

Advanced Diagnostics and Monitoring with Oracle Enterprise Manager 12c



Tyler Sharp *Database Administrator*
Aaron Rimel *Systems Architect*

October 2 2014

Cerner Acquires Siemens HIT Division

Cerner Today



14,000+

associates

21% development

14% clinicians

10% managed services



Solutions licensed at
14,000 sites. We have
a presence in **24**
countries.

Cerner + Siemens

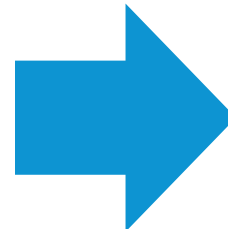
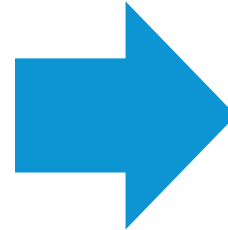


20,000+

associates



Solutions licensed at
18,000 sites. We will
have a presence in **40**
countries.



Fortunate to Work with Leaders

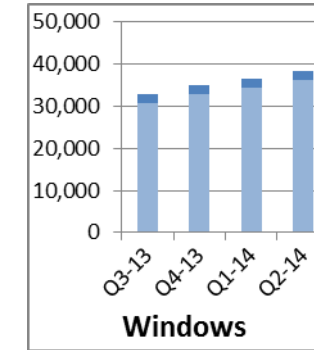
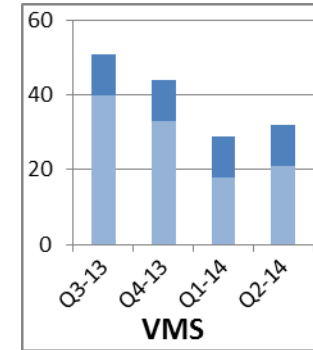
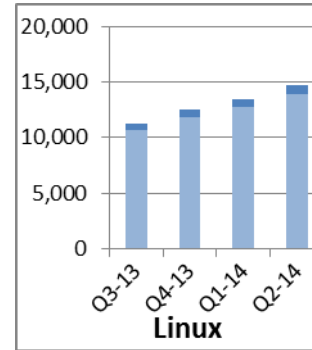
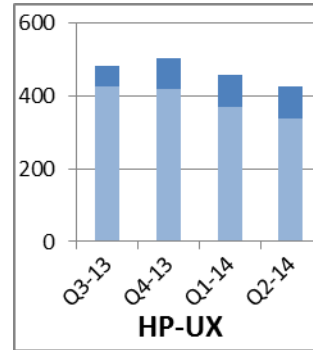
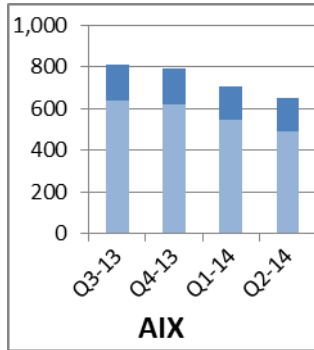
17 out of 30
top US-based health
care organizations
have a Cerner
footprint.

By 2013 net patient revenues,
Modern Healthcare, June 2013

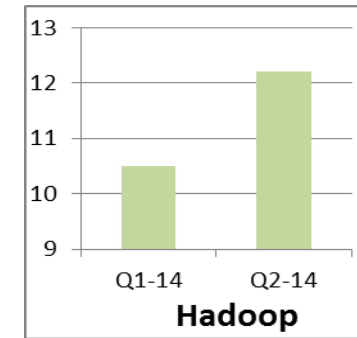
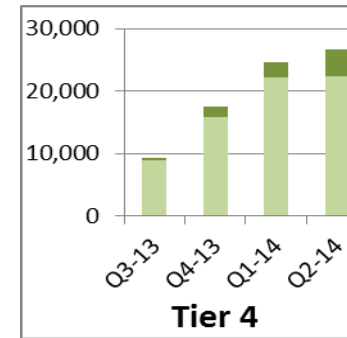
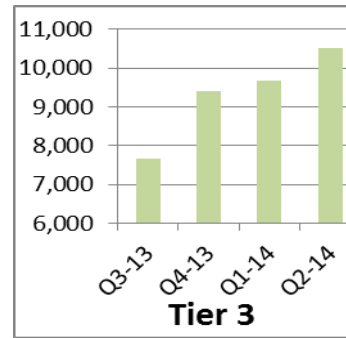
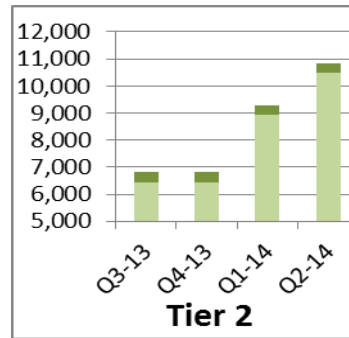
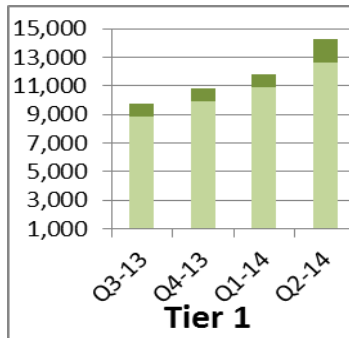
Cerner has a
footprint in **2,910**
hospitals world wide
and we have **1,444**
Millennium EMR
Suites implemented
around the globe.

