ORACLE®

Back to Basics:
DB Time Performance Tuning: Theory and Practice

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Oracle America

ST Partners June, 2011

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Agenda

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

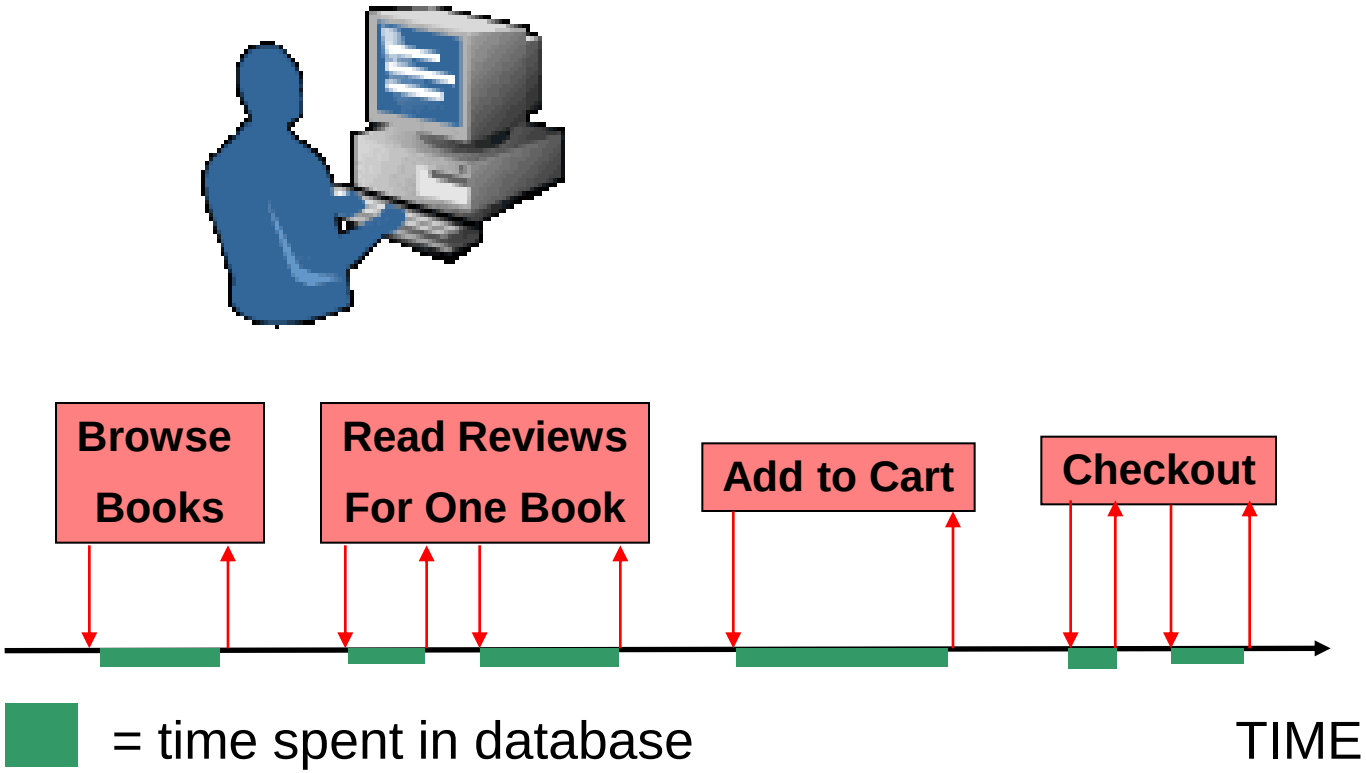
Database Time (DB Time)

- Total time in database calls by foreground sessions
- Includes CPU time, IO time and non-idle wait time
- DB Time <> response time
- Common currency 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

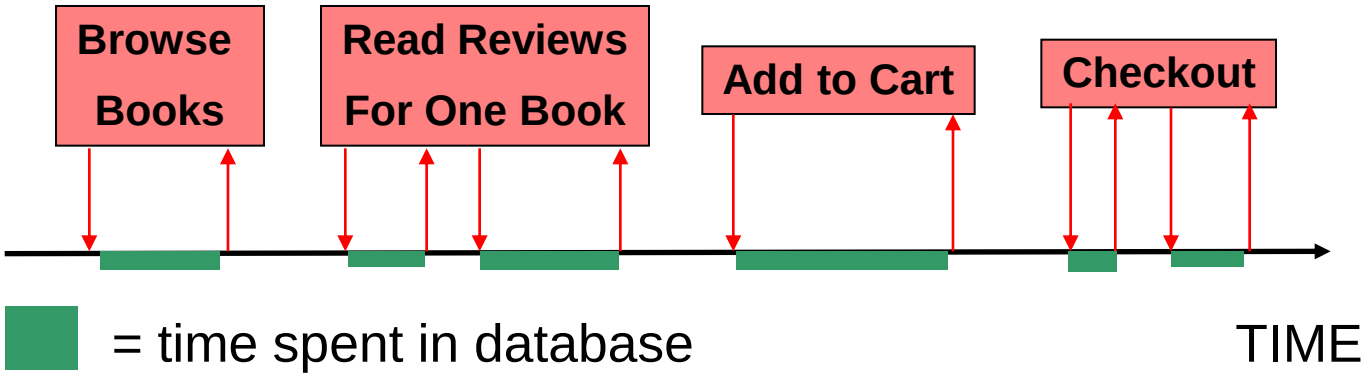


Fundamental Concepts

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



Session Details: 1869 (AFOTHERG)

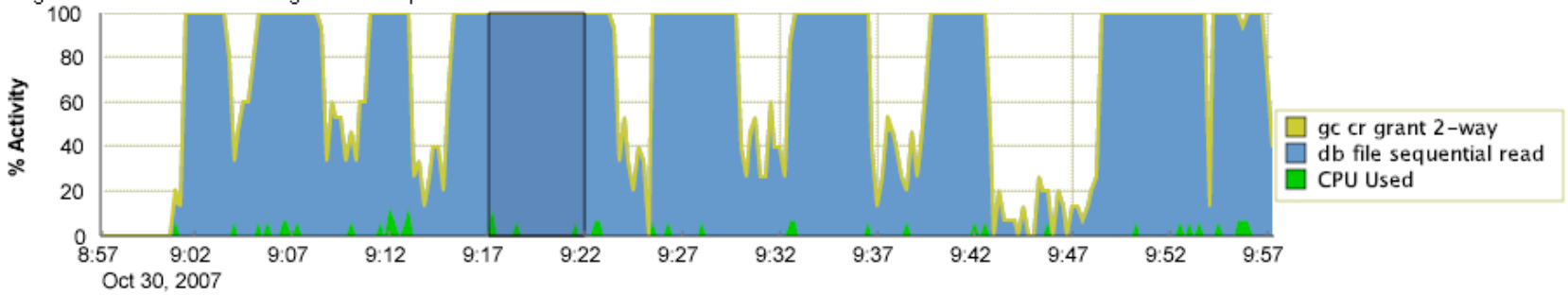
Collected From Target **Oct 30, 2007 9:49:37 AM CDT**

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	

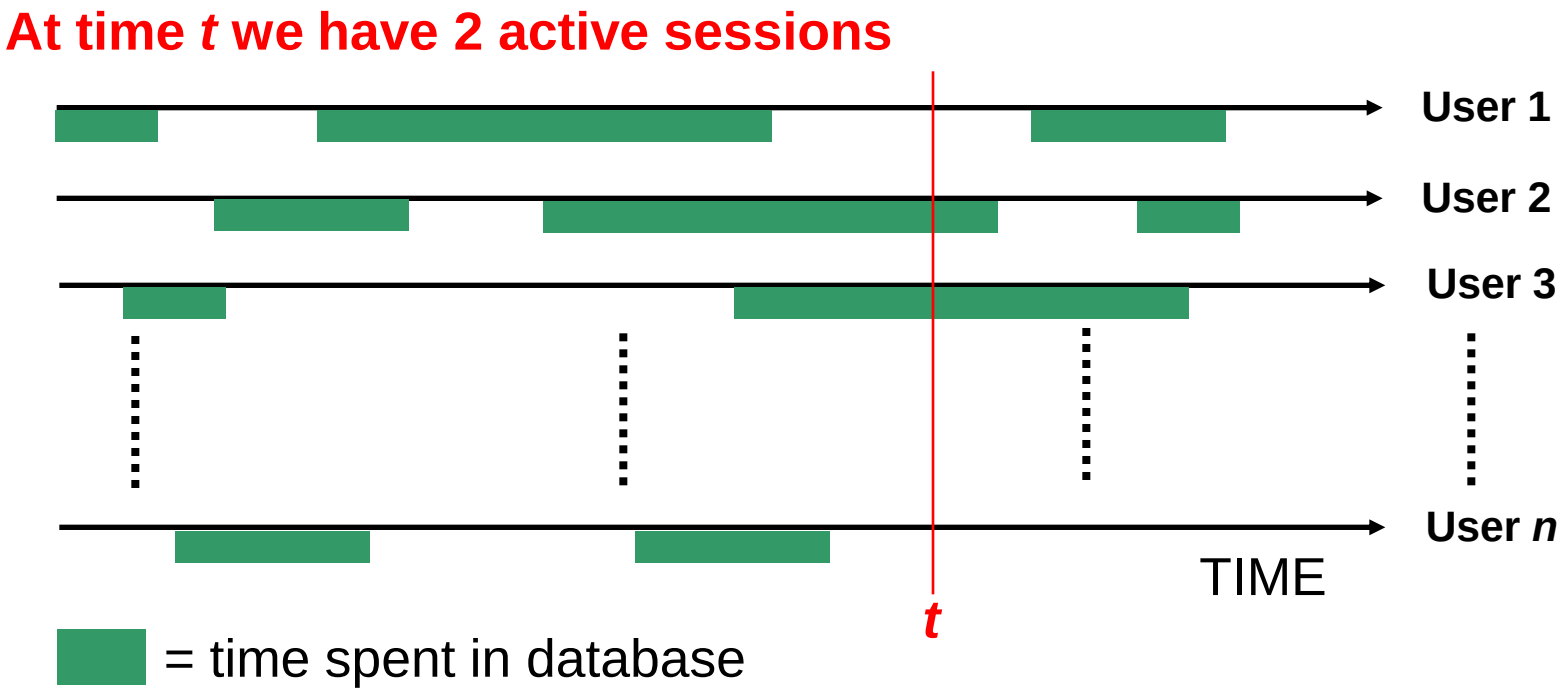
General | Activity | Statistics | Open Cursors | Blocking Tree | Wait Event History

