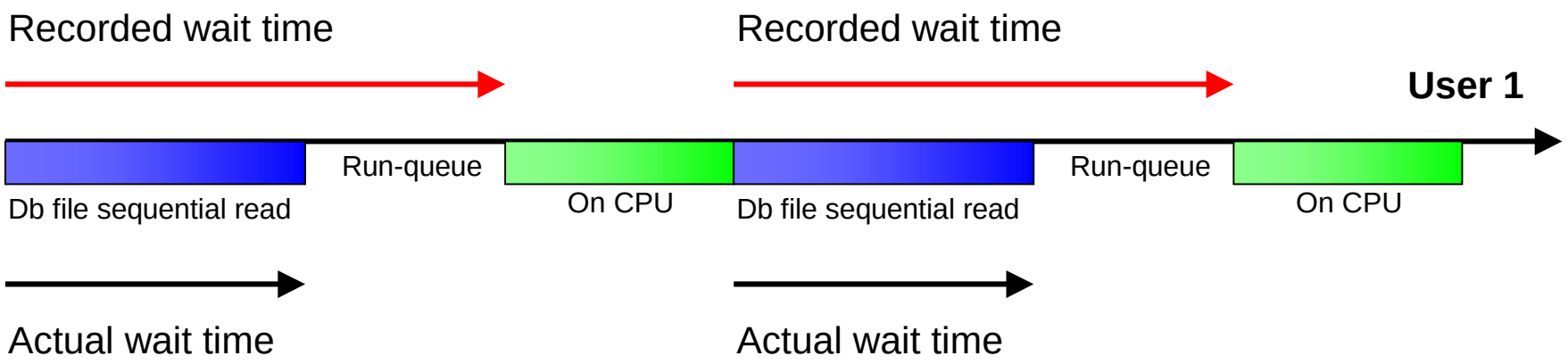
DB time increases when performance degrades.

Host Performance and DB Time

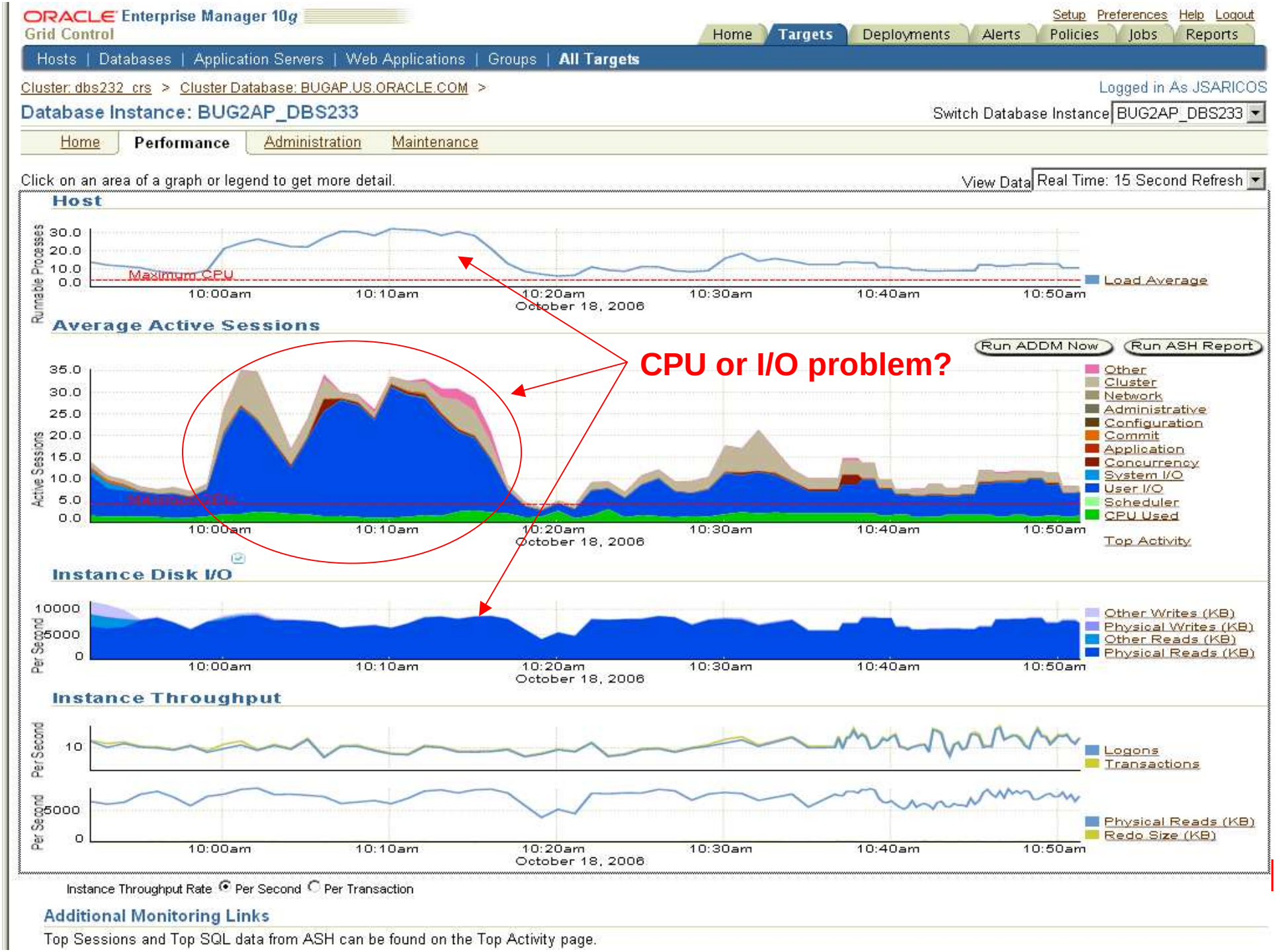
- Host is CPU-bound
  - => foregrounds accumulate active run-queue time
    - => wait event times are artificially inflated
      - => DB time increases

Tune for CPU before waits when CPU constrained

CPU Run-queue and DB Time



DB time is inflated when host is CPU-bound


ORACLE Enterprise Manager 10g
Grid Control
Setup Preferences Help Logout
Home Targets Deployments Alerts Policies Jobs Reports
Hosts | Databases | Application Servers | Web Applications | Groups | All Targets
Cluster: dbs232_crs > Cluster Database: BUGAP.US.ORACLE.COM >
Logged in As JSARICOS
Database Instance: BUG2AP_DBS233
Switch Database Instance BUG2AP_DBS233
Home Performance Administration Maintenance
Click on an area of a graph or legend to get more detail.
View Data Real Time: 15 Second Refresh
Host
Runnable Processes
30.0
20.0
10.0
0.0
Maximum CPU
10:00am
10:10am
10:20am
October 18, 2006
10:30am
10:40am
10:50am
Load Average
Average Active Sessions
Run ADDM Now
Run ASH Report
CPU or I/O problem?
Active Sessions
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Other
Cluster
Network
Administrative
Configuration
Commit
Application
Concurrency
System I/O
User I/O
Scheduler
CPU Used
Top Activity
Instance Disk I/O
Per Second
10000
5000
0
Other Writes (KB)
Physical Writes (KB)
Other Reads (KB)
Physical Reads (KB)
Instance Throughput
Per Second
10
Logons
Transactions
Per Second
5000
0
Physical Reads (KB)
Redo Size (KB)
Instance Throughput Rate Per Second Per Transaction
Additional Monitoring Links
Top Sessions and Top SQL data from ASH can be found on the Top Activity page.