CTS Technology Footprint

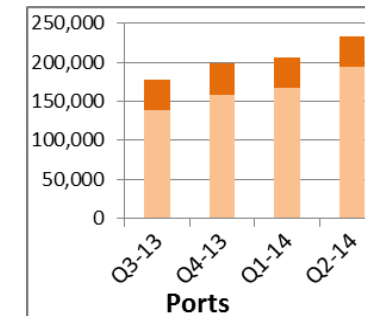
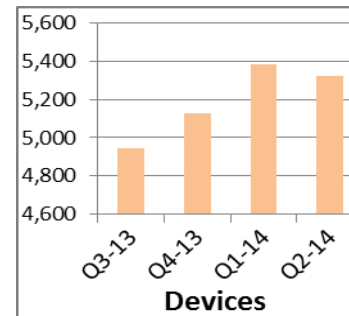
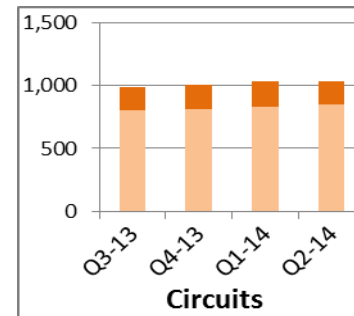
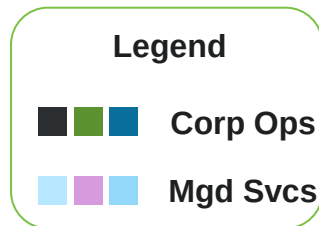
SYSTEMS: 55,365 Total Systems (+25.85% YOY)



STORAGE: 74.03 Raw PB (Tiers 1-H) (+44.01% YOY)



NETWORK: 1,034 Circuits (+7.26% YOY); 6,857 Devices (+14.99% YOY); 233,646 Total Ports (+37.15%)



Cerner Cost of Downtime - Patient Impact



CernerWorks hosts data related to ~230k beds, making up greater than 25% of the nation's total. With a 65% occupancy rate*, over the most recent 16 months the percentage of patient hours**

affected by incidents can be equated to approximately 9,800 patients per month being impacted by Oracle database-related outages.

Cerner's OEM 12c Deployment

27,000 targets

500 cluster databases

2000 database instances

840 named users

2800 production incidents per day

Cerner's OEM 12c Deployment

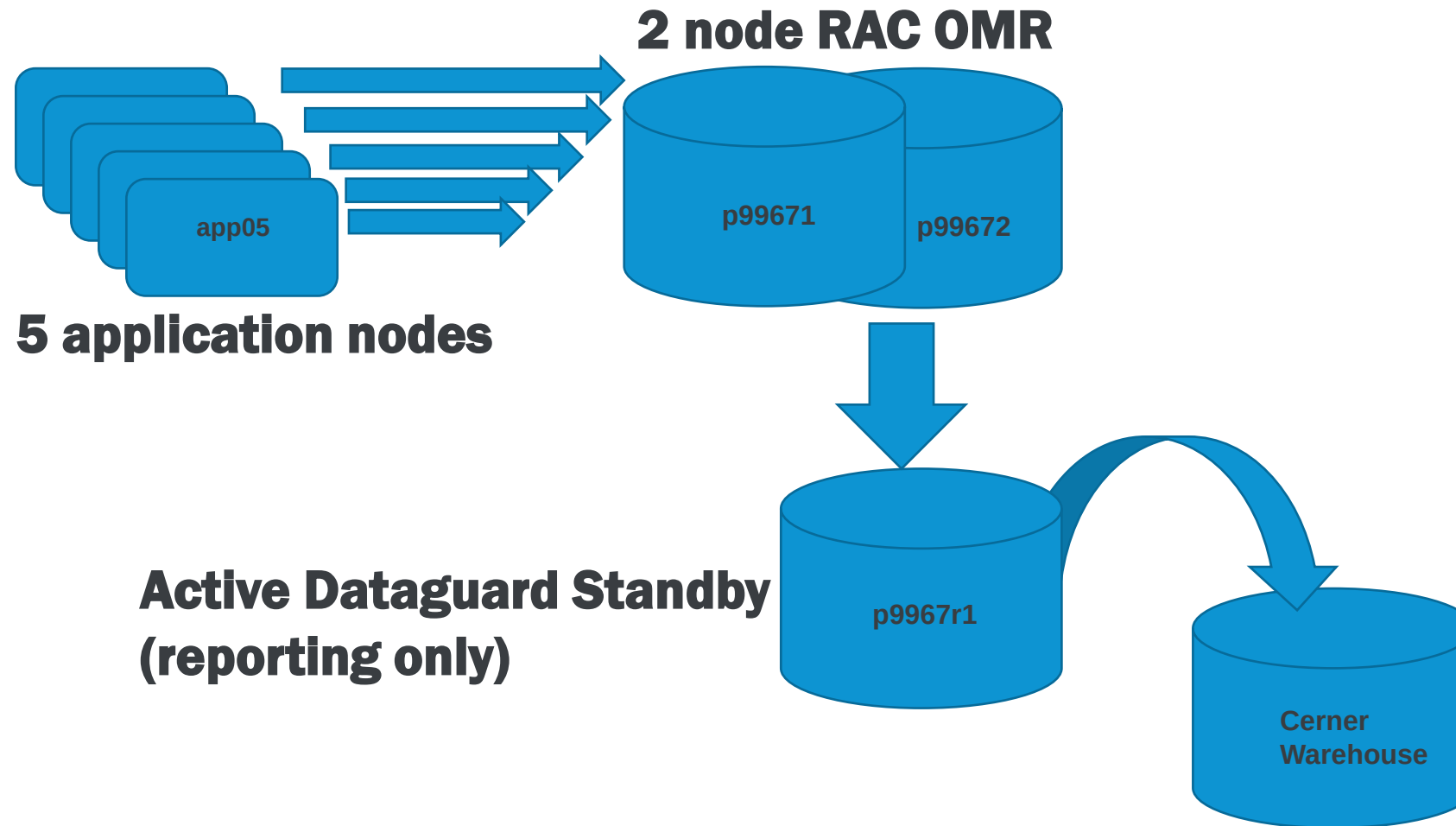
110 custom points of monitoring

20 custom metric extensions

70 out of the box metrics with thresholds

10 out of the box metrics for historical trending

Cerner's Architecture



Why?