Kill Session Enable SQL Trace

Multiple Sessions

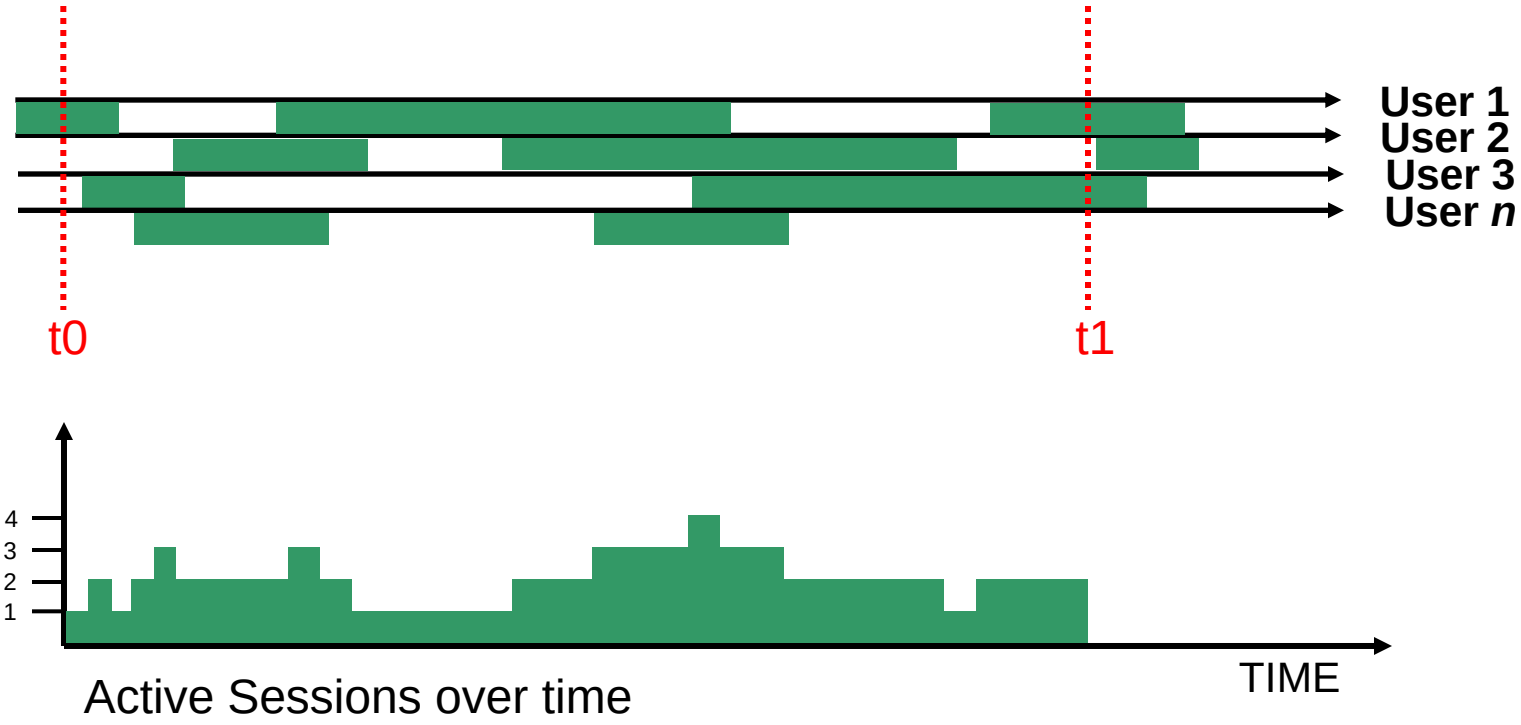
DB Time = Sum of DB Time Over All Sessions

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

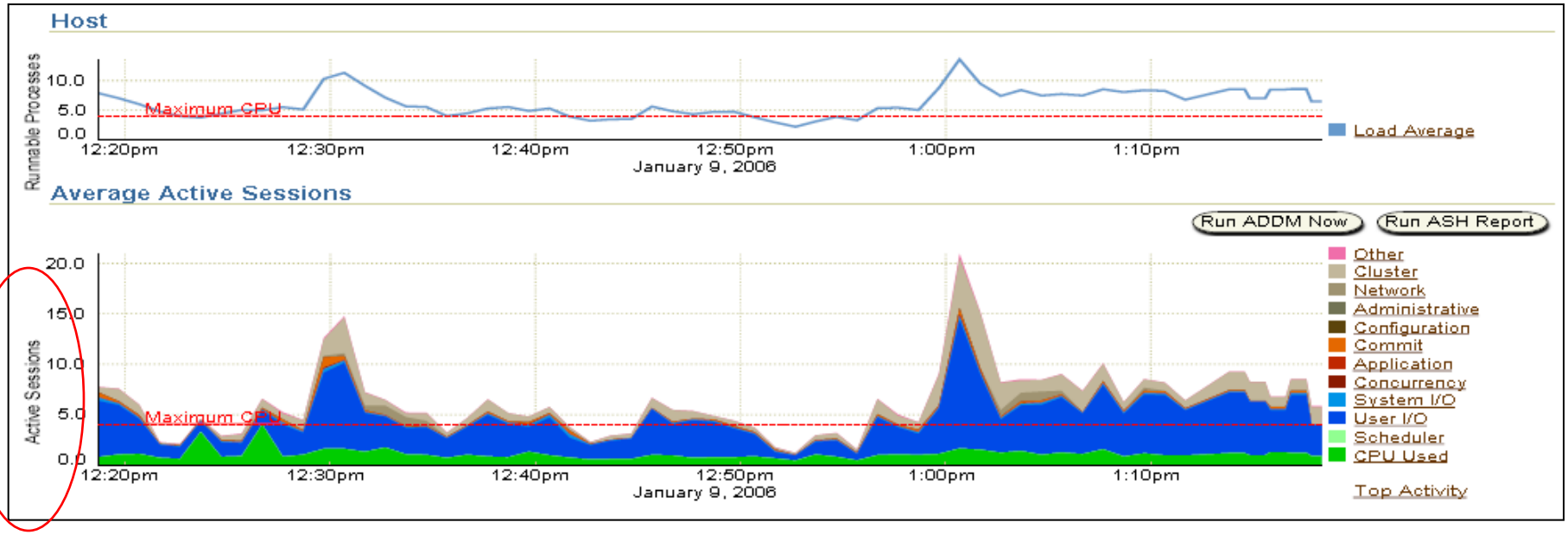


Visualizing DB Time

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



EM Performance Page



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

Average active sessions

= DB time / elapsed time

- Time-normalized DB time
- Time units in numerator and denominator must synchronize to produce the proper metric

Average Active Sessions

- Full-time equivalent sessions
  - Not whole sessions
  - How many full-time virtual sessions to do the work?
- Comparable
  - Across systems
  - Across time periods

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

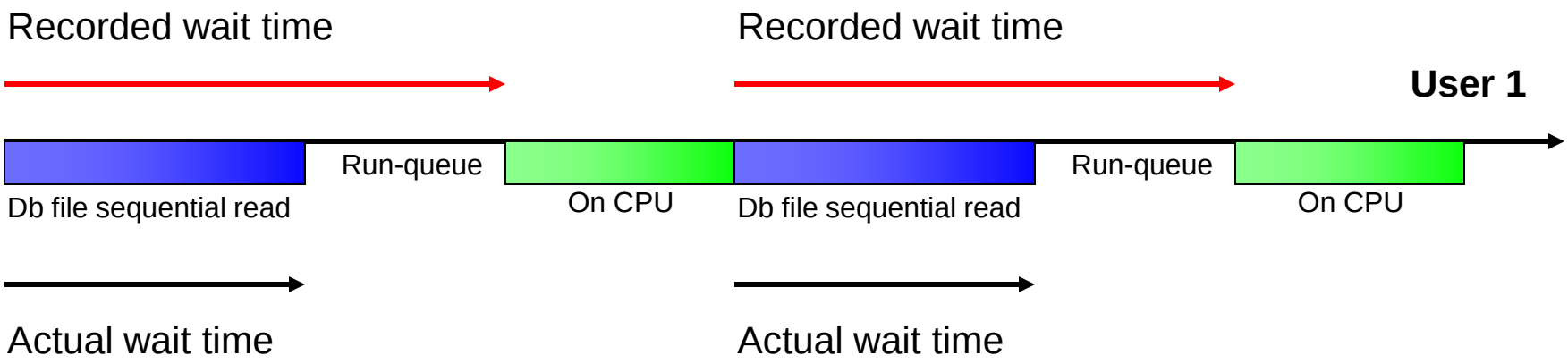
DB time increases when performance degrades.

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



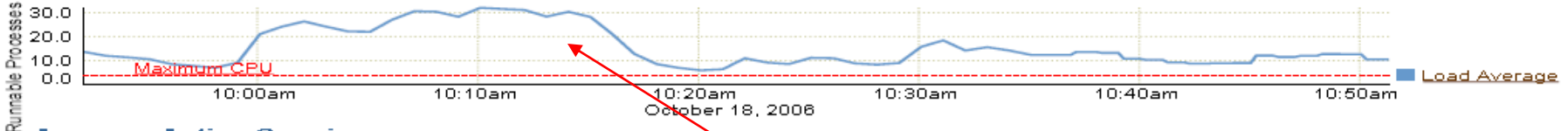
DB time is inflated when host is CPU-bound

Database Instance: BUG2AP_DBS233

Click on an area of a graph or legend to get more detail.

View Data: Real Time: 15 Second Refresh

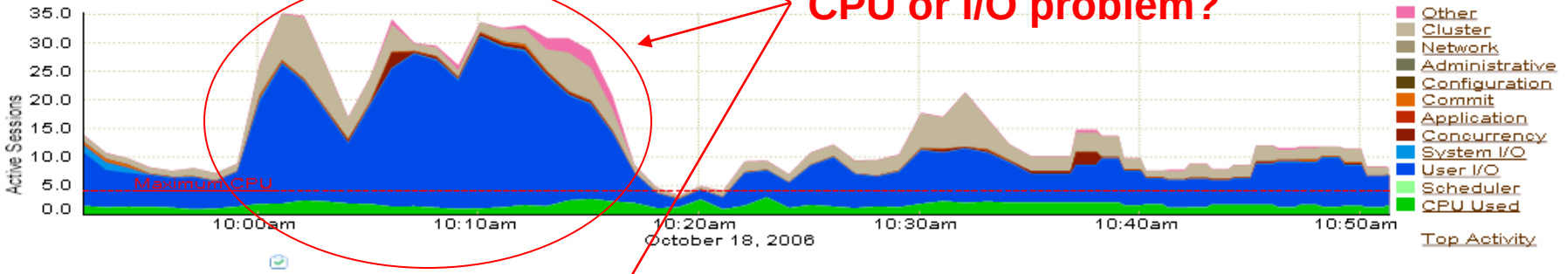
Host



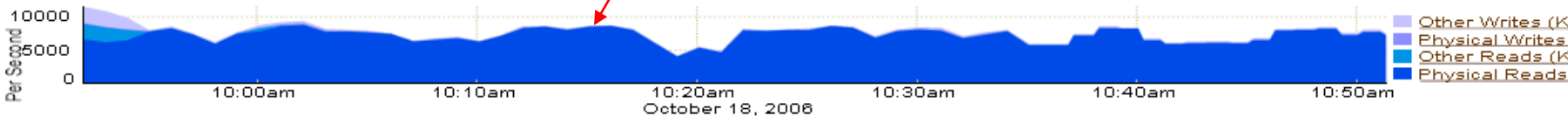
Average Active Sessions

Run ADDM Now | Run ASH Report

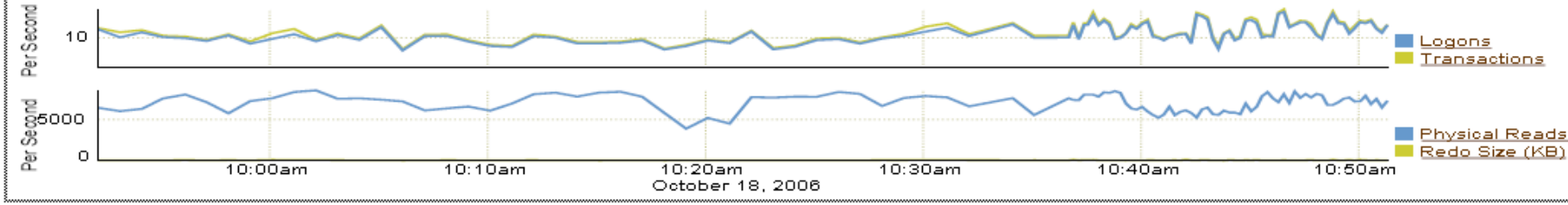
CPU or I/O problem?