Where to find DB Time?

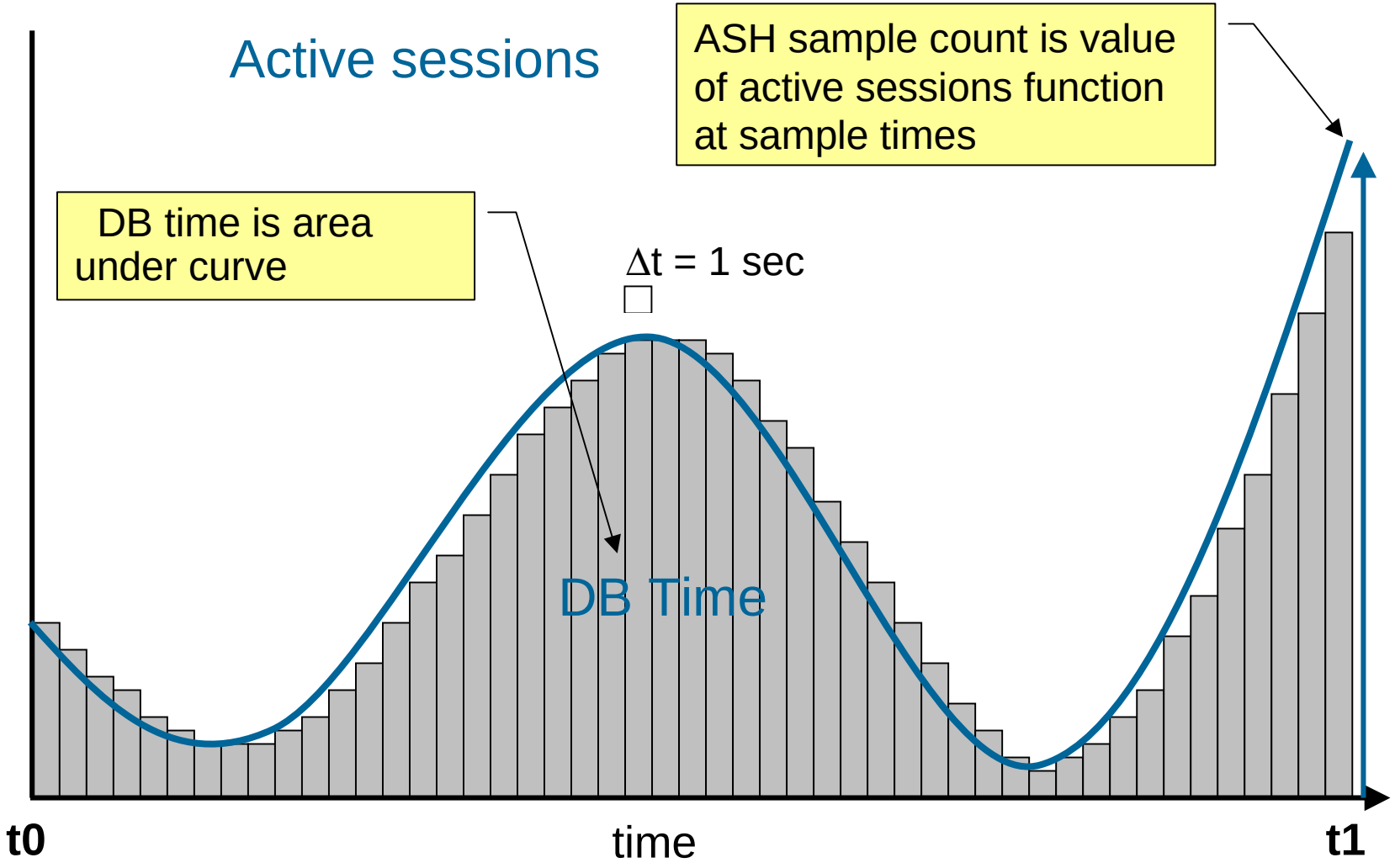
- VSYS_TIME_MODEL, VSESS_TIME_MODEL
  - STAT_NAME = ‘DB time’
- V$SYSMETRIC_HISTORY
  - “Database Time Per Second”, “CPU Usage Per Sec”
  - 10g units = centi-secs/sec (100xAvg. Active Sessions)
  - 11g new metric “Average Active Sessions”
- V$SQL
  - ELAPSED_TIME and CPU_TIME
  - Wait class times:
    APPLICATION, CONCURRENCY, CLUSTER, USER_IO
- V$ACTIVE_SESSION_HISTORY

Active Session History

Active Session History (ASH)

- All ‘Active’ sessions captured every second
  - Foregrounds and backgrounds are sampled
  - Active foregrounds contribute to DB Time
- In-memory: V$ACTIVE_SESSION_HISTORY
  - Sampling interval = 1 second
- On-disk: DBA_HIST_ACTIVE_SESS_HISTORY
  - Sampling interval = 10 second
- ASH is a system-wide record of database activity

Active Sessions and DB Time



Estimating DB Time with ASH

- ASH sample counts = DB Time in seconds
  - Low sample counts are less reliable
- Enables DB Time analysis over many dimensions
  - Sqlid, session id, instance, service, module, action
  - 10gR2
    - Blocking_sid (10gR2)
    - XID
  - 11g
    - Row source
    - Execution ID
    - Operation type
      - Connect
      - Java/SQL/PLSQL
      - parse, bind, execute/fetch, close