10x?

More automation!

Executive reports?

Capacity management?

Trend analysis of database?

Undersized SGA's?

Smarter alarming?

DBA performance?

Easiest query to fix in the enterprise?

Worst query in the enterprise?

The Answer - OEM

- Out of the box + Metric Extensions
- Created the Cerner Warehouse by scraping data from MGMT\$ views
- Data retained indefinitely
- Stored outside of EM repository to prevent performance or growth issues

Management Repository Views

Name	Description
MGMT\$METRIC_CURRENT	Most recent sample of metric values
MGMT\$METRIC_DETAILS	Most recent sample of metric values and values not yet aggregated
MGMT\$METRIC_HOURLY	Aggregated metric values by hour
MGMT\$METRIC_DAILY	Aggregated metric values by day

http://docs.oracle.com/cd/E24628_01/doc.121/e25161/views.htm

Management Repository Views

Name	Tables
MGMT\$METRIC_DETAILS	EM_METRIC_COLUMNS EM_METRIC_GROUPS GC_METRIC_VALUES GC_METRIC_STR_VALUES

http://docs.oracle.com/cd/E24628_01/doc.121/e25161/views.htm

Find the METRIC_GUID

```
SELECT METRIC_COLUMN_GUID, --metric_guid
       METRIC_GROUP_NAME,
       METRIC_COLUMN_NAME,
       b.METRIC_GROUP_ID,
       b.METRIC_GROUP_GUID,
       b.METRIC_GROUP_LABEL,
       A.METRIC_COLUMN_ID,
       A.METRIC_COLUMN_LABEL
FROM sysman.em_metric_columns a, sysman.em_metric_groups b
WHERE  a.metric_group_id = b.metric_group_id
       AND b.target_type = 'oracle_database'
       AND b.metric_group_name = 'wait_bottlenecks';
```

Cerner Warehouse

- SQL Statistics
- Table Statistics
- SQL Tuning Advisor
- Metrics

Why SQL Statistics?

10x?

Worst query in the enterprise?

Running worse here than there?

Trend analysis of SQL?

ME - SQL Statistics

```
SELECT DISTINCT dhs.snap_id || '-' || dhs2.snap_id AS snap_id_range,
TO_CHAR (dhs.begin_interval_time, 'DD-MON-YYYY HH24:MI') AS begin_interval_time,
TO_CHAR (dhs.end_interval_time, 'DD-MON-YYYY HH24:MI') AS end_interval_time,
sqt.sql_id, sqt.phv, sqt.bget AS tbget, sqt.exec,
ROUND (NVL ( (sqt.cput / 1000000), TO_NUMBER (NULL))) AS cpu_time,
ROUND (NVL ( (sqt.elap / 1000000), TO_NUMBER (NULL))) AS elapsed_time,
disk_reads,
NVL (module, 'n/a') || '||||' || NVL (version_count, -1) || '||||' || NVL (sql_profile, 'n/a') || '||||' || NVL (INVALIDATIONS_DELTA, -1) || '||||' || NVL (sharable_mem, -1) || '||||' || NVL (DBMS_LOB.SUBSTR (sql_text, 100), (**
SQL Text Not Available
FROM ( SELECT sql_id, snap_id, plan_hash_value, version_count, sql_profile,
CPU_TIM ELAPSE DREAD
E SQL_ID PHV BGETS EXEC E D S DETAILS
VERSION_C b12g3n0660rn 59948087
SUM (buffer 60161-60162 c 0 3 2786 1465 1526 8350 e
SUM (cpu_ti 59946333
SUM (disk_r 60161-60162 7x0yk3yrzv3rf 0 0 2786 1462 1520 8350 e
FROM dba_hist_sqlstat
WHERE dbid = databaseid
AND instance_number = instance_nbr
AND snap_id BETWEEN curr_start_snap_id AND curr_final_snap_id
GROUP BY sql_id, snap_id, PLAN_HASH_VALUE, VERSION_COUNT, SQL_PROFILE,
INVALIDATIONS_DELTA, SHARABLE_MEM) sqt, dba_hist_sqltext st, dba_hist_snapshot dhs, dba_hist_snapshot dhs2
WHERE st.sql_id(+) = sqt.sql_id AND st.sql_id IS NOT NULL AND dhs.startup_time = dhs2.startup_time AND st.dbid(+) = databaseid AND sqt.snap_id(+) = dhs.snap_id AND dhs2.begin_interval_time =
dhs.end_interval_time
ORDER BY NVL (sqt.bget, -1) DESC, sqt.sql_id;
```


Warehouse - SQL Statistics

SQL_ID	PHV	TOTAL_BG	TOTAL_DR	TOTAL_EXEC S	CPU_TM	ELAPSED_T M
d1wuhqpszftv p	122688973 6	35,113,362,774,97 6	1,300,092	2,683,646,120	88,426,544	83,497,224
d1wuhqpszftv p	258822717 6	28,638,423,347,41 2	1,393,996	1,775,854,000	76,440,236	73,871,248
d9ct13wx17v9 3	345203957 6	14,926,290,137,56 1	936,920,076	46,846,000,00 0	84,353,971	93,428,954
1097zatpw463 7	342767733 1	9,891,943,767,783	20,572,926	11,532	44,145,411	44,524,812
cs4bq99fzh36 n	161818729 0	7,736,366,569,461	17,209,758	176,411,901	17,075,416	17,173,383
48ypwfbrxygy 8	331870958 1	6,453,979,534,014	344,610,000,00 0	11,153,529	156,718,75 8	214,697,010

Warehouse - SQL Statistics

- Highest consumer of disk reads, buffer gets, CPU time
- Baseline performance of SQL ID and PHV
- SQL ID cross-database comparisons
- Custom query or Cerner query

Why Table Statistics?