Instance Disk I/O



Instance Throughput



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.

Instrumentation: 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

ASH Math

COUNT(*) = DB Time

GROUP BY ?

ASH Math: COUNT(*)=DB Time

- ASH is a big fact table
  - Each row represents 1-second of active session time
- V$ACTIVE_SESSION_HISTORY
  - COUNT(*) = DB time in seconds
- DBA_HIST_ACTIVE_SESS_HISTORY
  - COUNT(*) * 10 = DB time in seconds

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(*))
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  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

The calculus of DB time

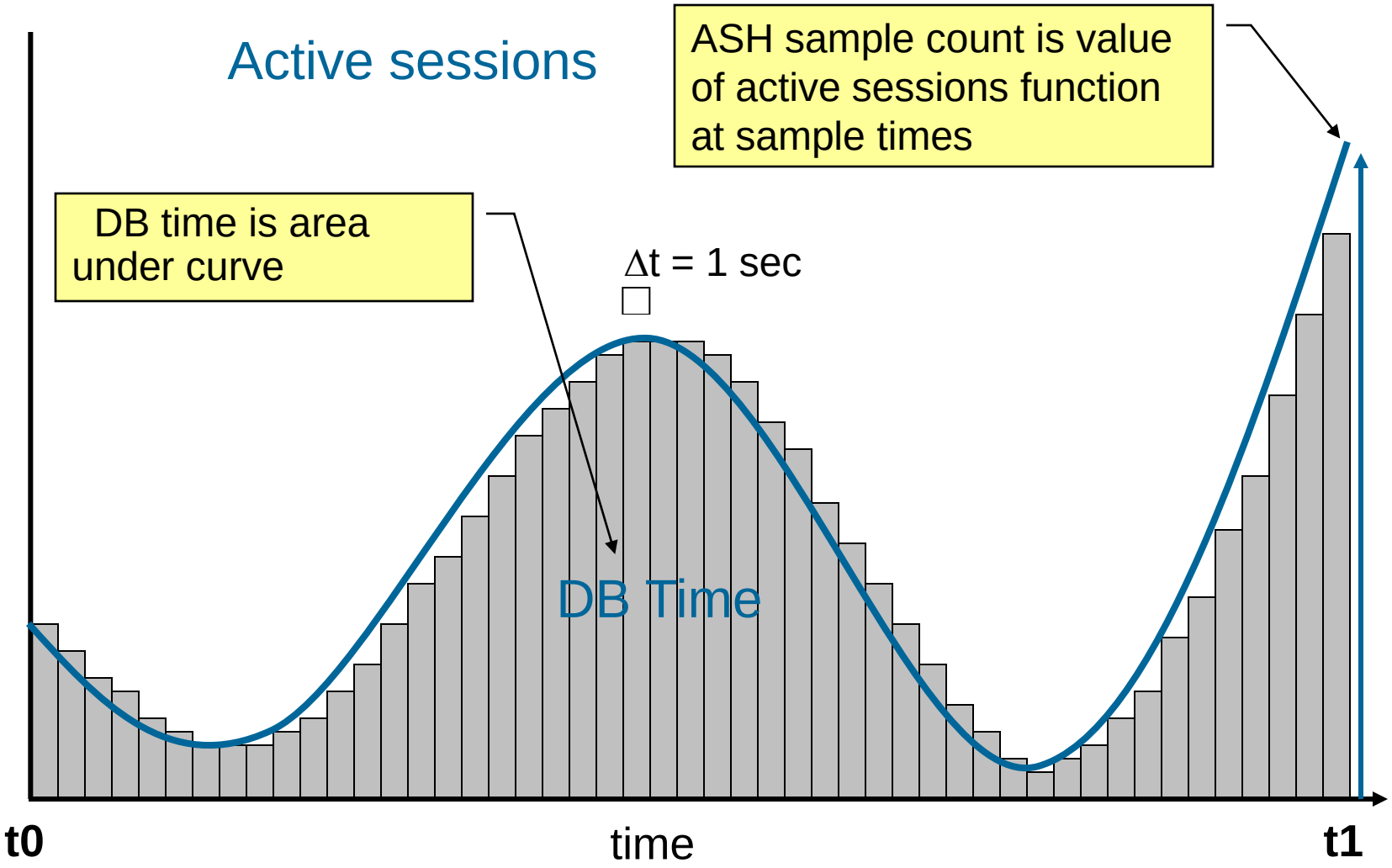
- The number of active sessions at any time is the rate of change of the DB time function at that time.

$$\delta DBtime / \delta t = ActiveSessions$$

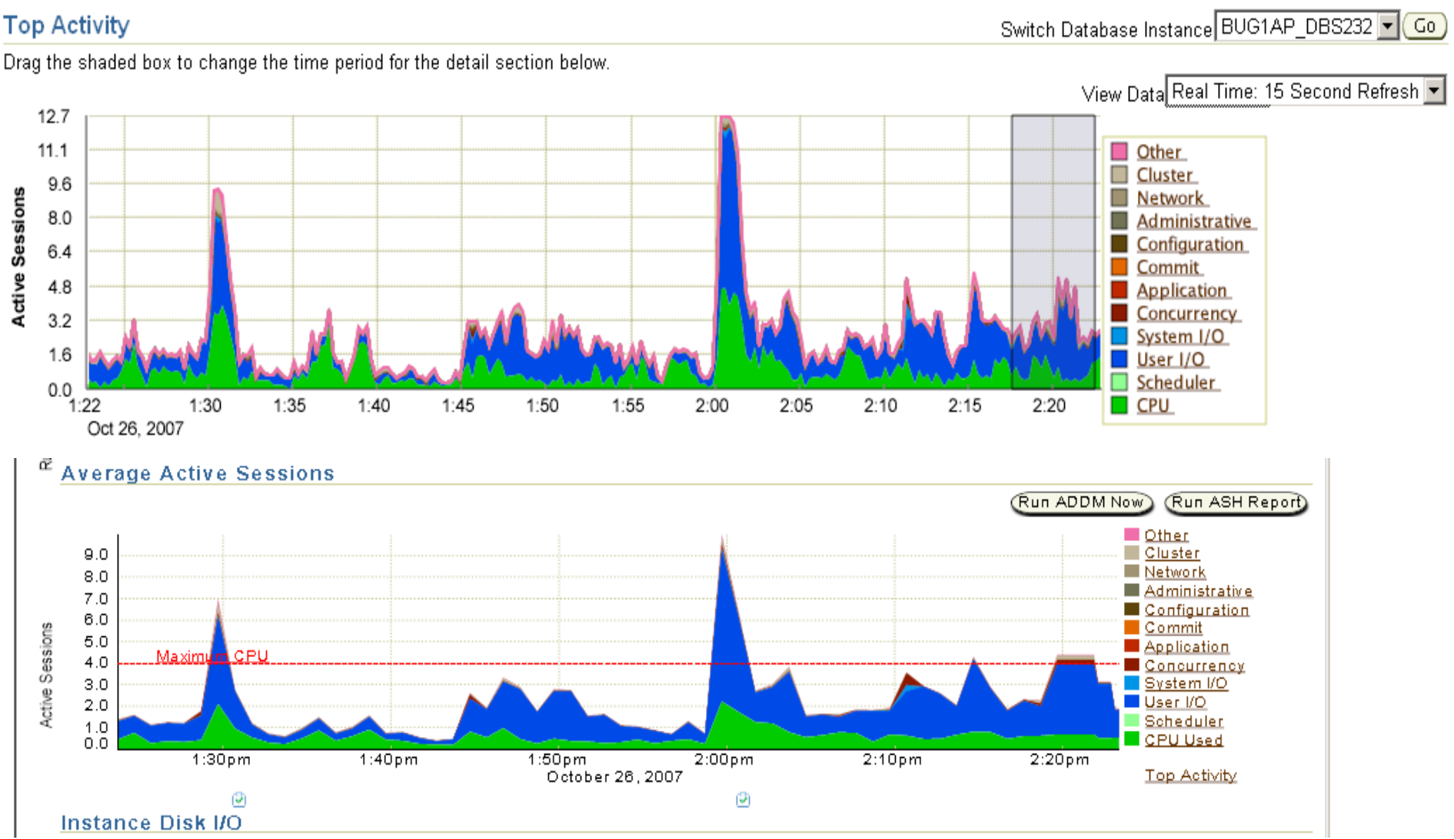
- DB time is the integral of the Active Session function.

$$DBtime = \int_{t_0}^{t_1} ActiveSessions$$

Avg Active Sessions and DB Time



DB Time: ASH vs Time Model



ASH Timing for Nano-Operations

- Some important operations are still too frequent and short-lived for timing
  - No “bind” wait event
- A session-level bit vector is updated in binary fashion before/after an operation
  - Cheaper than timer call
- The bit vector is sampled into ASH
- ASH math allows us to estimate time spent in these un-timed transient operations

Techniques:

The DB Time Method

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

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

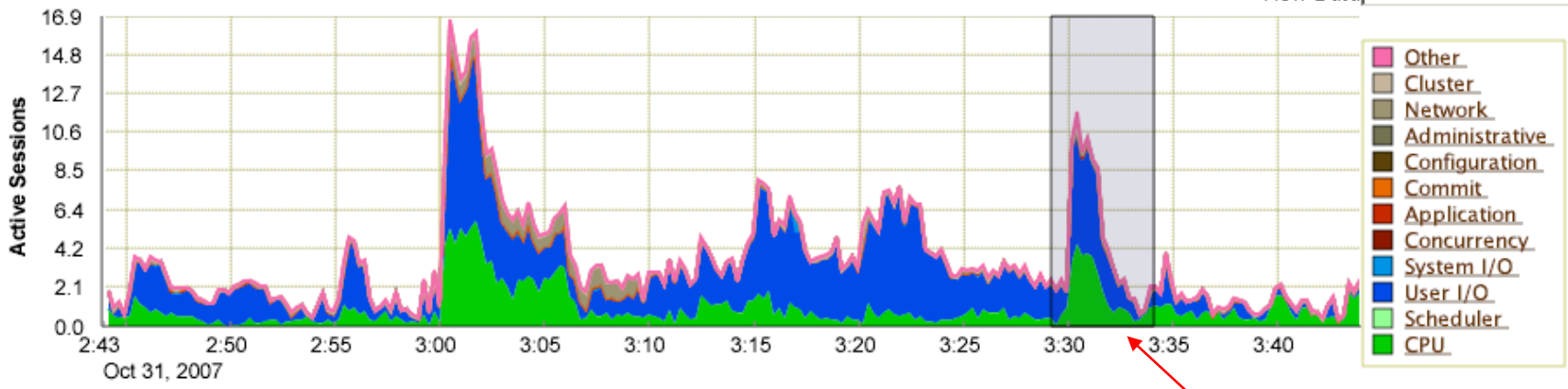
- Identify uneven distributions of DB time (skew)
  - => Largest potential improvement within scope
- System scope:
  - Resource limits – is problem outside the DB?
- Application scope:
  - Service, module, action
  - Resource contention (e.g. latches)
  - SQLID, rowsource
- Session scope:
  - Long running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

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



Detail for Selected 5 Minute Interval

Start Time **Oct 31, 2007 3:29:12 PM CDT**

Run ASH Report

DB time

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
  - Properly scoped problems and solutions are 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**
- **Active Reports**