Example: DB Time by SQL ID

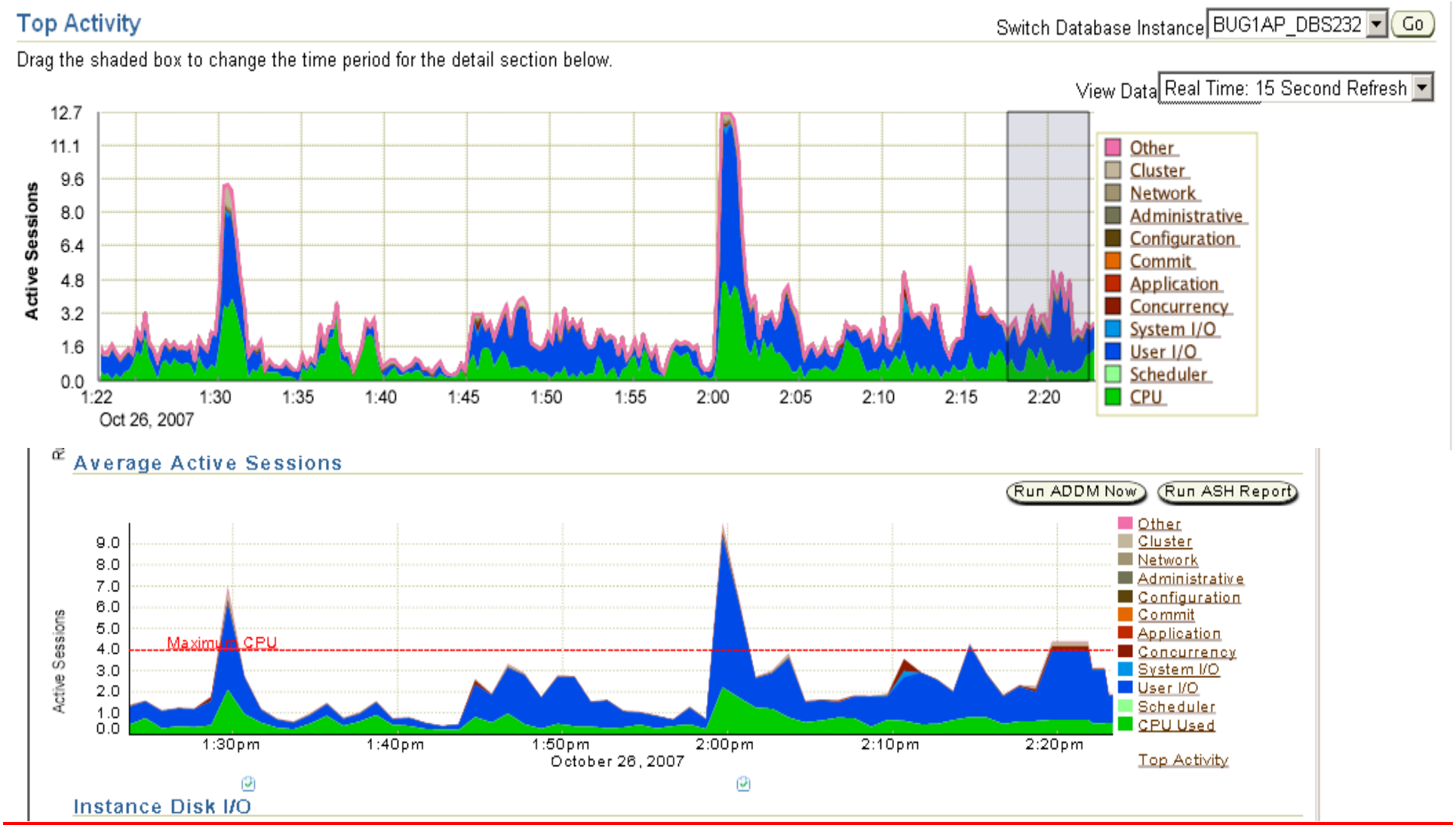
```
select sql_id
     , count(*) DBTime
     , round(count(*)*100/sum(count(*))
                                over (), 2) pctload
  from v$active_session_history
 where sample_time > sysdate - 1/24/60
   and session_type <> 'BACKGROUND‘
 group by sql_id
 order by count(*) desc;
```

Example: DB Time by SQL ID

```
select sql_id
     , count(*) DBTime
     , round(count(*)*100/sum(count(*))
                                over (), 2) pctload
  from v$active_session_history
 where sample_time > sysdate - 1/24/60
   and session_type <> 'BACKGROUND'
 group by sql_id
 order by count(*) desc;
```

SQL_ID	DBTIME	PCTLOAD
6bmxrabnwwsxd	60	63.83
azzsynmz43nrr	8	8.51
28pb73sbwhmm8	5	5.32
58psyvgau23s2	3	3.19
amrq8hk767tuz	2	2.13
2r5qhb3fb63vm	1	1.06
f3919usqp5wj2	1	1.06

DB Time: ASH vs Time Model



Where is DB Time used?

- ADDM
- EM Performance page and drill downs
- ASH report
- AWR and AWR compare periods reports
- SYSMETRICS and Server-generated Alerts

Techniques:

The DB Time Method

The DB Time Method: Short Course

or

just ask ADDM

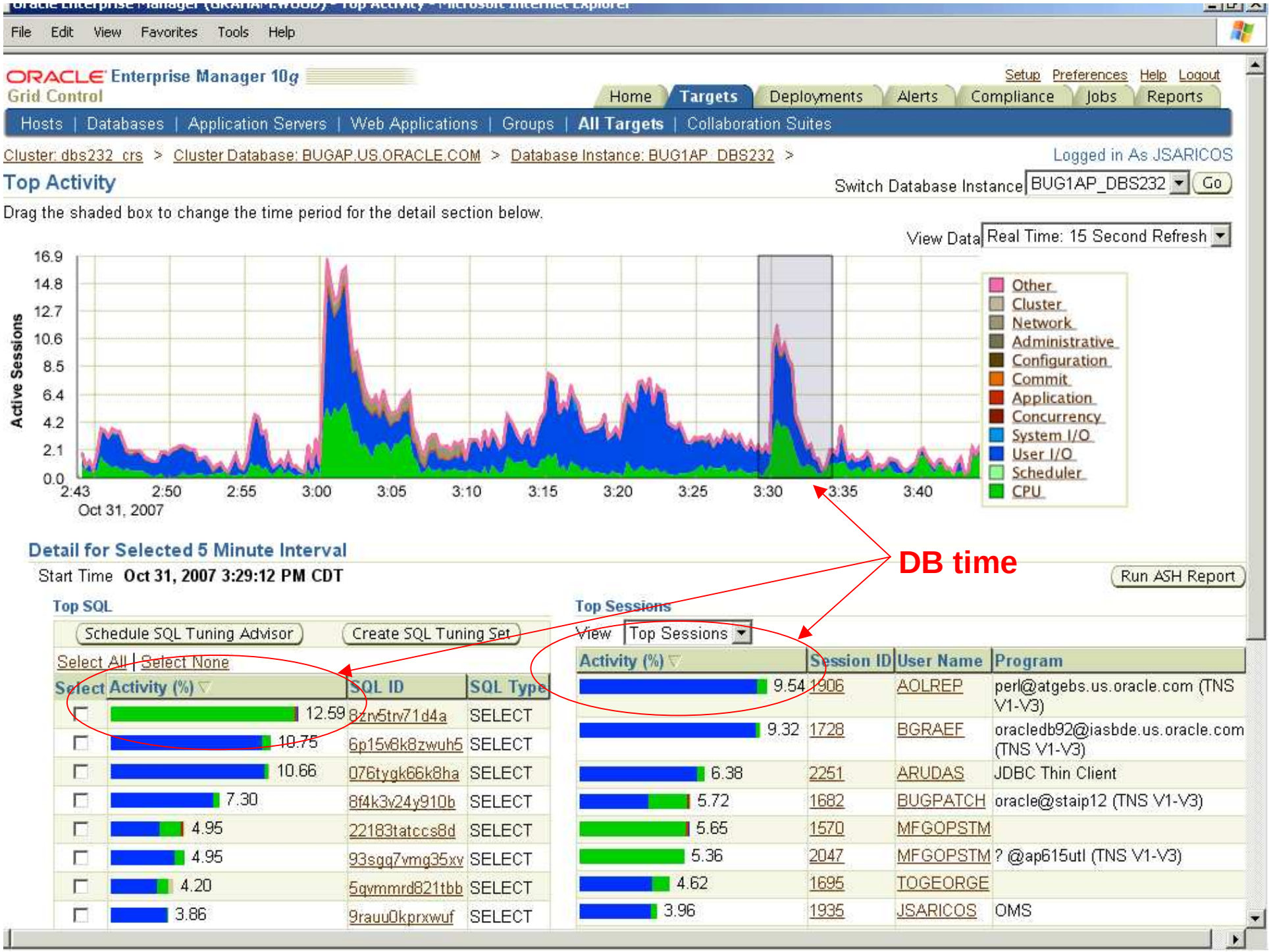
The DB Time Method: Process

1. Identify performance issue
2. Scope the issue
3. Set goals
4. Data capture (NO OP)
5. Investigate DB time distribution
   - Identify the largest potential for improvement
6. Modify system to tune for largest gain
7. Evaluate against goals
   - Repeat from step 4 if goals not met