10x?

Capacity Management?

Trend analysis of database?

Busiest table in enterprise?

ME – Table Statistics

```
EXEC DBMS_STATS.FLUSH_DATABASE_MONITORING_INFO();
```

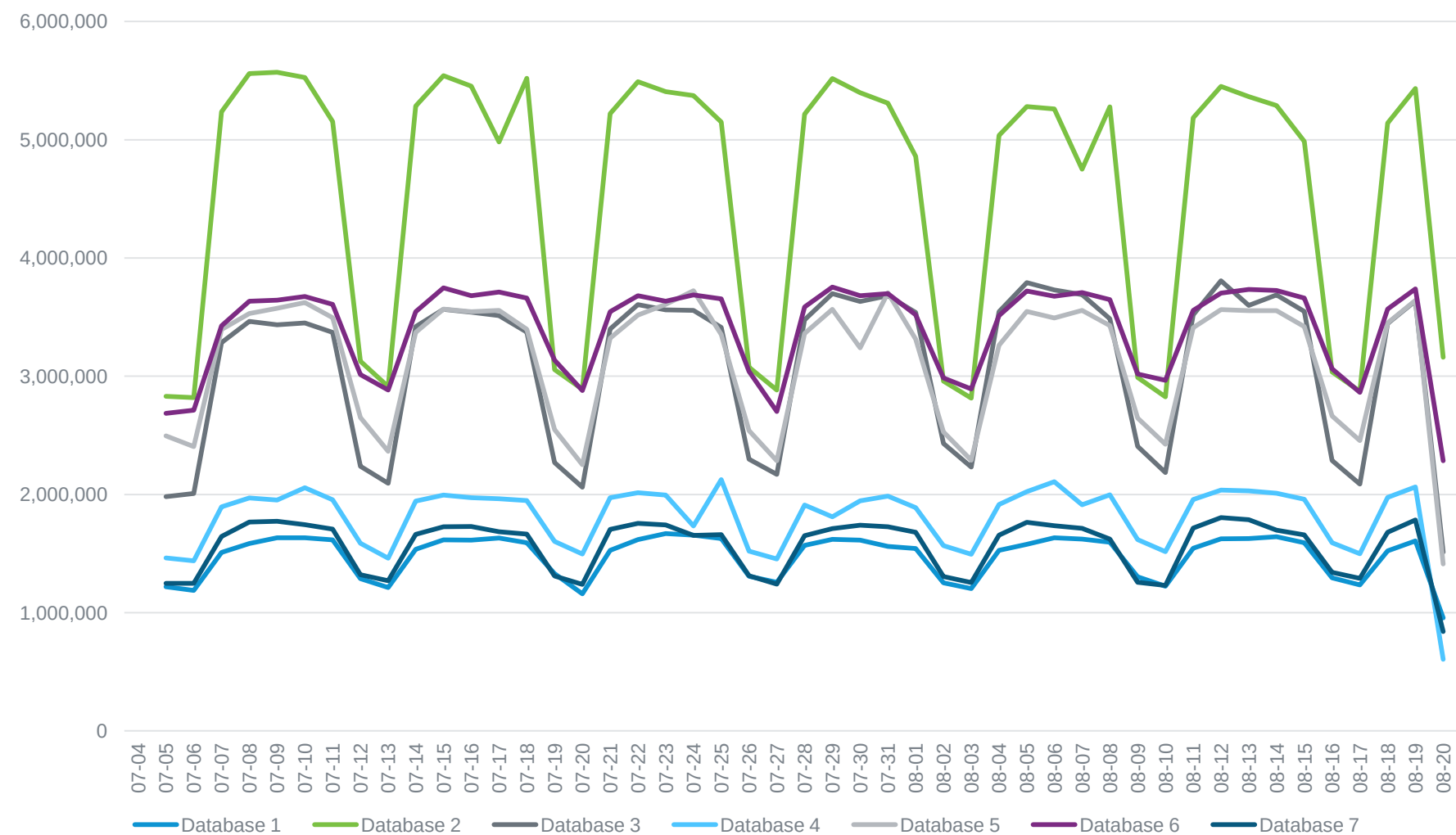
```
SELECT DISTINCT b.owner,  
               a.table_name,  
               b.num_rows,  
               a.inserts,  
               a.updates,  
               a.deletes,  
               b.last_analyzed  
FROM SYS.dba_tab_modifications a, SYS.dba_tables b  
WHERE  a.table_name = b.table_name  
      AND a.table_owner = b.owner  
      AND b.owner NOT LIKE '%SYS%' ORDER BY num_rows DESC;
```

Warehouse – Table Statistics

DBA_TAB_STATISTICS

- TARGET_NAME
- COLLECTION_TIME
- OWNER
- TABLE_NAME
- NUM_ROWS
- INSERTS
- UPDATES
- DELETES
- LAST_ANALYZED

CLINICAL_EVENT - Inserts



Why the SQL Tuning Advisor?

10x?

Easy fixes for worst queries?

Create indexes with most benefit?

Most common recommendation?