Tools for Applying DB Time Method

Two use-cases, one method:

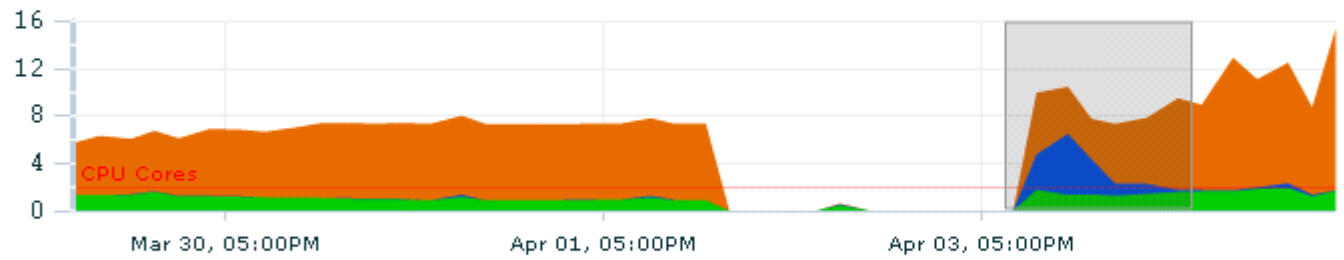
1. Tuning steady-state performance
   - Improve overall workload throughput or response time
   - Best practice: use ADDM

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

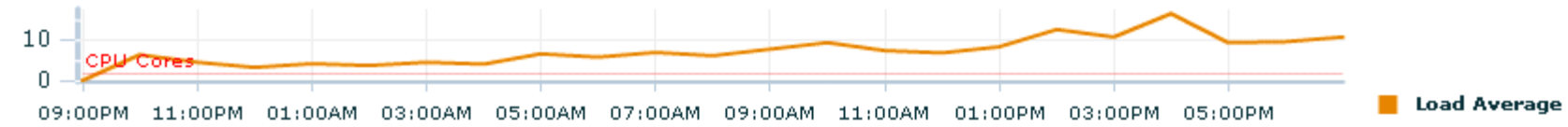
Best Practice: Use ADDM

- 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

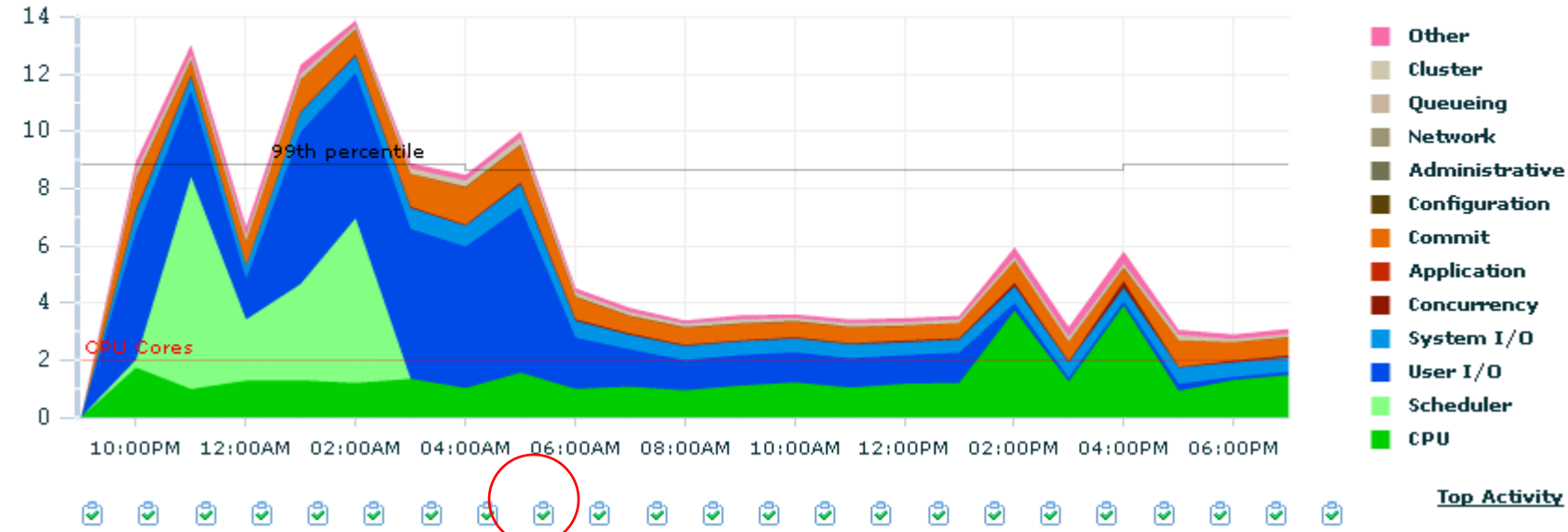
Average Active Sessions - 7 Day View



Host: Runnable Processes



Average Active Sessions



Top Activity

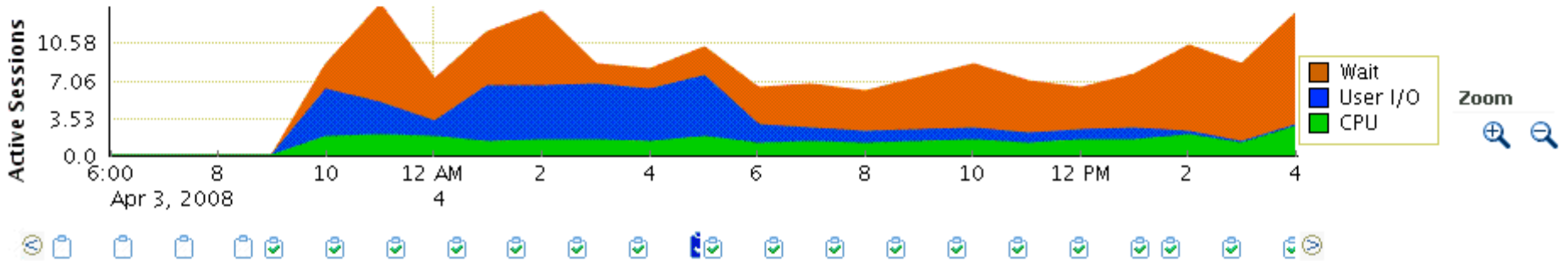
Automatic Database Diagnostic Monitor (ADDM)

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

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_197

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

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

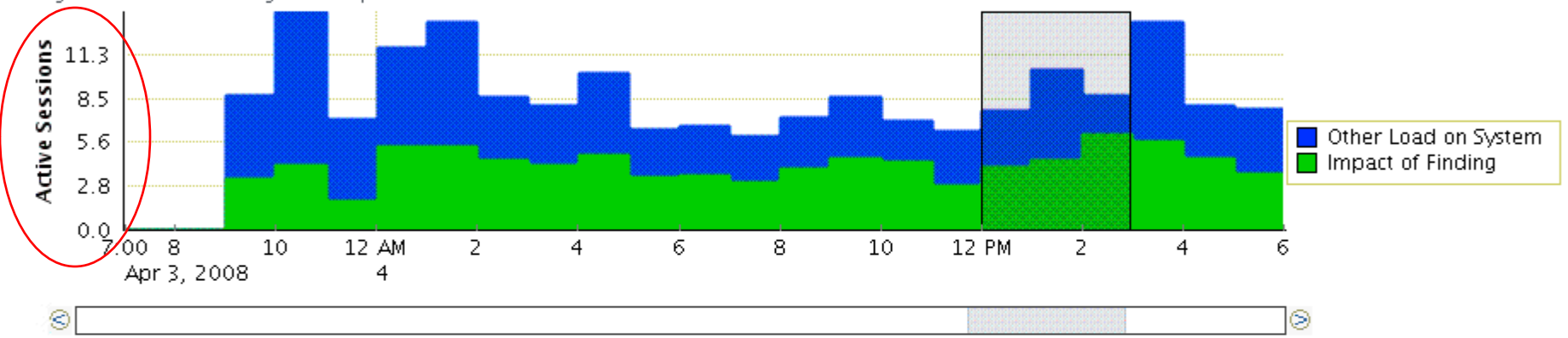
Findings Path

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.

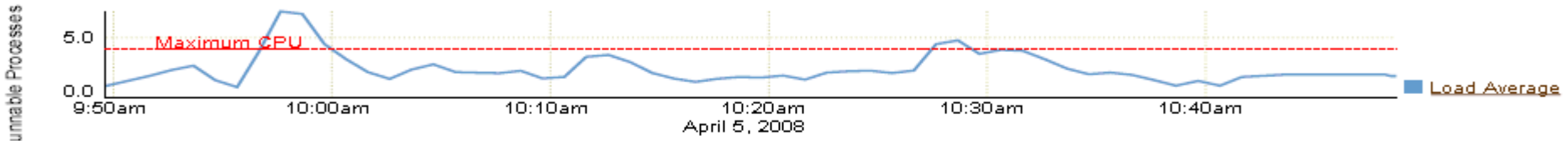
Best Practice: EM Real-time Interface

- 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

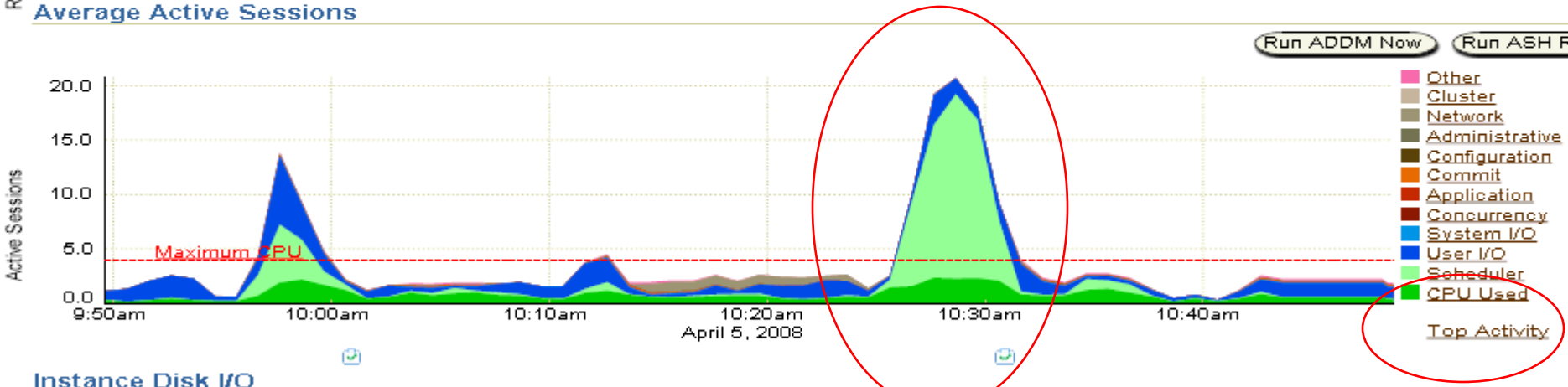
Click on an area of a graph or legend to get more detail.