Performance tuning by removing excess DB time

Investigate DB Time Distribution

- Identify uneven distributions of DB time (skew)
  - => Largest potential improvement within scope
- System scope:
  - Resource limits – is problem outside the DB?
- Application scope:
  - Service, module, action
  - Resource contention (e.g. latches)
  - SQLID, rowsource
- Session scope:
  - Long running SQL
  - Resource contention (e.g. enqueues)


File Edit View Favorites Tools Help
ORACLE Enterprise Manager 10g
Grid Control
Setup Preferences Help Logout
Home Targets Deployments Alerts Compliance Jobs Reports
Hosts | Databases | Application Servers | Web Applications | Groups | All Targets | Collaboration Suites
Cluster: dbs232_crs > Cluster Database: BUGAP.US.ORACLE.COM > Database Instance: BUG1AP_DBS232 >
Logged in As JSARICOS
Top Activity
Switch Database Instance BUG1AP_DBS232 Go
Drag the shaded box to change the time period for the detail section below.
View Data Real Time: 15 Second Refresh
Active Sessions
16.9
14.8
12.7
10.6
8.5
6.4
4.2
2.1
0.0
2:43 2:50 2:55 3:00 3:05 3:10 3:15 3:20 3:25 3:30 3:35 3:40
Oct 31, 2007
Other
Cluster
Network
Administrative
Configuration
Commit
Application
Concurrency
System I/O
User I/O
Scheduler
CPU
DB time
Detail for Selected 5 Minute Interval
Start Time Oct 31, 2007 3:29:12 PM CDT
Run ASH Report
Top SQL
Schedule SQL Tuning Advisor
Create SQL Tuning Set
Select All | Select None
Select Activity (%) SQL ID SQL Type
12.59 8zrv5trv71d4a SELECT
10.75 6p15v8k8zwuh5 SELECT
10.66 076tygk66k8ha SELECT
7.30 8f4k3v24y910b SELECT
4.95 22183tatccs8d SELECT
4.95 93sgq7vmg35xv SELECT
4.20 5qvmmrd821tbb SELECT
3.86 9rauu0kprxwuf SELECT
Top Sessions
View Top Sessions
Activity (%) Session ID User Name Program
9.54 1906 AOLREP perl@atgebs.us.oracle.com (TNS V1-V3)
9.32 1728 BGRAEF oracledb92@iasbde.us.oracle.com (TNS V1-V3)
6.38 2251 ARUDAS JDBC Thin Client
5.72 1682 BUGPATCH oracle@staip12 (TNS V1-V3)
5.65 1570 MFGOPSTM
5.36 2047 MFGOPSTM ? @ap615utl (TNS V1-V3)
4.62 1695 TOGEORGE
3.96 1935 JSARICOS OMS

Identify Potential Solutions

- Session contention issues
  - Kill session
  - Fix application
- SQL issues
  - SQL Tuning Advisor => Indexes, SQL profile
  - Re-write SQL
- Design issues
  - Access Advisor => Indexes, physical layout
- System issues
  - Initialization parameters
  - Add resources

Modify System

- Start with the largest DB time issues first
  - Address root causes, not symptoms
- Match solution scope to problem scope
  - Don’t tweak optimizer parameters before tuning SQL
- Proceed iteratively one fix at a time
  - Concurrent fixes should be orthogonal
- Measure and validate results at each successive step
- Stop when goals are met

The DB Time Method: Advantages

- Tunes the one thing that affects users: Time
- Data capture scoping not necessary
  - ‘Always on’ data collection
  - No requirement to reproduce problem
- Works for concurrency problems such as locking
- Combines best of current methods
  - Less intrusive, more inclusive

Method Summary

- DB time is the fundamental performance metric
- The method allows DB time analysis at many scopes
  - Proper scoping of problems and solutions is critical to success
- DB time based diagnosis removes value judgments
  - Scientific method, not sorcerer's magic
- Performance improvement means doing the same work in less DB Time

Tools:

- **ADDM**
- **Enterprise Manager**
- **Reports**

Tools for Applying DB Time Method

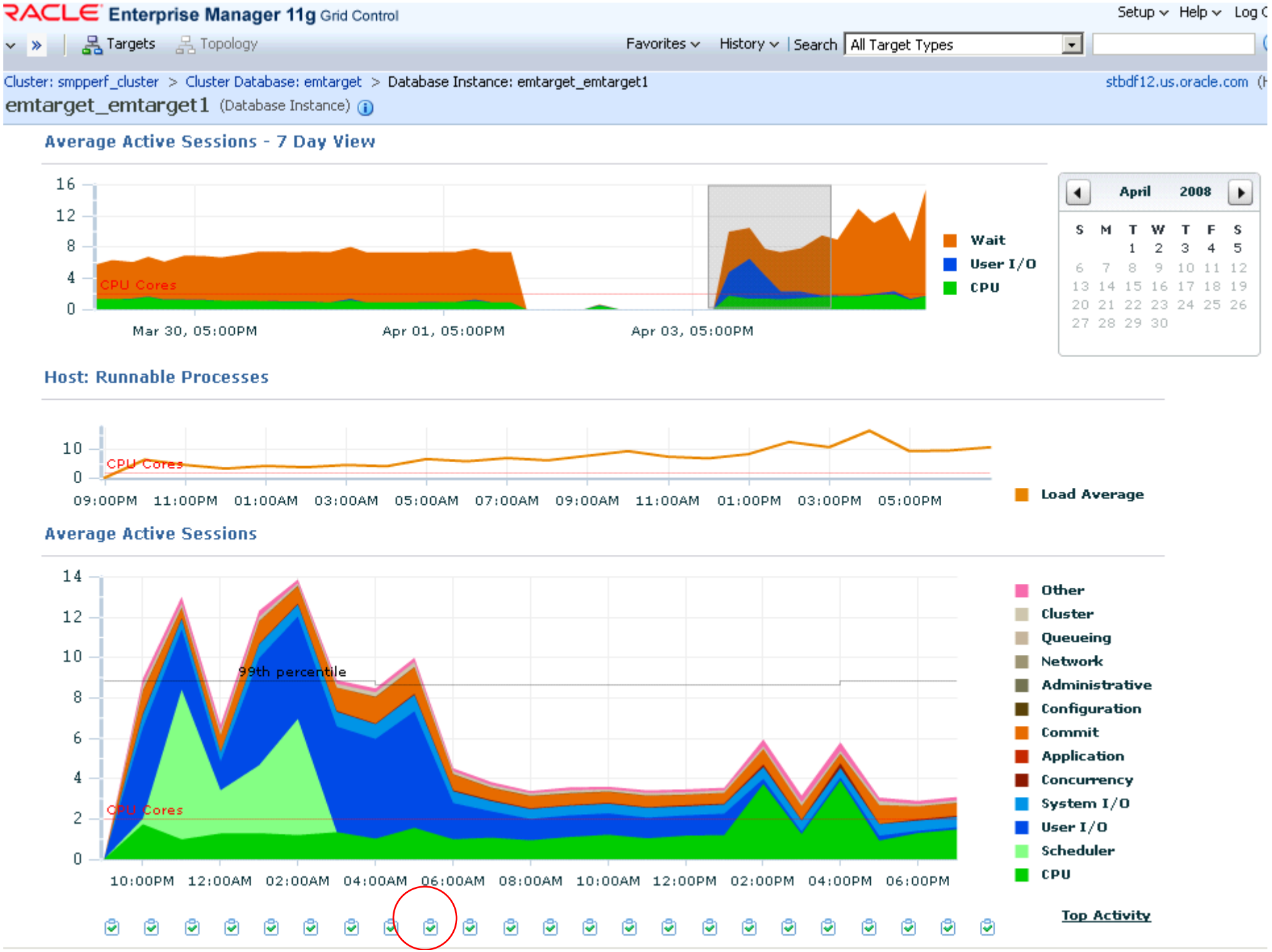
Two use-cases, one method:

1. Tuning steady-state performance
   - Improve overall workload throughput or response time
   - Best practice: use ADDM

2. Diagnosing transient performance problems
   - Confirm and investigate reported performance issues
   - Best practice: use EM real-time screens

Best Practice: Use ADDM

- Embedded expert system using the DB time method
  - Identifies root causes behind the symptoms
- Variably scoped:
  - Host to instance to SQL and even database block
  - Scoped to database for RAC (new in 11g)
- Findings prioritized by impact on DB time
  - Finding history allows flexible time scoping
  - Directives can filter findings
- Recommendations by benefit (reduction) to DB time


RACLE Enterprise Manager 11g Grid Control
Setup
Help
Log
Targets
Topology
Favorites
History
Search
All Target Types
Cluster: smpperf_cluster > Cluster Database: emtarget > Database Instance: emtarget_emtarget1
stbdf12.us.oracle.com
emtarget_emtarget1 (Database Instance)
Average Active Sessions - 7 Day View
16
12
8
4
0
CPU Cores
Mar 30, 05:00PM
Apr 01, 05:00PM
Apr 03, 05:00PM
Wait
User I/O
CPU
April
2008
S M T W T F S
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30
Host: Runnable Processes
10
0
CPU Cores
09:00PM 11:00PM 01:00AM 03:00AM 05:00AM 07:00AM 09:00AM 11:00AM 01:00PM 03:00PM 05:00PM
Load Average
Average Active Sessions
14
12
10
8
6
4
2
0
99th percentile
CPU Cores
10:00PM 12:00AM 02:00AM 04:00AM 06:00AM 08:00AM 10:00AM 12:00PM 02:00PM 04:00PM 06:00PM
Other
Cluster
Queueing
Network
Administrative
Configuration
Commit
Application
Concurrency
System I/O
User I/O
Scheduler
CPU
Top Activity

ORACLE Enterprise Manager 11g Grid Control

Setup | Help

Grid | Targets | Topology | Favorites | History | Search: All Target Types

... > Cluster Database: emtarget > Database Instance: emtarget_emtarget1 > Advisor Central > Automatic Database Diagnostic Monitor (ADDM) stbdf12.us.oracle.c

emtarget_emtarget1 (Database Instance)

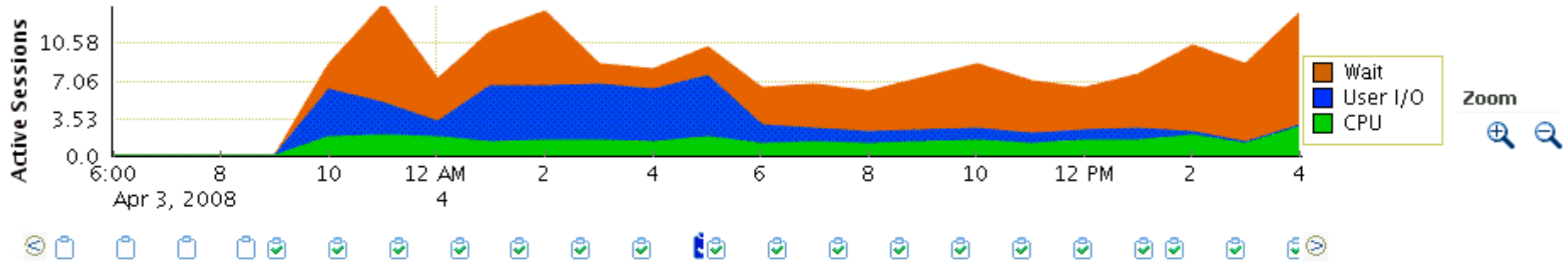
Automatic Database Diagnostic Monitor (ADDM)

Page Refreshed **Apr 5, 2008 2:17:40 PM PDT** Refre

Database Activity

Run ADDM | Finding History

The icon selected below the graph identifies the ADDM analysis period. Click on a different icon to select a different analysis period.



TIP For an explanation of the icons and symbols used in this page, see the Icon Key