OEM – SQL Tuning Advisor

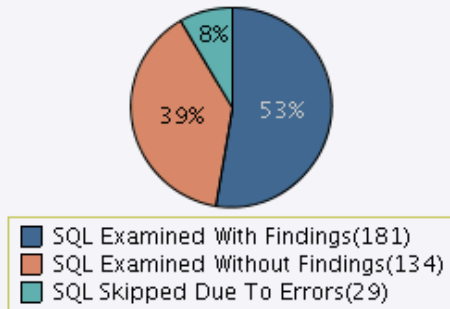


OEM – SQL Tuning Advisor

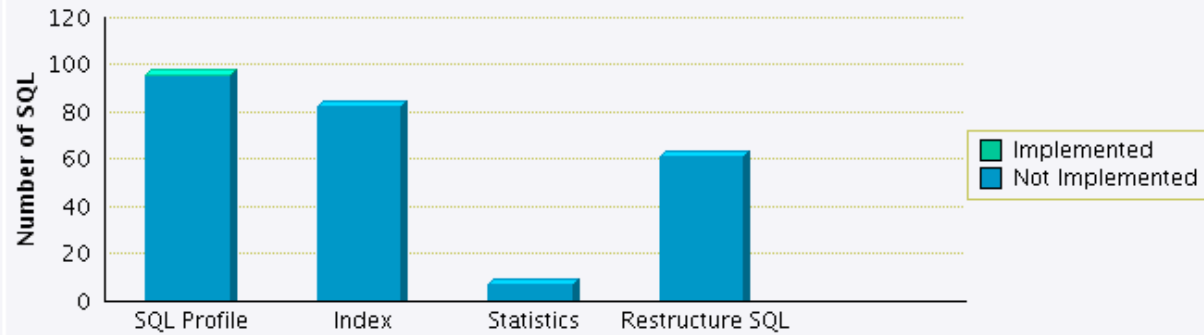
Overall Task Statistics

Executions 53 Candidate SQL 14827 Distinct SQL Examined 344

SQL Examined Status



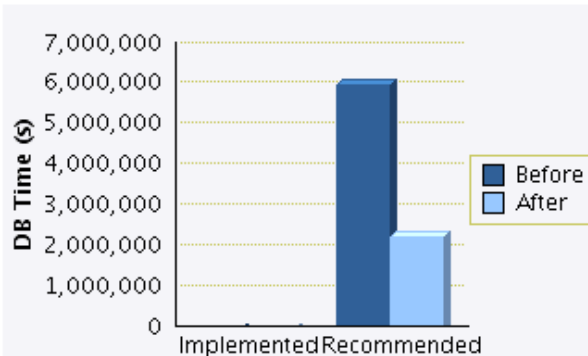
Breakdown by Finding Type



Profile Effect Statistics

Workload Potential DB Time Benefit (seconds per week)

Implemented (sec) 5143 Potential Benefit(sec) 3772840



OEM – SQL Tuning Advisor

Automated Maintenance Tasks > Automatic SQL Tuning >

Automatic SQL Tuning Result Details: All Analyzed SQLs

Begin Date Aug 11, 2014 7:00:08 PM GMT-07:00

End Date Sep 11, 2014 10:49:01 AM GMT-07:00

Recommendations

Only profiles that significantly improve SQL performance were implemented.

[View Recommendations](#) [Implement All SQL Profiles](#)

Select	SQL Text	Parsing Schema	SQL ID	Statistics	SQL Profile ▼	Index	Restructure SQL
☒	SELECT /*+ RULE CCL<LH_MU_EP_RUN_LOAD:...	V500	3s75r0bqvjc9		(100%) ✓		
☐	/*+ JDBC<COM.CERNER.EXTRACT.MILLENNIUM.C...	V500_READ	cu7x2rv6f8krb		(100%) ✓		
☐	SELECT /*+ CCL<AH_PN_GET_LAB_RESULTS:S...	V500	93r829b9d9mk0		(100%) ✓		
☐	SELECT /*+ MECH_ORDER CCL<LH_CORE:S999...	V500	crzydbgwx9rk		(100%) ✓		✓
☐	SELECT /*+ RULE CCL<LH_MU_EP_LOAD:S999...	V500	bcnybb9wq105x		(100%) ✓	(99.4%) ✓	
☐	SELECT /*+ RULE CCL<LH_MU_EP_RUN_LOAD:...	V500	byytm1ynn8mr9		(100%) ✓		
☐	SELECT /*+ RULE CCL<LH_MU_EP_RUN_LOAD:...	V500	05nsgyvv9jrx4		(100%) ✓		
☐	/*+ JDBC<COM.CERNER.DATA.ACCESS.MMF.MOM...	V500	g0nbqq2v0h753		(100%) ✓		
☐	SELECT /*+ CCL<LH_VTE:S9999:08:q00.1> ...	V500	axrfy2784a5t1		(100%) ✓		✓
☐	SELECT /*+ leading(epr) CCL<LH_NQF2_RE...	V500	cjkkqf796naax		(100%) ⚠		
☐	SELECT /*+ CCL<LH_VTE:S9999:08:q00.1> ...	V500	515c3uhg4dbpp		(100%) ✓		✓
☐	SELECT /*+ CCL<LH_E_VTE:S9999:08:q00.1...	V500	1y38vb9d6515u		(100%) ✓		
☐	SELECT /*+ LEADING(O) CCL<AH_CPOE_PROV...	V500_READ	6x3v5nd78fkq7		(100%) ✓	(82%) ✓	✓
☐	SELECT /*+ CCL<LH_VTE:S9999:08:q00.1> ...	V500	5rs9k6umsvk02		(99.9%) ✓		✓
☐	SELECT /*+ MECH_ORDER CCL<LH_CORE:S999...	V500	05c5a4v8arxjs		(99.9%) ✓		✓
☐	SELECT /*+ CCL<LH_VTE:S9999:08:q00.1> ...	V500	gbzbm8ztg802z		(99.9%) ✓		
☐	SELECT /*+ CCL<LH_VTE:S9999:08:q00.1> ...	V500	fj0hxb5aagkvz		(99.9%) ✓		
☐	SELECT /*+ MECH_ORDER CCL<LH_CORE:S999...	V500	05c5a4v8arxjs		(99.9%) ✓		✓
☐	SELECT /*+ RULE CCL<LH_MU_EP_LOAD:S999...	V500	6vtsp8hwuqrhg		(99.8%) ✓	(98.9%) ✓	
☐	SELECT /*+ CCL<PM_ENS_PERSON_ORG_RELTN...	V500	gw42adxxgan8x		(99.5%) ✓	(92%) ✓	
☐	SELECT /*+ CCL<OCX_GET_PROVIDERS_BY_NA...	V500	7zhfpu27usw7v		(99.5%) ✓		✓
☐	SELECT /*+ CCL<OMF_RUN_VIEW:S9999:08:q...	V500	c9nfprqjyk8p		(99.3%) ✓	(66.9%) ✓	
☐	SELECT /*+ INDEX(ELH xie8encntr_loc_hi...	V500_READ	7db02vxf0udwx		(99.3%) ✓		
☐	SELECT /*+ leading(enc) CCL<LH_NQF2_RE...	V500	dbvrhrc3zjhbh		(99.3%) ✓	(80.7%) ✓	
☐	SELECT /*+ CCL<LH_VTE:S9999:08:q00.1> ...	V500	an9rduccuh95a		(98.9%) ✓		✓