View Data Real Time: 15 Second Refres

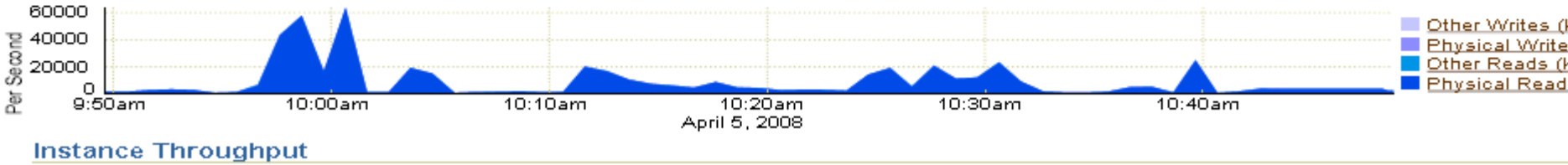
Host



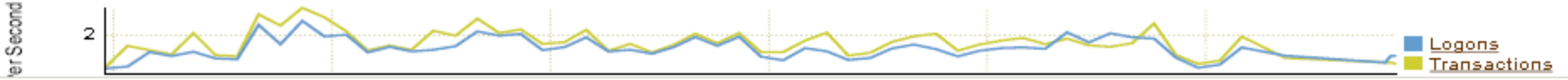
Average Active Sessions



Instance Disk I/O



Instance Throughput

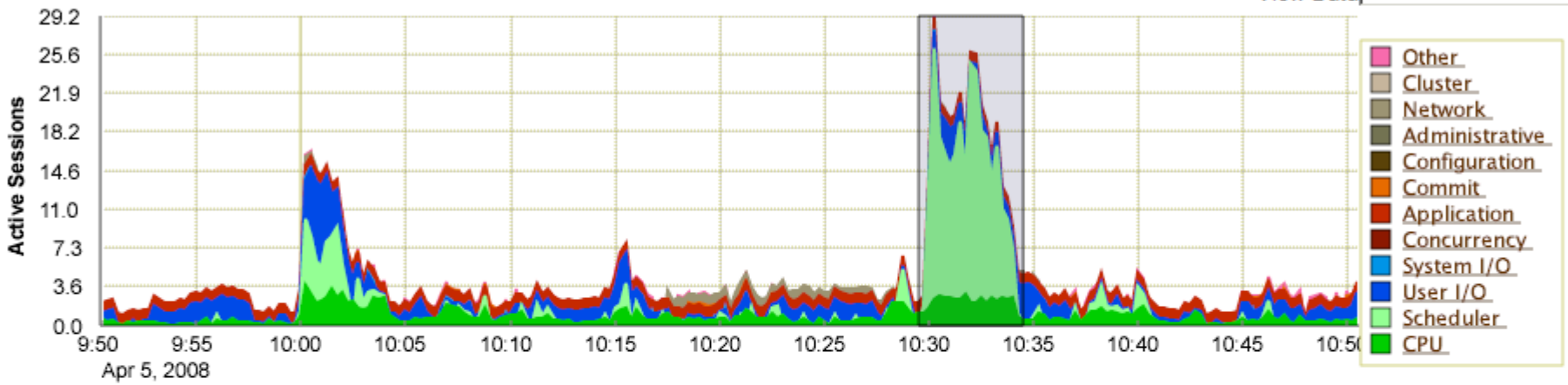


Top Activity

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)