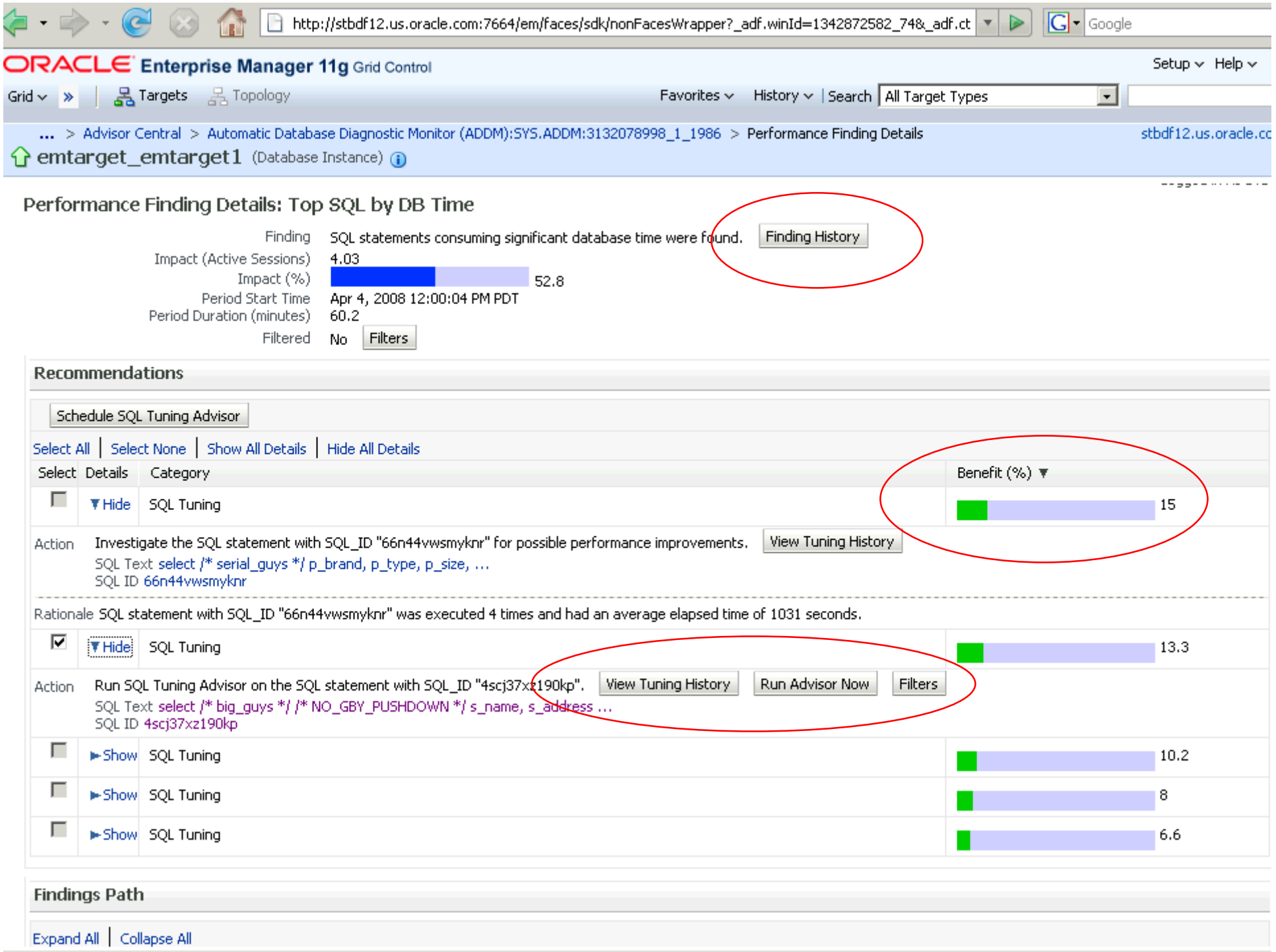
ADDM Performance Analysis

Task Name ADDM:3132078998_1_1978

Filters | View Snapshots | View Report

Task Owner	SYS	Average Active Sessions	10.2	Period Start Time	Apr 4, 2008 4:00:31 AM PDT	Period Duration (minutes)	60	Instance	emtarget_emtarget1	Global ADDM Task Name	ADDM:3132078998_1978

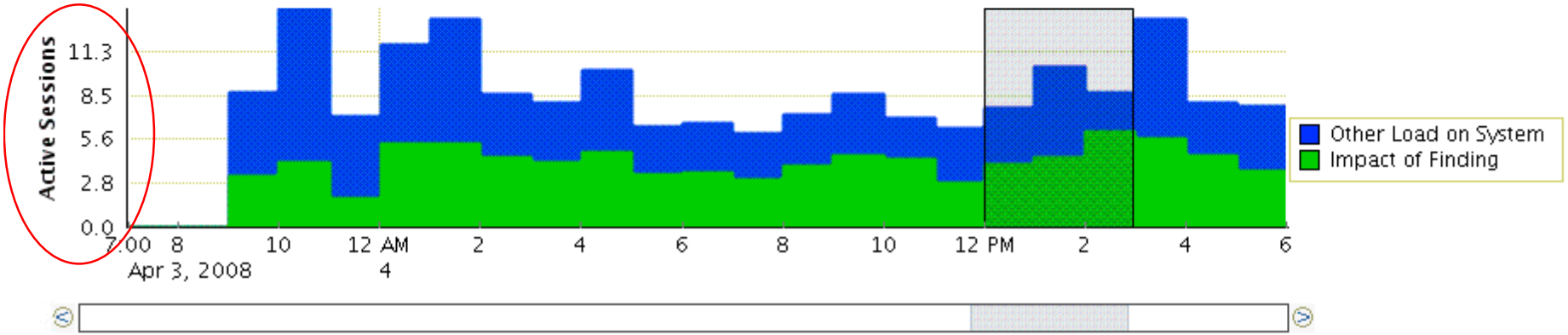
Impact (%) ▼	Finding	Occurrences (latest 24 hrs)
47.9	Top SQL by DB Time	24 of 24
39.5	Top SQL By I/O	0 of 24
36.3	Top Segments by I/O	1 of 24
12.9	Commits and Rollbacks	23 of 24
7.6	I/O Throughput	1 of 24
3.5	Undersized PGA	0 of 24


http://stbdf12.us.oracle.com:7664/em/faces/sdk/nonFacesWrapper?_adf.winId=1342872582_74&_adf.ct
Google
ORACLE Enterprise Manager 11g Grid Control
Setup
Help
Grid
Targets
Topology
Favorites
History
Search
All Target Types
... > Advisor Central > Automatic Database Diagnostic Monitor (ADDM):SYS.ADDM:3132078998_1_1986 > Performance Finding Details
stbdf12.us.oracle.co
emtarget_emtarget1 (Database Instance)
Performance Finding Details: Top SQL by DB Time
Finding
SQL statements consuming significant database time were found.
Finding History
Impact (Active Sessions)
4.03
Impact (%)
52.8
Period Start Time
Apr 4, 2008 12:00:04 PM PDT
Period Duration (minutes)
60.2
Filtered
No
Filters
Recommendations
Schedule SQL Tuning Advisor
Select All
Select None
Show All Details
Hide All Details
Select
Details
Category
Benefit (%)
Hide
SQL Tuning
15
Action
Investigate the SQL statement with SQL_ID "66n44vwsmyknr" for possible performance improvements.
View Tuning History
SQL Text select /* serial_guys */ p_brand, p_type, p_size, ...
SQL ID 66n44vwsmyknr
Rationale
SQL statement with SQL_ID "66n44vwsmyknr" was executed 4 times and had an average elapsed time of 1031 seconds.
Hide
SQL Tuning
13.3
Action
Run SQL Tuning Advisor on the SQL statement with SQL_ID "4scj37xz190kp".
View Tuning History
Run Advisor Now
Filters
SQL Text select /* big_guys */ /* NO_GBY_PUSHDOWN */ s_name, s_address ...
SQL ID 4scj37xz190kp
Show
SQL Tuning
10.2
Show
SQL Tuning
8
Show
SQL Tuning
6.6
Findings Path
Expand All
Collapse All

Finding History: Top SQL by DB Time

View Apr 3, 2008 Go Filters

Drag the shaded box to change the time period for the detail section below.



Detail for Selected 3 Hour Interval

Show All Details | Hide All Details

Details	Finding Details	Impact (Active Sessions)	Start Date
▶Show	ADDM:3132078998_1_1986	4.03	Apr 4, 2008 12:00:04 PM PDT
▶Show	ADDM:3132078998_1_1987	4.55	Apr 4, 2008 1:00:18 PM PDT
▼Hide	ADDM:3132078998_1_1988	6.24	Apr 4, 2008 2:00:45 PM PDT

Action Investigate the SQL statement with SQL_ID "2a6s3wn0nu91w" for possible performance improvements.
SQL Text select /* big_guys */ /* pq_distribute(supplier none partition) pq_map(supplie...
SQL ID 2a6s3wn0nu91w

Action Investigate the SQL statement with SQL_ID "1pzgsfba2jrm8" for possible performance improvements.
SQL Text select /* big_guys */ o_year, sum(case when nation='BRAZIL' then volume...
SQL ID 1pzgsfba2jrm8