[View Recommendations](#) [Implement All SQL Profiles](#)

ME – SQL Tuning Advisor

```
SELECT *  
  FROM dba_advisor_recommendations u  
 WHERE u.task_id = (SELECT task_id  
                   FROM dba_advisor_tasks  
                   WHERE task_name = 'SYS_AUTO_SQL_TUNING_TASK'  
);  
SELECT object_id,  
       attr1,  
       attr3,  
       e.execution_start,  
       e.execution_name  
  FROM dba_advisor_objects o, dba_advisor_executions e  
 WHERE   o.task_id = (SELECT task_id  
                     FROM dba_advisor_tasks  
                     WHERE task_name = 'SYS_AUTO_SQL_TUNING_TASK')  
        AND o.TYPE = 'SQL'  
        AND o.execution_name = e.execution_name;
```

Warehouse – SQL Tuning Advisor

SQL_ID	REPORTING_DATABASES	DISTINCT_DATABASES	TOTAL_BG	TOTAL_EXECS	BG_PER
52qnsp16afdm7	81	196	47,136,951,749	7,270	6,483,762
804wj40auww6w	77	203	1,071,329,713,190	5,776,129	185,475
46yympary4gyz	76	124	6,701,719,543,096	11,683,131	573,624
ds6vbytup6w0r	69	119	3,253,934,836,692	10,444,961	311,532
f0u8qzt3gaym9	55	100	3,760,689,635	1,339,419	2,808
a8r4jspc82zn5	44	174	61,586,138,487	41,900,725	1,470
08243r3317bgz	43	44	230,290,386,500	56,521	4,074,422
b21vbsddyvhfc	33	163	16,747,593,484	17,386	963,280
9u8f3qzknpc32	31	135	704,415,240	9,079	77,587

Warehouse – SQL Tuning Advisor

SQL_ID	REPORTING_DATABASES	DISTINCT_DATABASES	TOTAL_BG	TOTAL_EXECS	BG_PER
804wj40auww6w	77	203	1,071,329,713,190	5,776,129	185,475

SQL ID: 804wj40auww6w

Databases reporting benefit: 77

Databases running this SQL ID: 203

Total Buffer Gets since 1/1/2014 (Enterprise): 1.1 trillion

Buffer Gets Per Day (Enterprise): 3.7 billion

Potential Buffer Gets Per Day: 37 million

99% improvement!

Why Metrics?

10x?

Technical Data Scientist?

Do execs per second relate to CPU per second?

Average Active Sessions trend?

Capacity Management?

OEM – Metrics Settings

ORACLE Enterprise Manager Cloud Control 12c Setup ▾

Enterprise ▾ Targets ▾ Favorites ▾ History ▾ Search Target Name

Monitoring Templates

▽	Throughput					Every 10
☐	Average Active Sessions	>			None	
☐	BG Checkpoints Per Sec	>			None	
☐	Cumulative Logons Per Sec	>=			None	
☐	Database Block Changes Per Sec	>			None	
☐	Database Block Changes Per Txn	>			None	
☐	Database Block Gets Per Sec	>			None	
☐	Database Block Gets Per Txn	>			None	
☐	Database Time (centiseconds per second)	>			None	
☐	DBWR Checkpoints Per Sec	>			None	
☐	Executes Performed without Parses (%)	<			None	
☐	Executes Per Sec	>			None	
☐	Full Index Scans Per Sec	>			None	
☐	Full Index Scans Per Txn	>			None	