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","CUSTOME
FROM "BG"."RPTHEAD"  "H" WHERE "RPTDATE">:1 AND "RPTD_BY"<>'BATCH'    AND "CUSTOMER" LIKE '%WPTG%' AND
```

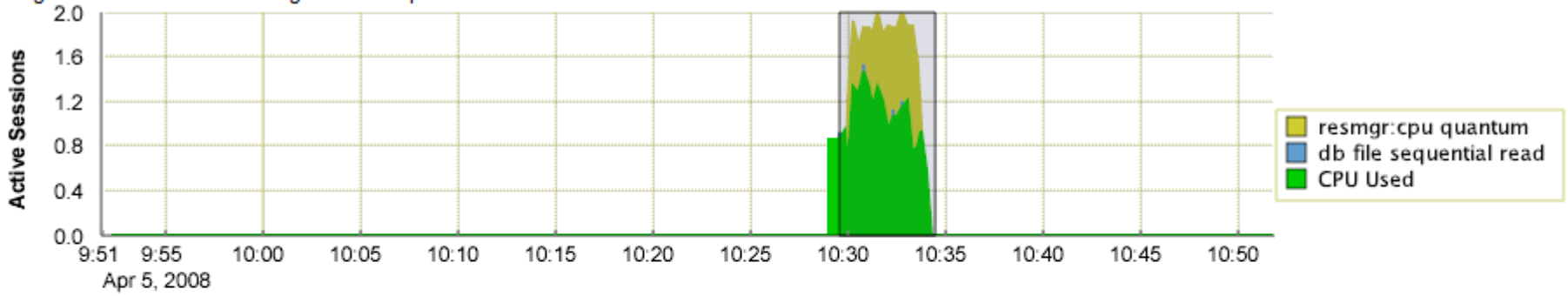
Details

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

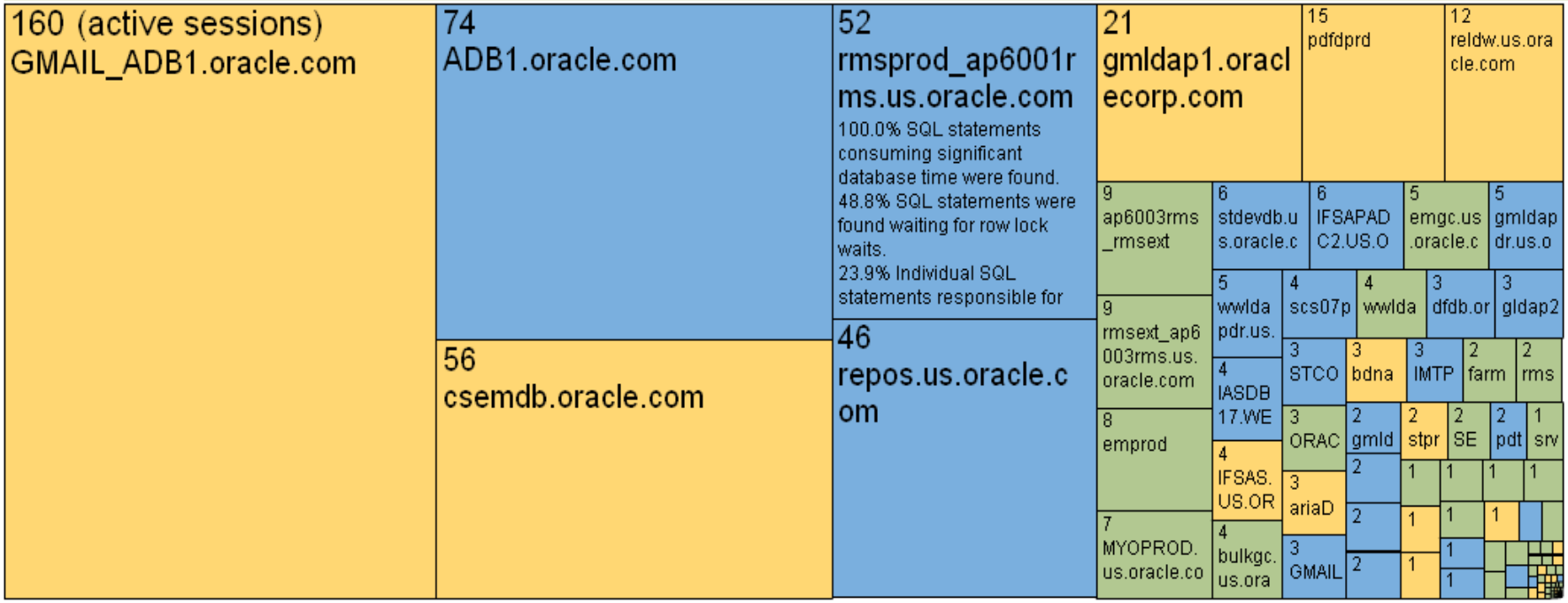
Operation	Object	Object Type	Order	Rows	Size (KB)	Cost	Time (sec)	CPU Cost	
SELECT STATEMENT			12			71,662			
FILTER			11						
TABLE ACCESS BY INDEX ROWID	BG.RPTHEAD	TABLE	9	1	0.172	71,662	557	5,287,109,561	71
BITMAP CONVERSION TO ROWIDS			8						
BITMAP AND			7						
BITMAP CONVERSION FROM ROWIDS			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	

Grid Control DB Loadmap

View ◉ Oracle Load Map ○ Search List

Page Refreshed May 5, 200

Total Active Load: 578.2 active sessions



View Level: ◉ Database ○ Instance

Database Incidents

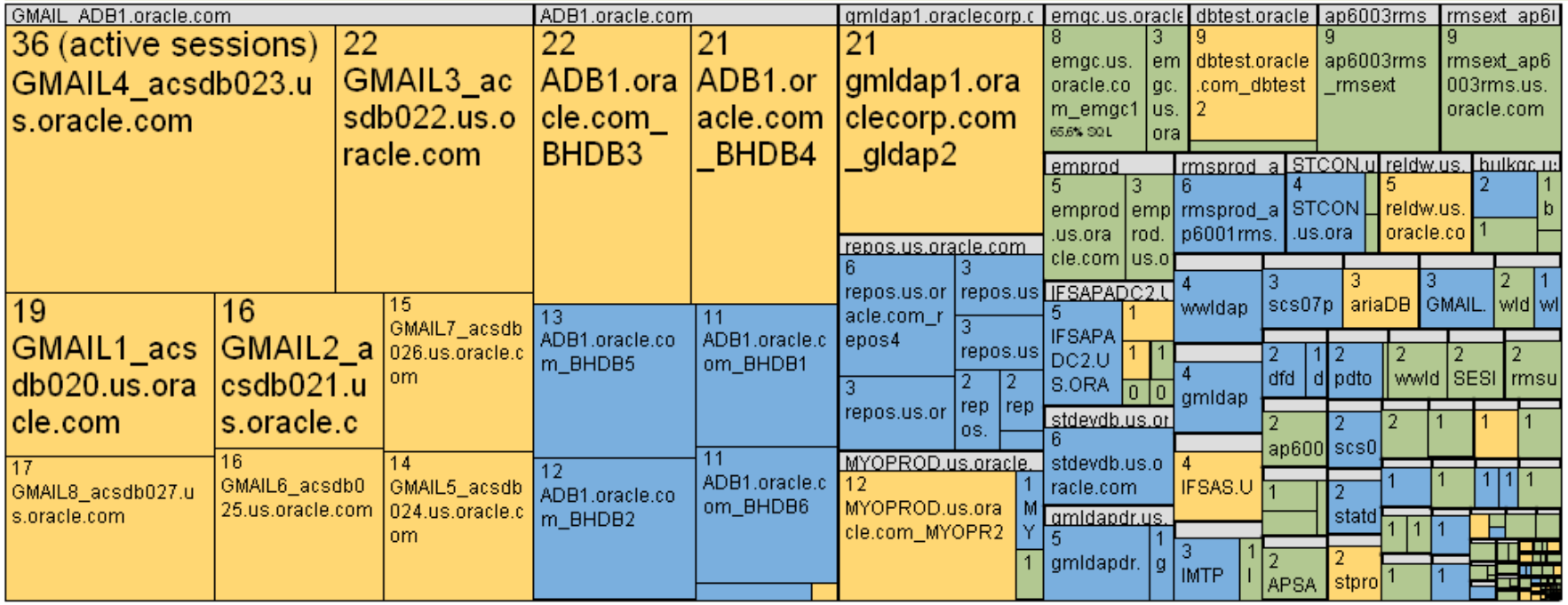
Event Message	DB/Instance
The archiver hung at time/line number: Sun May 3 09:30:46 2009/247855.	emgc.us.oracle.com_emgc2
The archiver hung at time/line number: Sun May 3 09:37:26 2009/248046.	emgc.us.oracle.com_emgc2
The archiver hung at time/line number: Mon Apr 20 09:40:25 2009/324702.	bulkgc.us.oracle.com_bulkgc1
The archiver hung at time/line number: Tue Apr 28 09:50:19 2009/425128.	bulkgc.us.oracle.com_bulkgc1
The archiver hung at time/line number: Tue Apr 28 09:57:19 2009/425162.	bulkgc.us.oracle.com_bulkgc1

Grid Control DB Loadmap

View (•) Oracle Load Map ( ) Search List

Page Refreshed **May 5, 200**

Total Active Load: 460.6 active sessions



View Level: ( ) Database (•) Instance

Database Incidents

Previou

Event Message	DB/Instance
The archiver hung at time/line number: Sun May 3 09:30:46 2009/247855.	emgc.us.oracle.com_emgc2
The archiver hung at time/line number: Sun May 3 09:37:26 2009/248046.	emgc.us.oracle.com_emgc2
The archiver hung at time/line number: Mon Apr 20 09:40:25 2009/324702.	bulkgc.us.oracle.com_bulkgc1
The archiver hung at time/line number: Tue Apr 28 09:50:19 2009/425128.	bulkgc.us.oracle.com_bulkgc1
The archiver hung at time/line number: Tue Apr 28 09:57:19 2009/425162.	bulkgc.us.oracle.com_bulkgc1

Oracle Enterprise Manager (SYSMAN) - Top Activity - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://asmmt570.us.oracle.com:7788/em/console/rac/racTopActivity?waitClass=Overview&leftEdge=1287677932921.6636&rightEdge=1287678232921.

Most Visited | My Oracle | Network Request | Software | Gmail | Google News | Etrade | Fidelity NetBenefits | FuncSpecReview < S... | SMPSpecificationshom... | Account Request | CRM Tickets | Aria

Oracle Enterprise Manager (SYS... | Oracle Enterprise Manager (...

ORACLE Enterprise Manager Grid Control 11g

Setup Preferences Help Logout

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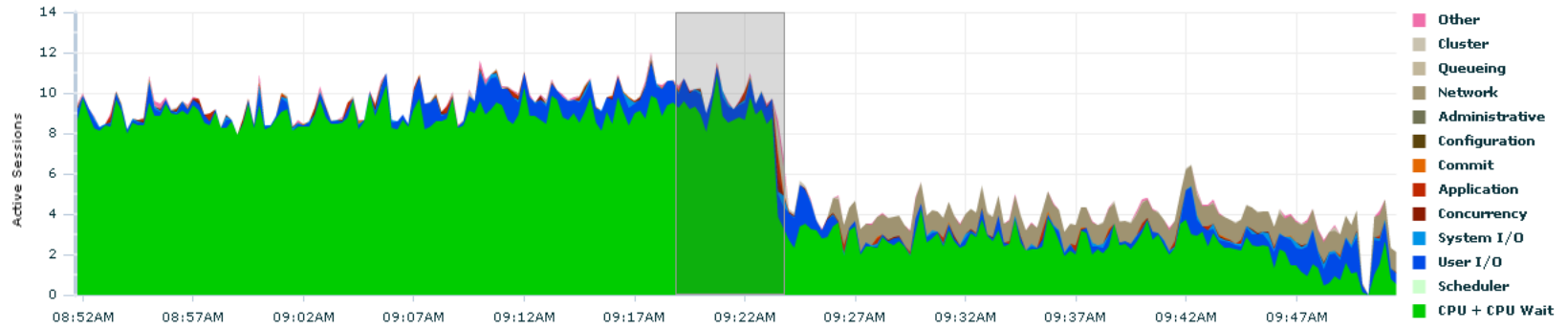
Cluster: crs112_adcdaq0456-scn > Cluster Database: st3b14 >

Logged in As FUSION

Top Activity

Show By Waits

View Data Real Time: 15 Second Refresh



Detail for Selected 5 Minute Interval

Start Time **Oct 21, 2010 9:18:52 AM**

Top SQL

Actions Schedule SQL Tuning Advisor Go

Select All | Select None

Select	Activity (%)	SQL ID	SQL Type	Service	Instance
☐	25.03	95s7nq6hu5ju8	SELECT	SYS$USERS	st3b143
☐	14.51	68s6sfr95k1m5	PL/SQL EXECUTE	SYS$USERS	st3b142
☐	13.74	765xvf89b5dr3	SELECT	SYS$USERS	st3b143
☐	12.48	77b7zmd5awdz9	PL/SQL EXECUTE	SYS$USERS	st3b141
☐	11.07	7yq7ht2w5rbpb	SELECT	st3b14	st3b141
☐	3.74	36212jy7638qf	SELECT	SYS$USERS	st3b141
☐	2.41	8qc9btzqcbbj7	SELECT	SYS$USERS	st3b141
☐	2.37	44vqkfz09h2u4	SELECT	SYS$USERS	st3b143
☐	1.22	013q1n2rfyrz4	SELECT	SYS$USERS	st3b141
☐	1.18	fzf418fzp4hqp	SELECT	SYS$USERS	st3b142

Actions Schedule SQL Tuning Advisor Go

Total Sample Count: 2,701

Top Sessions

View Top Sessions

Activity (%)	Session ID	User Name	Program	Service	Instance
10.06	1953	FUSION	nqsserver@dadvfa0904 (TNS V1-V3)	st3b14	st3b141
9.56	4213	FUSION_ORA_ESS	oracle@adcdaq04 (J003)	SYS$USERS	st3b141
9.56	4949	FUSION_ORA_ESS	oracle@adcdaq04 (J007)	SYS$USERS	st3b141
9.56	3784	FUSION_ORA_ESS	oracle@adcdaq05 (J004)	SYS$USERS	st3b142
9.56	4216	FUSION_ORA_ESS	oracle@adcdaq04 (J004)	SYS$USERS	st3b141
9.56	3049	FUSION_ORA_ESS	oracle@adcdaq04 (J006)	SYS$USERS	st3b141
9.53	1918	FUSION_ORA_ESS	oracle@adcdaq04 (J005)	SYS$USERS	st3b141
9.42	1519	FUSION_ORA_ESS	oracle@adcdaq05 (J001)	SYS$USERS	st3b142
9.42	5715	FUSION_ORA_ESS	oracle@adcdaq06 (J001)	SYS$USERS	st3b143
.88	1575	FUSION_ORA_ESS	JDBC Thin Client	st3b14	st3b141

Total Sample Count: 2,971

Additional Links

Top Segments

Cluster Cache Coherency

Oracle Enterprise Manager (SYSMAN) - Top Activity - Mozilla Firefox

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https://asmmt570.us.oracle.com:7799/em/console/database/instance/waitDetails?waitClass=Overview&leftEdge=&rightEdge=&event=updateRefreshChoice&

Review vidykris_lrg-5515106 - C... | Oracle Enterprise Manager (...

ORACLE Enterprise Manager Grid Control 11g

Setup Preferences Help Logout

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All Targets | Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | Virtual Servers

Cluster: adcdaa0911-cls > Cluster Database: st3b171r > Database Instance: st3b171r_st3b171r1 >

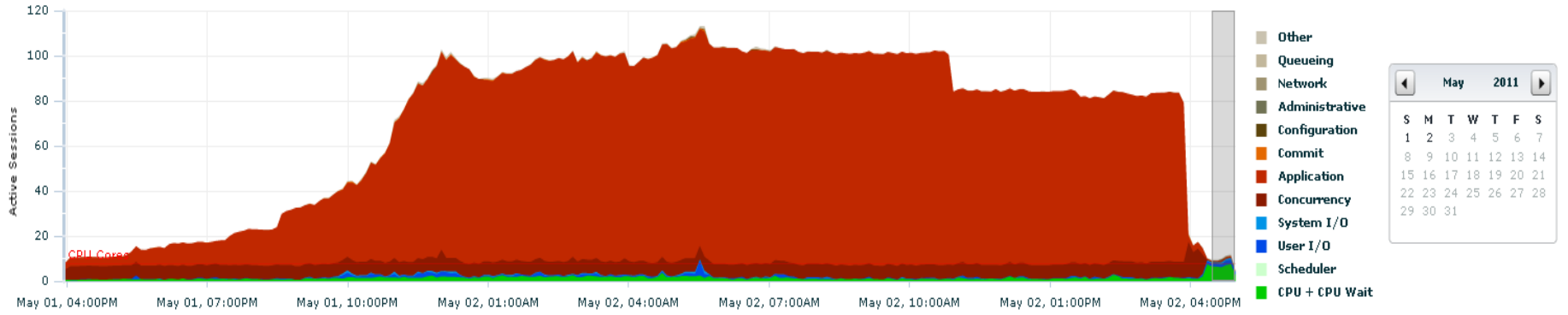
Logged in As DBSNMP

Top Activity

Switch Database Instance st3b171r_st3b171r1 Go

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

View Data Historical



May 2011

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	31				

Detail for Selected 30 Minute Interval

Start Time **May 2, 2011 4:27:46 PM**

Run ASH Report

Top SQL

Actions Schedule SQL Tuning Advisor Go

Select All | Select None

Select	Activity (%)	SQL Hash Value	SQL Type
☐	18.76	4r5p015wq9z5d	PL/SQL EXECUTE
☐	14.63	011vad6932xba	SELECT
☐	10.66	f157ywqn0uzz5	UPDATE
☐	4.66	0buktuhjr8aza	ALTER PACKAGE
☐	4.14	67uiq4ru7tkcx	PL/SQL EXECUTE
☐	3.26	94q3wb5v2rypm	INSERT
☐	2.97	5ctn85q2503qj	SELECT
☐	2.74	a07y05uya8653	SELECT
☐	2.39	7pwbtrm06b2jx	PL/SQL EXECUTE
☐	2.39	6h1yfm08un07s	SELECT

Actions Schedule SQL Tuning Advisor Go

Total Sample Count: 1,716

Top Sessions

View Top Sessions

Activity (%)	Session ID	User Name	Program
8.58	3143	FUSION_ORA_ESS	oracle@adcdaa09 (J009)
8.58	1617	FUSION_ORA_ESS	oracle@adcdaa09 (J004)
8.58	3454	FUSION_ORA_ESS	oracle@adcdaa09 (J008)
8.58	2393	FUSION_ORA_ESS	oracle@adcdaa09 (J005)
8.53	485	FUSION_ORA_ESS	oracle@adcdaa09 (J006)
8.53	2338	FUSION_ORA_ESS	oracle@adcdaa09 (J001)
8.48	4934	FUSION_ORA_ESS	oracle@adcdaa09 (J003)
6.05	5763	FUSION_ORA_ESS	oracle@adcdaa09 (J002)
2.95	1510	SYS	oracle@adcdaa09 (LGWR)
2.48	5279	SYS	oracle@adcdaa09 (LMS1)

Total Sample Count: 2,099

Oracle Enterprise Manager (SYSMAN) - SQL Details: czc671222xxg3 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://asmmt570.us.oracle.com:7799/em/console/database/instance/sqlDetail?leftEdge=&rightEdge=&event=show&direction=&selectedBa

Most Visited | My Oracle | Network Request | Software | Gmail | Google News | Etrade | Fidelity NetBenefits | FuncSpecReview < S... | SMPSpecificationshom... | Account Request | CRM Tickets

Reviews for me - Code Review | Review xxu_enable_ccc_generic... | Review adosani_ib17 - Code Rev... | Oracle Enterprise Manager (... | Oracle 11gR2 enqueue waits « V...

All Targets | Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | Virtual Servers

Cluster: cadcdaa0406 > Cluster Database: st3b15 > Database Instance: st3b15_st3b151 > Top Activity >

Logged in As FUSION_RE

SQL Details: czc671222xxg3

Switch Database Instance st3b15_st3b151

Switch to SQL ID Go

View Data Real Time: Manual Refresh Refresh SQL Worksheet Schedule SQL Tuning Advisor SQL Repair

Text