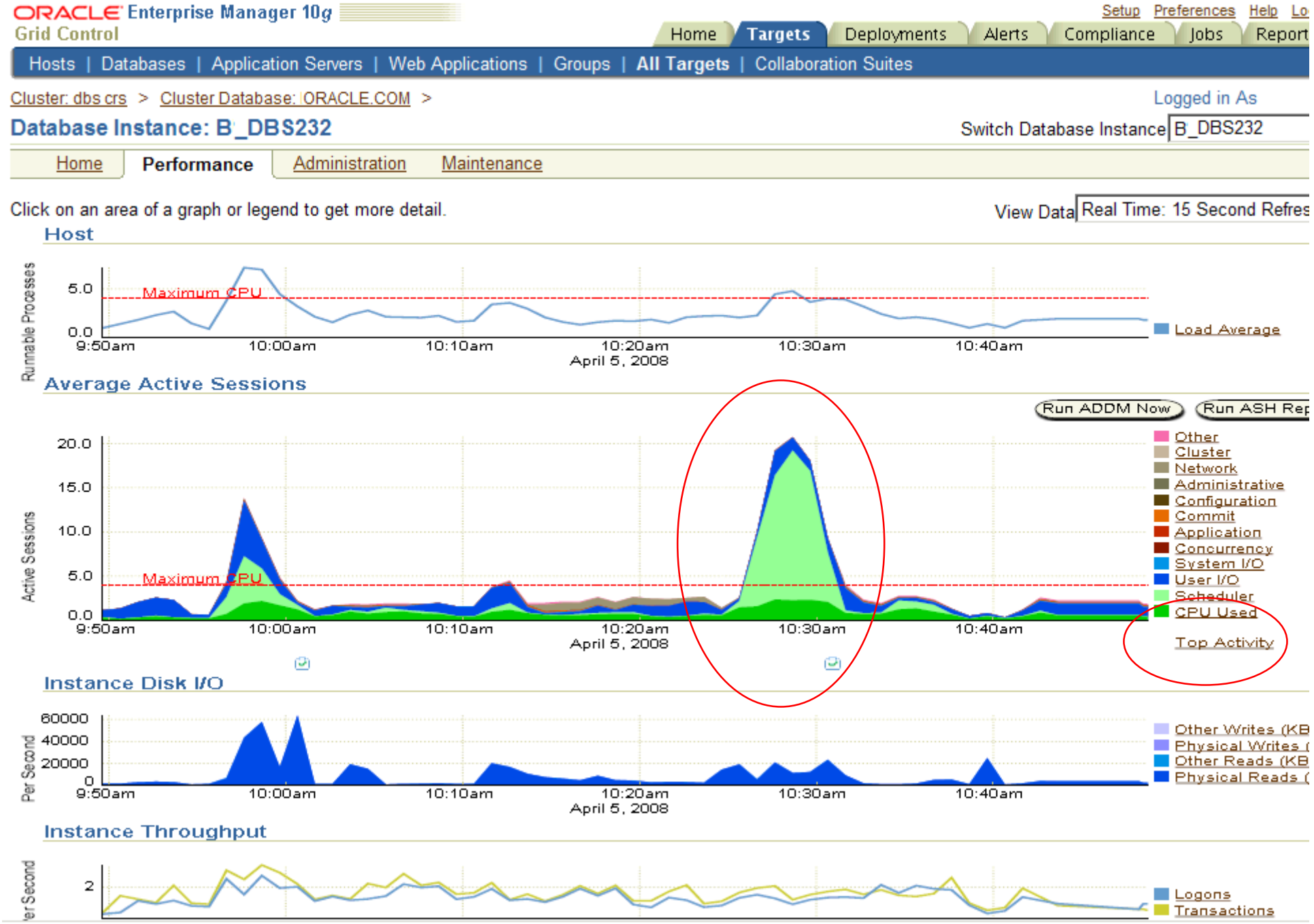
Action Investigate the SQL statement with SQL_ID "dt7umutdm8p67" for possible performance improvements.
SQL Text select /* big_guys */ supp_nation, cust_nation, year, ...
SQL ID dt7umutdm8p67

Action Investigate the SQL statement with SQL_ID "9sqv60uk9hjzw" for possible performance improvements.
SQL Text select /* big_guys */ o_orderpriority, count(*) as order_count from ...
SQL ID 9sqv60uk9hjzw

Action Investigate the SQL statement with SQL_ID "66n44vwsmyknr" for possible performance improvements.

Best Practice: EM Real-time Interface

- Transient (sub-hour) or immediate time scope
  - Requires interactivity of UI
- ‘Click on the big stuff’
  - Data visualizations display skew directly
- Takes some expertise to separate symptoms from root causes


ORACLE Enterprise Manager 10g
Grid Control
Setup Preferences Help Lo
Home Targets Deployments Alerts Compliance Jobs Report
Hosts | Databases | Application Servers | Web Applications | Groups | All Targets | Collaboration Suites
Cluster: dbs crs > Cluster Database: ORACLE.COM >
Logged in As
Database Instance: B_DBS232
Switch Database Instance B_DBS232
Home Performance Administration Maintenance
Click on an area of a graph or legend to get more detail.
View Data Real Time: 15 Second Refres
Host
Runnable Processes
5.0
0.0
Maximum CPU
9:50am 10:00am 10:10am 10:20am 10:30am 10:40am
April 5, 2008
Load Average
Average Active Sessions
Run ADDM Now
Run ASH Rep
Active Sessions
20.0
15.0
10.0
5.0
0.0
Maximum CPU
9:50am 10:00am 10:10am 10:20am 10:30am 10:40am
April 5, 2008
Other
Cluster
Network
Administrative
Configuration
Commit
Application
Concurrency
System I/O
User I/O
Scheduler
CPU Used
Top Activity
Instance Disk I/O
Per Second
60000
40000
20000
0
9:50am 10:00am 10:10am 10:20am 10:30am 10:40am
April 5, 2008
Other Writes (KB
Physical Writes (
Other Reads (KB
Physical Reads (
Instance Throughput
Per Second
2
Logons
Transactions

ORACLE Enterprise Manager 10g
Grid Control

Setup | Preferences | Help | L

Home | Targets | Deployments | Alerts | Compliance | Jobs | Repor

Hosts | Databases | Application Servers | Web Applications | Groups | All Targets | Collaboration Suites

Cluster: dbs:crs > Cluster Database: ORACLE.COM > Database Instance: B_DBS232 >

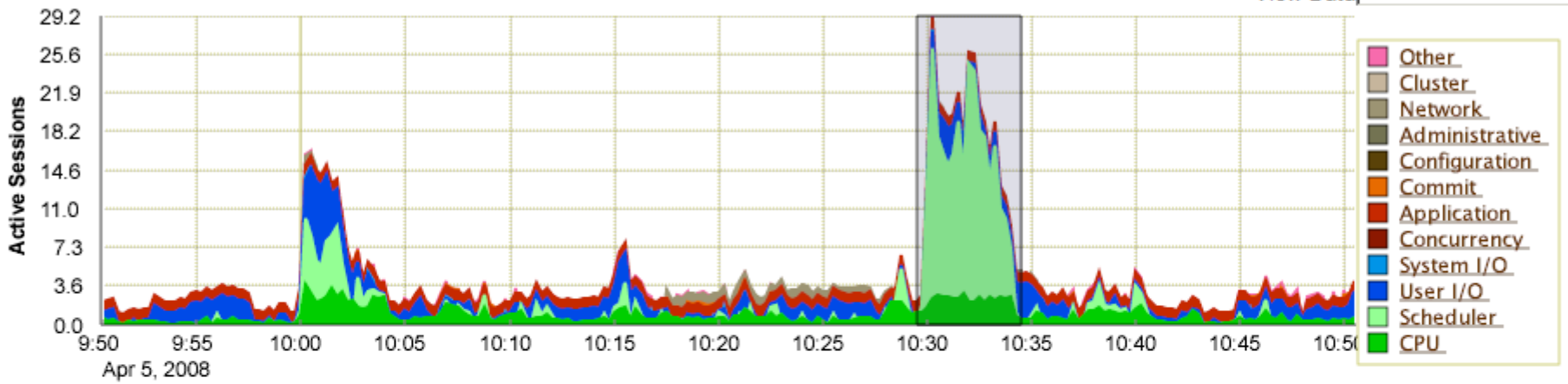
Logged in As

Top Activity

Switch Database Instance: B_DBS232

Drag the shaded box to change the time period for the detail section below.