Warehouse – Buffer Cache Hit

Collected every ten minutes

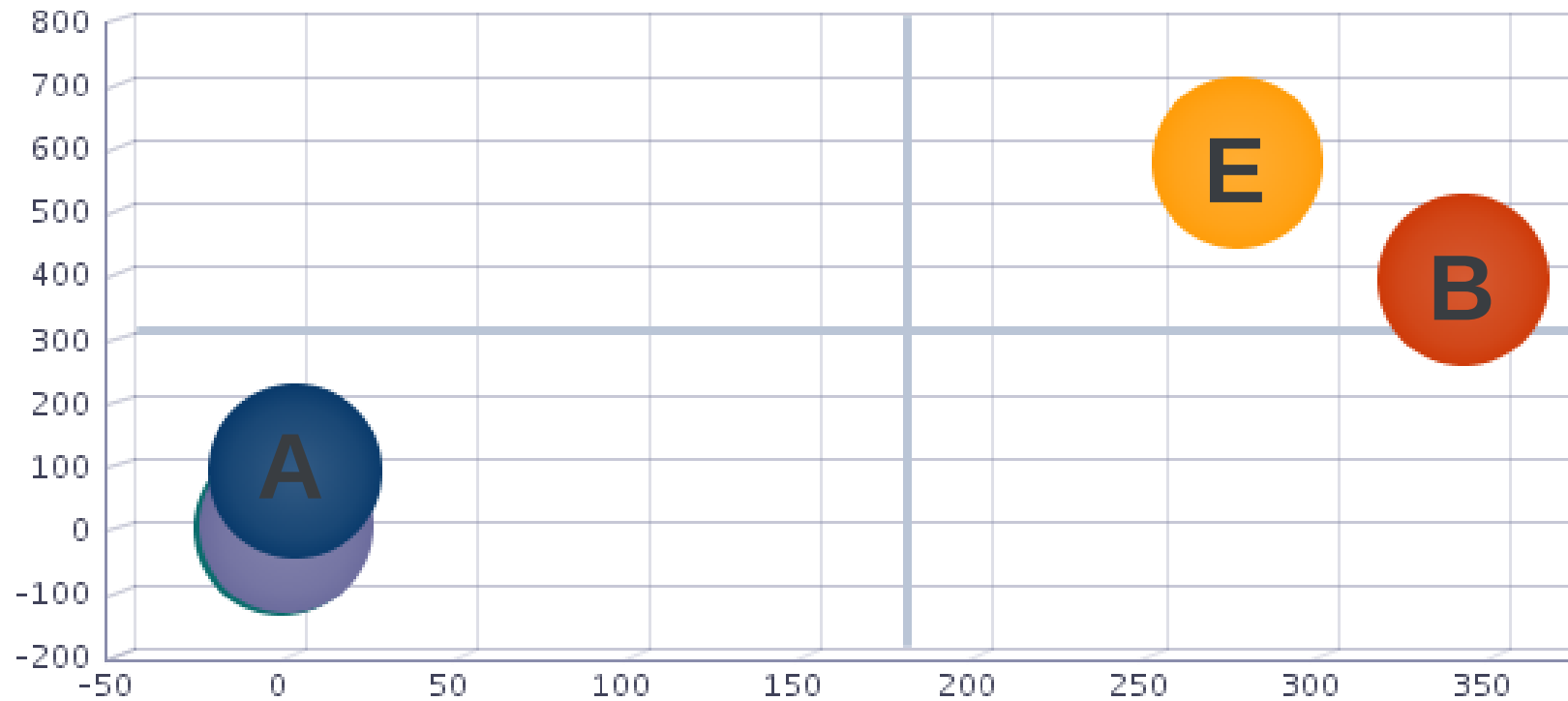
Only analyze business hours for last 30 days

	>=98%	< 98% and >=95%	< 95% and >=90%	<90%
Database A	2038	192	80	0
Database B	1672	137	176	340
Database C	2255	13	0	0
Database D	2266	2	0	0
Database E	367	1231	580	279