```
SELECT EnterpriseApplicationEO.ENTERPRISE_APPLICATION_ID, EnterpriseApplicationEO.SOURCE_FILE, EnterpriseApplicationEO.VERSION,
EnterpriseApplicationEO.TYPE, EnterpriseApplicationEO.VISIBLE, EnterpriseApplicationEO.DEPENDENCY, EnterpriseApplicationEO.FOR_SETUP,
EnterpriseApplicationEO.GROUP_NAME, EnterpriseApplicationEO.INSTALL_DIR, EnterpriseApplicationEO.NAME, EnterpriseApplicationEO.SHORT_NAME,
EnterpriseApplicationEO.DEFAULT_URL
FROM ASK_ENTERPRISE_APPLICATIONS EnterpriseApplicationEO
WHERE EnterpriseApplicationEO.ENTERPRISE_APPLICATION_ID = :Bind_EnterpriseApplicationId ORDER BY NAME
```

Details

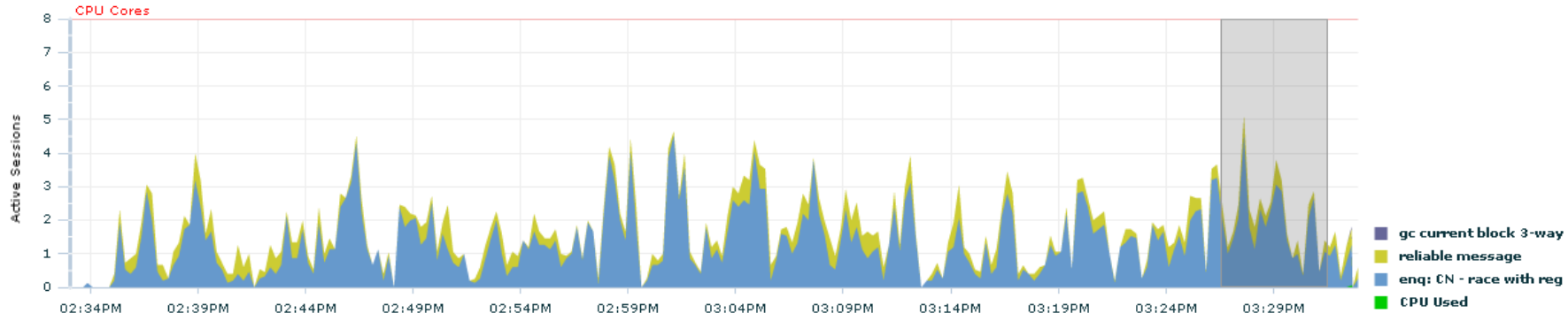
Select the plan hash value to see the details below. Plan Hash Value 3504394492

Statistics | **Activity** | Plan | Plan Control | Tuning History | SQL Monitoring

Summary

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

Show Maximum CPU Line



Detail for Selected 5 Minute Interval

Start Time **Jan 5, 2011 3:26:33 PM**

Run AWR SQL Report Run ASH

Previous 1-10 of 12

Activity (%)	SID	QC SID	User	Program	Service	Plan Hash Value
20.19	782		FUSION_RUNTIME	JDBCProgramName	st3b15	3504394492
17.47	3096		FUSION_RUNTIME	JDBCProgramName	st3b15	3504394492
13.30	876		FUSION_RUNTIME	JDBCProgramName	st3b15	3504394492
13.14	5311		FUSION_RUNTIME	JDBCProgramName	st3b15	3504394492
10.42	848		FUSION_RUNTIME	JDBCProgramName	st3b15	3504394492

Oracle Enterprise Manager (SYSMAN) - Session Details: 3087 (FUSION_RUNTIME) - Mozilla Firefox

File Edit View History Bookmarks Tools Help

oracle.com https://asmmt570.us.oracle.com:7799/em/console/database/instance/sessionDetails?event=doLoad&target=st3b15_st3b151&type=oracle_(enq - CN

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Reviews for me - Code Review | Review xxu_enable_ccc_gen... | Review adosani_ib17 - Code ... | Oracle Enterprise Manag... | Descriptions of Wait Events | enq - cn oracle - Google Sea...

All Targets | Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | Virtual Servers

Cluster: cadcdaa0406 > Cluster Database: st3b15 > Top Sessions > Database Instance: st3b15_st3b151 > Top Activity >

Logged in As FUSION_READ_ONLY

Session Details: 3087 (FUSION_RUNTIME)

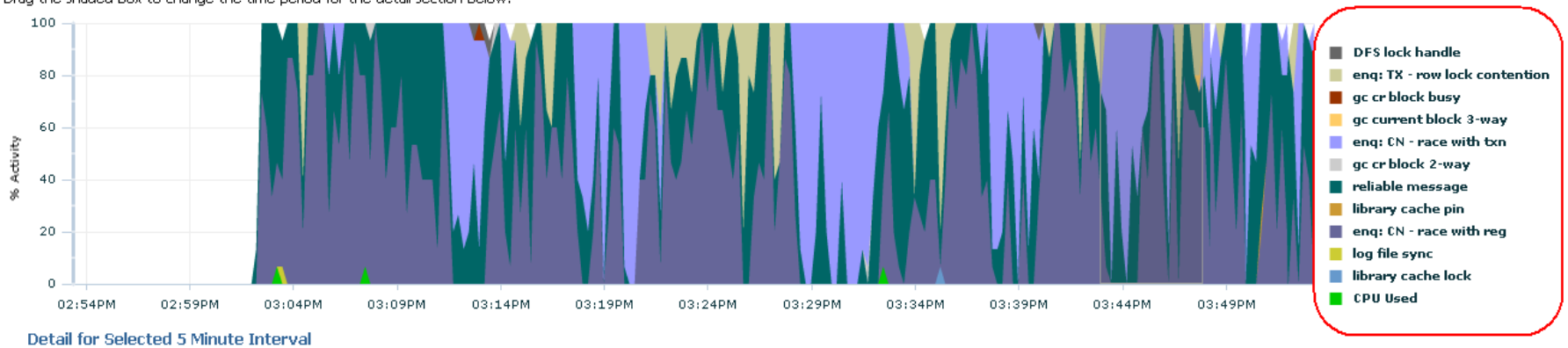
Collected From Target **Jan 5, 2011 3:52:25 PM**

View Data Real Time: 15 Second Refresh Refresh

Kill Session Enable SQL Trace

General | **Activity** | Statistics | Open Cursors | Blocking Tree | Wait Event History | Parallel SQL | SQL Monitoring

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



Detail for Selected 5 Minute Interval

Start Time **Jan 5, 2011 3:42:56 PM** View Show Aggregated Data Run ASH Report

Activity (%)	SQL ID	QC SID	SQL Command	Plan Hash Value	Module	Action	Client ID
39.80			UNKNOWN	0	JDBCProgramName		
30.77	d8uz67g5du4g0		SELECT	3504394492	JDBCProgramName		
12.71	czc671222xxg3		SELECT	3504394492	JDBCProgramName		
4.68	bk33kbng03gwy		DELETE	3802009415	JDBCProgramName		
3.01	a2wqq5nz1wbc8		SELECT	1880298191	JDBCProgramName		
3.01	amyr801r8furd		SELECT	3758944103	JDBCProgramName		
2.68	5u1mzd5ap3akx		SELECT	892950380	JDBCProgramName		
2.34	8rvaf73t0ts94		SELECT	1933281220	JDBCProgramName		
.67	0djctwjwc374p		SELECT	2642171256	JDBCProgramName		
.33	ac0nxtqq7jmxw		SELECT	354573245	JDBCProgramName		

General | **Activity** | Statistics | Open Cursors | Blocking Tree | Wait Event History | Parallel SQL | SQL Monitoring

Kill Session Enable SQL Trace

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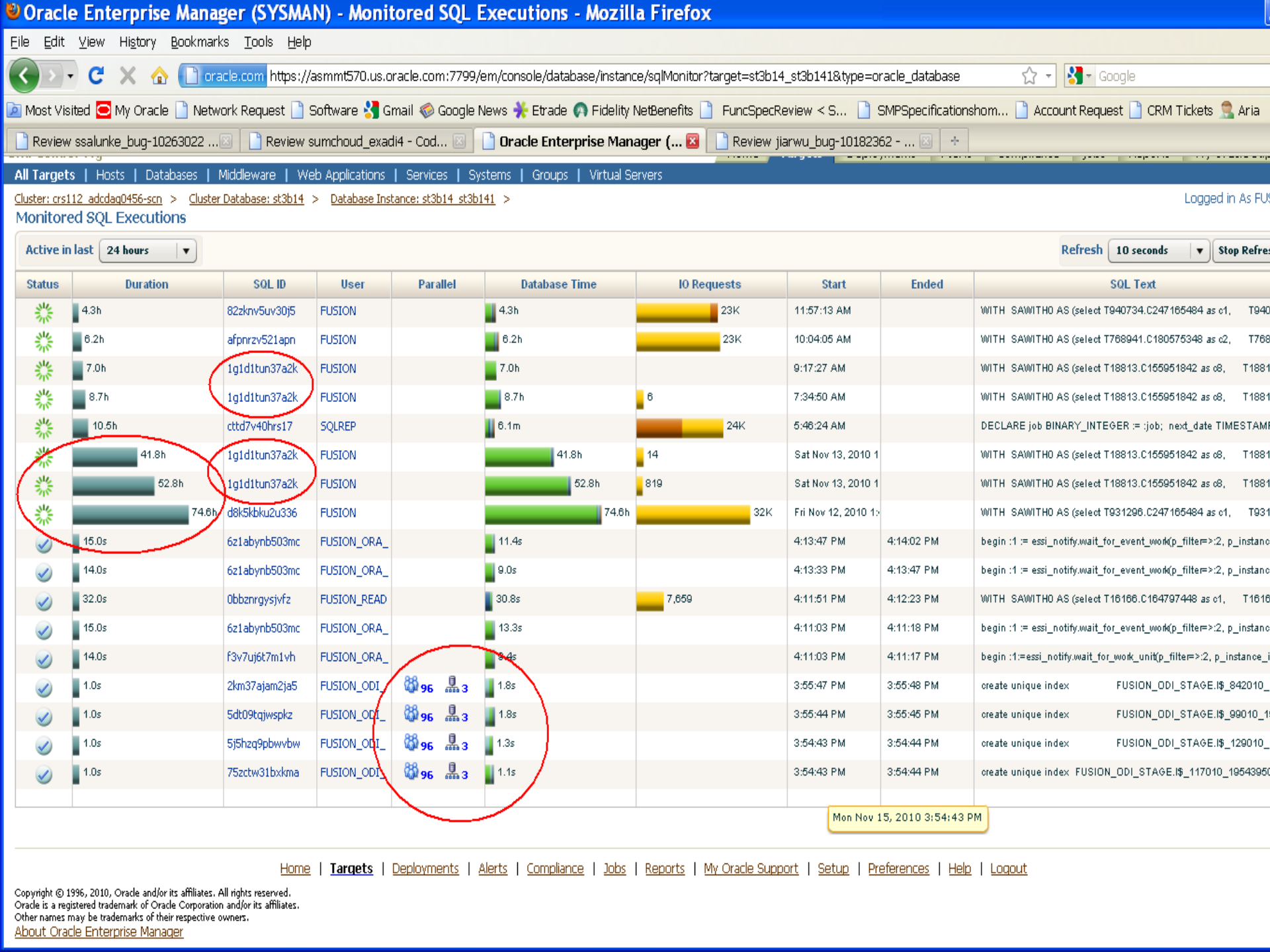
Oracle Enterprise Manager (SYSMAN) - Monitored SQL Executions - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://asmmt570.us.oracle.com:7799/em/console/database/instance/sqlMonitor?target=st3b14_st3b141&type=oracle_database
Oracle Enterprise Manager (...
All Targets | Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | Virtual Servers
Cluster: crs112_adcdag0456-scn > Cluster Database: st3b14 > Database Instance: st3b14_st3b141 >
Monitored SQL Executions
Active in last 24 hours
Refresh 10 seconds
Status | Duration | SQL ID | User | Parallel | Database Time | IO Requests | Start | Ended | SQL Text