View Data: Real Time: 15 Second Refre



Detail for Selected 5 Minute Interval

Start Time **Apr 5, 2008 10:29:32 AM CDT**

Run ASH Report

Top SQL

Schedule SQL Tuning Advisor | Create SQL Tuning Set

Select All | Select None

Select	Activity (%)	SQL ID	SQL Type
☐	12.10	bbxb6c4kmgmmq	SELECT
☐	7.19	b2yz2b9rvga7h	SELECT
☐	6.60	8zrv5trv71d4a	SELECT
☐	6.30	9c09ntcqunu1u	SELECT
☐	5.82	cn96qsdrrmaub	SELECT
☐	4.66	93sgq7vmg35xv	SELECT
☐	4.50	bxygj7qmvrfan	SELECT

Top Sessions

View: Top Sessions

Activity (%)	Session ID	User Name	Program
5.90	2170	NKANDALU	oracle@stddr46 (TNS V1-
5.29	1772	AOLREP	perl@atgebs.us.oracle.co (TNS V1-V3)
4.85	2023	MFGOPSTM	? @ap615utl (TNS V1-V3
4.66	2228	MOCONNEL	oracle@rmlnxie01 (TNS V V3)
4.62	1955	MOCONNEL	oracle@moconnel-lnx (TN V1-V3)
4.32	2203	MOCONNEL	oracle@moconnel-lnx (TN V1-V3)

ORACLE Enterprise Manager 10g
Grid Control

Setup | Preferences | Help | Lo

Home | Targets | Deployments | Alerts | Compliance | Jobs | Repor

Hosts | Databases | Application Servers | Web Applications | Groups | All Targets | Collaboration Suites

Cluster: dbs crs > Cluster Database: ORACLE.COM > Database Instance: B_DBS232 > Top Activity > Logged in As

SQL Details: bbxb6c4kmgmmq

Switch to SQL ID [ ] Go View Data [Real Time: Manual Refresh] Refresh | Schedule SQL Tuning Advisor

Text

```
SELECT /*+ OPAQUE_TRANSFORM */
"RPTNO","RPTDATE","RPTD_BY","VERSION","UTILITY_VERSION","CATEGORY","STATUS","SUBJECT","UPD_BY","CUSTOMEI
FROM "BG"."RPTHEAD"  "H" WHERE "RPTDATE">:1 AND "RPTD_BY"<>'BATCH'    AND "CUSTOMER" LIKE '%WPTG%' AND
```

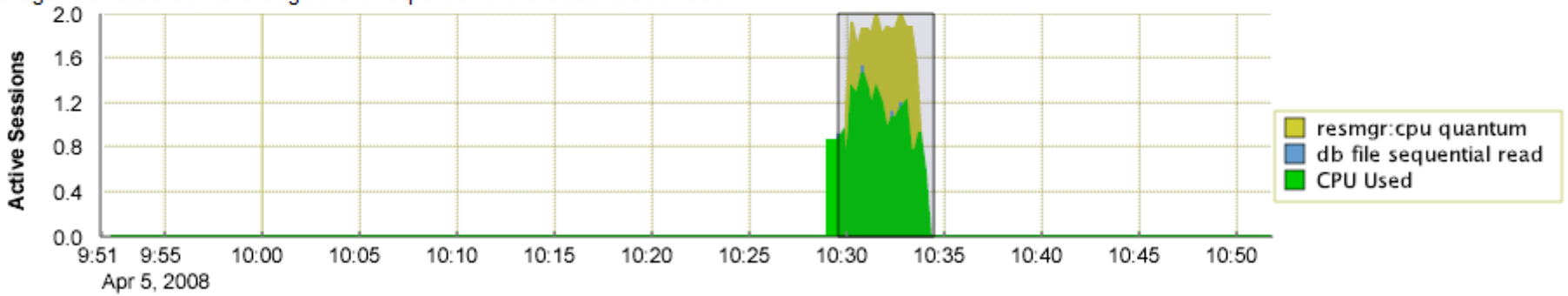
Details

Select the plan hash value to see the details below. Plan Hash Value [301316116]

Statistics | **Activity** | Plan | Tuning Information

Summary

Drag the shaded box to change the time period for the detail section below.



Detail for Selected 5 Minute Interval

Start Time **Apr 5, 2008 10:29:32 AM** Run ASH Report

Activity (%)	SID	User	Program	Service	Plan Hash Value
51.89	2228	MOCONNEL	oracle@rmlnxie01 (TNS V1-V3)	boracle.com	301316116
48.11	2203	MOCONNEL	oracle@moconnel-lnx (TNS V1-V3)	boracle.com	301316116

SQL Details: bbxb6c4kmgmmq

Switch to SQL ID [ ] Go View Data [Real Time: Manual Refresh] Refresh Schedule SQL Tuning Advi

Text

```
SELECT /*+ OPAQUE_TRANSFORM */
"RPTNO","RPTDATE","RPTD_BY","VERSION","UTILITY_VERSION","CATEGORY","STATUS","SUBJECT","UPD_BY","CUSTOMER
FROM "BG"."RPTHEAD"  "H" WHERE "RPTDATE">:1 AND "RPTD_BY"<>'BATCH'    AND "CUSTOMER" LIKE '%WPTG%' AND "
```

Details

Select the plan hash value to see the details below. Plan Hash Value [301316116]

Statistics | Activity | **Plan** | Tuning Information

Data Source **Cursor Cache** Capture Time **Apr 5, 2008 10:53:15 AM** Parsing Schema **MOCONNEL** Optimizer Mode **ALL_ROWS**

View ○ Graph ◉ Table

Expand All | Collapse All

Operation	Object	Object Type	Order	Rows	Size (KB)	Cost	Time (sec)	CPU Cost	
SELECT STATEMENT			12			71,662			
FILTER			11						
TABLE ACCESS BY INDEX ROWID	BG.RPTHEAD	TABLE	9	1	0.172	71,662	557	5,287,109,561	71
BITMAP CONVERSION TO ROWIDS			8						
BITMAP AND			7						
BITMAP CONVERSION FROM ROWIDS			3						
SORT ORDER BY			2						
INDEX RANGE SCAN	BG.I_RPTHEAD_PRODUCT_ID	INDEX	1			1,074	9	74,441,376	1
BITMAP CONVERSION FROM ROWIDS			6						
SORT ORDER BY			5						
INDEX RANGE SCAN	BG.I_RPTDATE	INDEX	4			4,205	33	311,071,176	4
INDEX RANGE SCAN	BG.BG_ACCESS_UNQ	INDEX (UNIQUE)	10	1	0.016	3	1	22,364	

Selected Additional Enterprise Manager Sessions

- Tuesday Sept 23
  - 11:30 a.m. *Advanced Performance Diagnostics: What the GUI Doesn't Tell You* Moscone West Rm 2003
  - 1:00 p.m. *Demystifying SQL Tuning: Tips and Techniques for SQL Experts* Moscone South Rm 303
  - 1:00 p.m. *Oracle Enterprise Manager Hands-on Lab: - Database Performance Diagnostics and Tuning* Marriott Golden Gate B3
- Wednesday Sept 24
  - 11:30 a.m. *Oracle Enterprise Manager Hands-on Lab: - Database Performance Diagnostics and Tuning* Marriott Golden Gate B3
  - 1:00 p.m. *SQL Tuning Roundtable with the Experts* Moscone West Rm 2001
- Thursday Sept 25
  - 1:30 p.m. *Proactive Performance Monitoring with Baselines and Adaptive Thresholds* Moscone South Rm 303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