4.3h 82zknv5uv30j5 FUSION 4.3h 23K 11:57:13 AM WITH SAWITH0 AS (select T940734.C247165484 as c1,
6.2h afpnrzv521apn FUSION 6.2h 23K 10:04:05 AM WITH SAWITH0 AS (select T768941.C180575348 as c2,
7.0h 1g1d1tun37a2k FUSION 7.0h 9:17:27 AM WITH SAWITH0 AS (select T18813.C155951842 as c8,
8.7h 1g1d1tun37a2k FUSION 8.7h 6 7:34:50 AM WITH SAWITH0 AS (select T18813.C155951842 as c8,
10.5h cttd7v40hrs17 SQLREP 6.1m 24K 5:46:24 AM DECLARE job BINARY_INTEGER := :job; next_date TIMESTAMP
41.8h 1g1d1tun37a2k FUSION 41.8h 14 Sat Nov 13, 2010 1 WITH SAWITH0 AS (select T18813.C155951842 as c8,
52.8h 1g1d1tun37a2k FUSION 52.8h 819 Sat Nov 13, 2010 1 WITH SAWITH0 AS (select T18813.C155951842 as c8,
74.6h d8k5kbku2u336 FUSION 74.6h 32K Fri Nov 12, 2010 1 WITH SAWITH0 AS (select T931296.C247165484 as c1,
15.0s 6z1abynb503mc FUSION_ORA_ 11.4s 4:13:47 PM 4:14:02 PM begin :1 := essi_notify.wait_for_event_work(p_filter=>:2, p_instanc
14.0s 6z1abynb503mc FUSION_ORA_ 9.0s 4:13:33 PM 4:13:47 PM begin :1 := essi_notify.wait_for_event_work(p_filter=>:2, p_instanc
32.0s 0bbznrgysjvfz FUSION_READ 30.8s 7,659 4:11:51 PM 4:12:23 PM WITH SAWITH0 AS (select T16166.C164797448 as c1,
15.0s 6z1abynb503mc FUSION_ORA_ 13.3s 4:11:03 PM 4:11:18 PM begin :1 := essi_notify.wait_for_event_work(p_filter=>:2, p_instanc
14.0s f3v7uj6t7m1vh FUSION_ORA_ 4:11:03 PM 4:11:17 PM begin :1:=essi_notify.wait_for_work_unit(p_filter=>:2, p_instance_i
1.0s 2km37ajam2ja5 FUSION_ODI_ 96 3 1.8s 3:55:47 PM 3:55:48 PM create unique index FUSION_ODI_STAGE.I$_842010_
1.0s 5dt09tqjwspkz FUSION_ODI_ 96 3 1.8s 3:55:44 PM 3:55:45 PM create unique index FUSION_ODI_STAGE.I$_99010_1
1.0s 5j5hzq9pbwvbw FUSION_ODI_ 96 3 1.3s 3:54:43 PM 3:54:44 PM create unique index FUSION_ODI_STAGE.I$_129010_
1.0s 75zctw31bxkma FUSION_ODI_ 96 3 1.1s 3:54:43 PM 3:54:44 PM create unique index FUSION_ODI_STAGE.I$_117010_1954395
Mon Nov 15, 2010 3:54:43 PM
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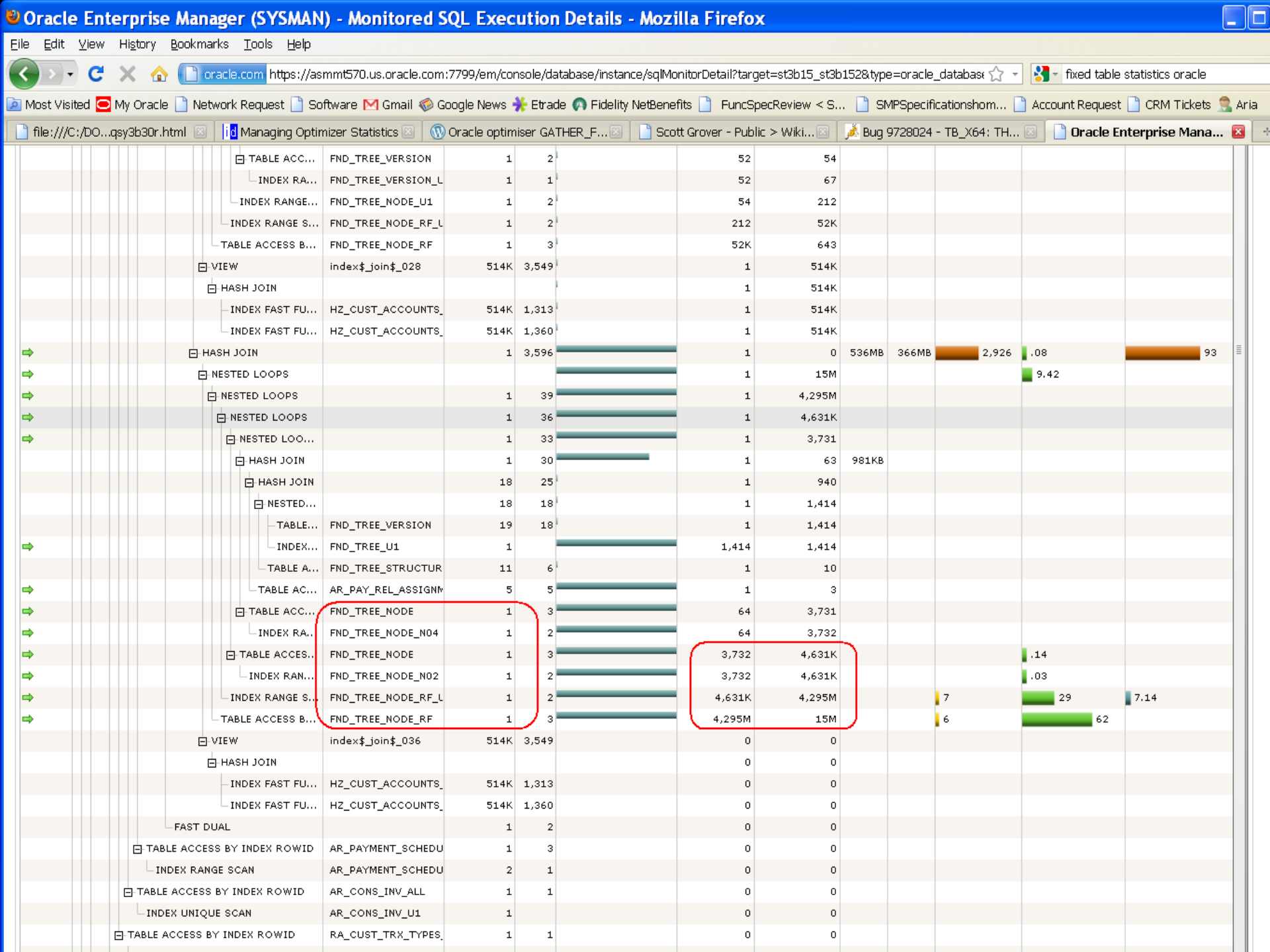
Oracle Enterprise Manager (SYSMAN) - Monitored SQL Execution Details - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://asmmt570.us.oracle.com:7799/em/console/database/instance/sqlMonitorDetail?target=st3b15_st3b152&type=oracle_databas
fixed table statistics oracle
Most Visited My Oracle Network Request Software Gmail Google News Etrade Fidelity NetBenefits FuncSpecReview < S... SMPSpecificationshom... Account Request CRM Tickets Aria
file:///C:/DO...qsy3b30r.html
Managing Optimizer Statistics
Oracle optimiser GATHER_F...
Scott Grover - Public > Wiki...
Bug 9728024 - TB_X64: TH...
Oracle Enterprise Mana...
TABLE ACC... FND_TREE_VERSION 1 2 52 54
INDEX RA... FND_TREE_VERSION_U 1 1 52 67
INDEX RANGE... FND_TREE_NODE_U1 1 2 54 212
INDEX RANGE S... FND_TREE_NODE_RF_U 1 2 212 52K
TABLE ACCESS B... FND_TREE_NODE_RF 1 3 52K 643
VIEW index$_join$_028 514K 3,549 1 514K
HASH JOIN 1 514K
INDEX FAST FU... HZ_CUST_ACCOUNTS_ 514K 1,313 1 514K
INDEX FAST FU... HZ_CUST_ACCOUNTS_ 514K 1,360 1 514K
HASH JOIN 1 3,596 1 0 536MB 366MB 2,926 .08 93
NESTED LOOPS 1 15M 9.42
NESTED LOOPS 1 39 1 4,295M
NESTED LOOPS 1 36 1 4,631K
NESTED LOO... 1 33 1 3,731
HASH JOIN 1 30 1 63 981KB
HASH JOIN 18 25 1 940
NESTED... 18 18 1 1,414
TABLE... FND_TREE_VERSION 19 18 1 1,414
INDEX... FND_TREE_U1 1 1,414 1,414
TABLE A... FND_TREE_STRUCTUR 11 6 1 10
TABLE AC... AR_PAY_REL_ASSIGNM 5 5 1 3
TABLE ACC... FND_TREE_NODE 1 3 64 3,731
INDEX RA... FND_TREE_NODE_N04 1 2 64 3,732
TABLE ACCES... FND_TREE_NODE 1 3 3,732 4,631K .14
INDEX RAN... FND_TREE_NODE_N02 1 2 3,732 4,631K .03
INDEX RANGE S... FND_TREE_NODE_RF_U 1 2 4,631K 4,295M 7 29 7.14
TABLE ACCESS B... FND_TREE_NODE_RF 1 3 4,295M 15M 6 62
VIEW index$_join$_036 514K 3,549 0 0
HASH JOIN 0 0
INDEX FAST FU... HZ_CUST_ACCOUNTS_ 514K 1,313 0 0
INDEX FAST FU... HZ_CUST_ACCOUNTS_ 514K 1,360 0 0
FAST DUAL 1 2 0 0
TABLE ACCESS BY INDEX ROWID AR_PAYMENT_SCHEDU 1 3 0 0
INDEX RANGE SCAN AR_PAYMENT_SCHEDU 2 1 0 0
TABLE ACCESS BY INDEX ROWID AR_CONS_INV_ALL 1 1 0 0
INDEX UNIQUE SCAN AR_CONS_INV_U1 1 0 0
TABLE ACCESS BY INDEX ROWID RA_CUST_TRX_TYPES_ 1 1 0 0

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