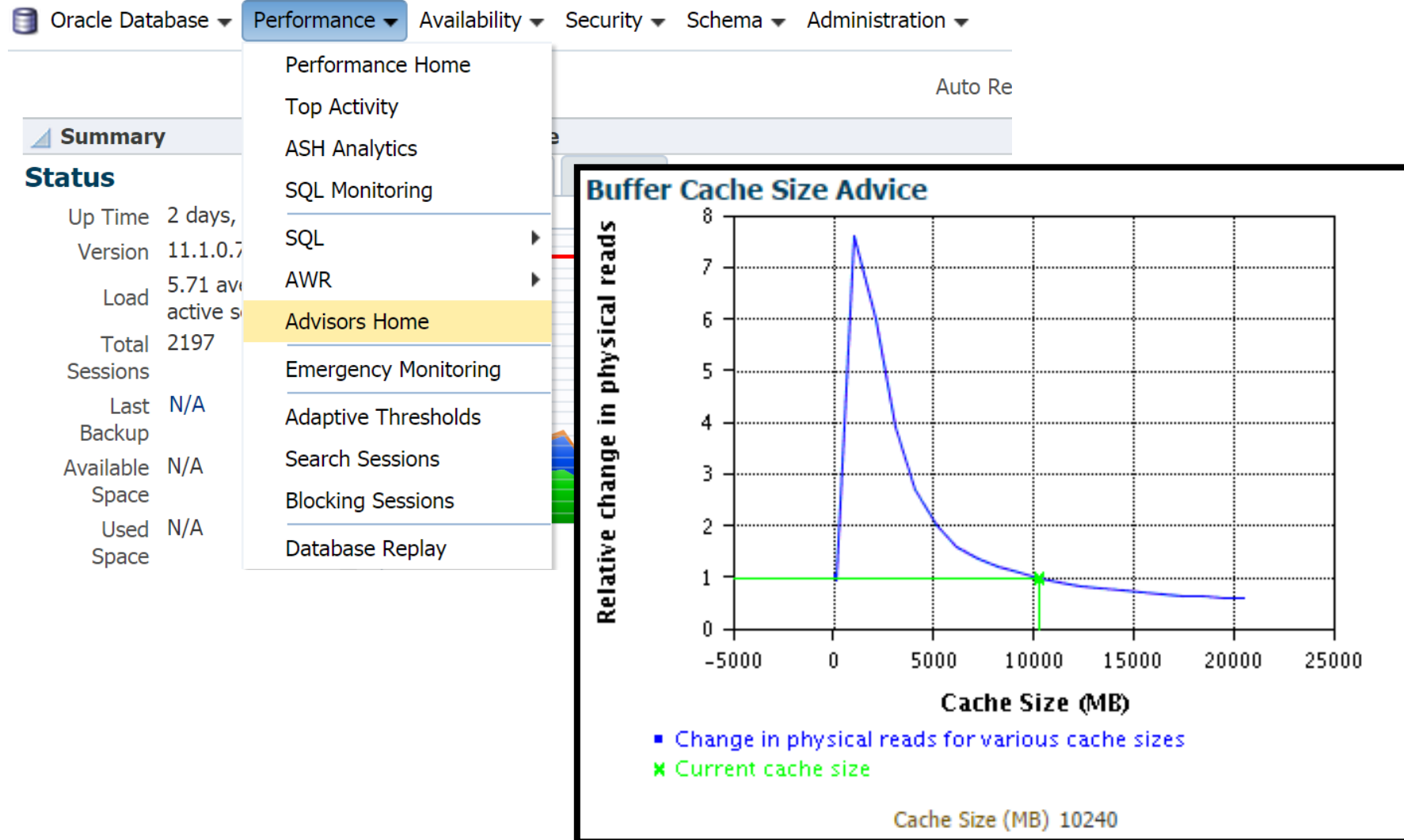
Warehouse – Buffer Cache Hit

X Axis: Count of snaps <90%

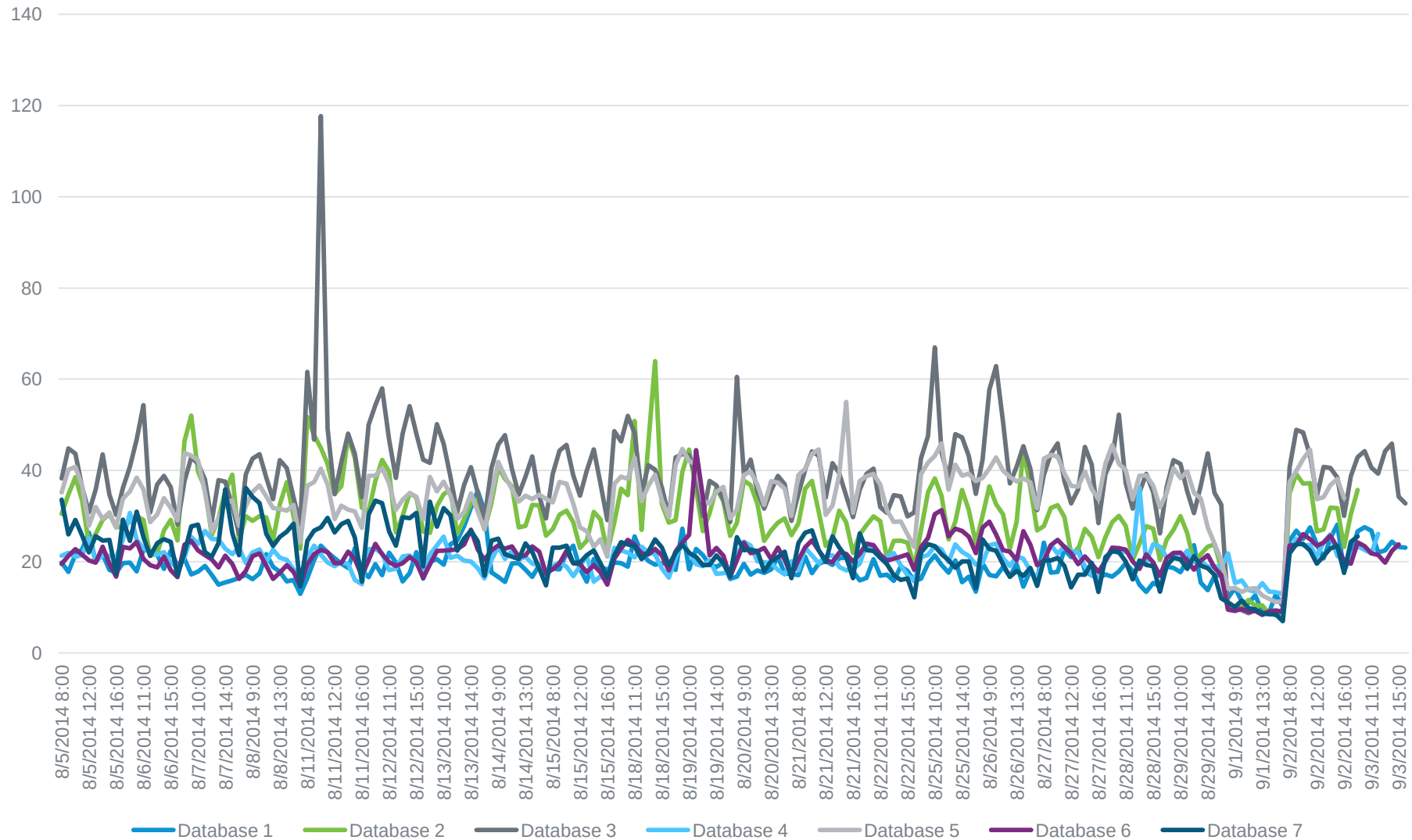
Y Axis: Count of snaps $\geq 90\%$ and <95%



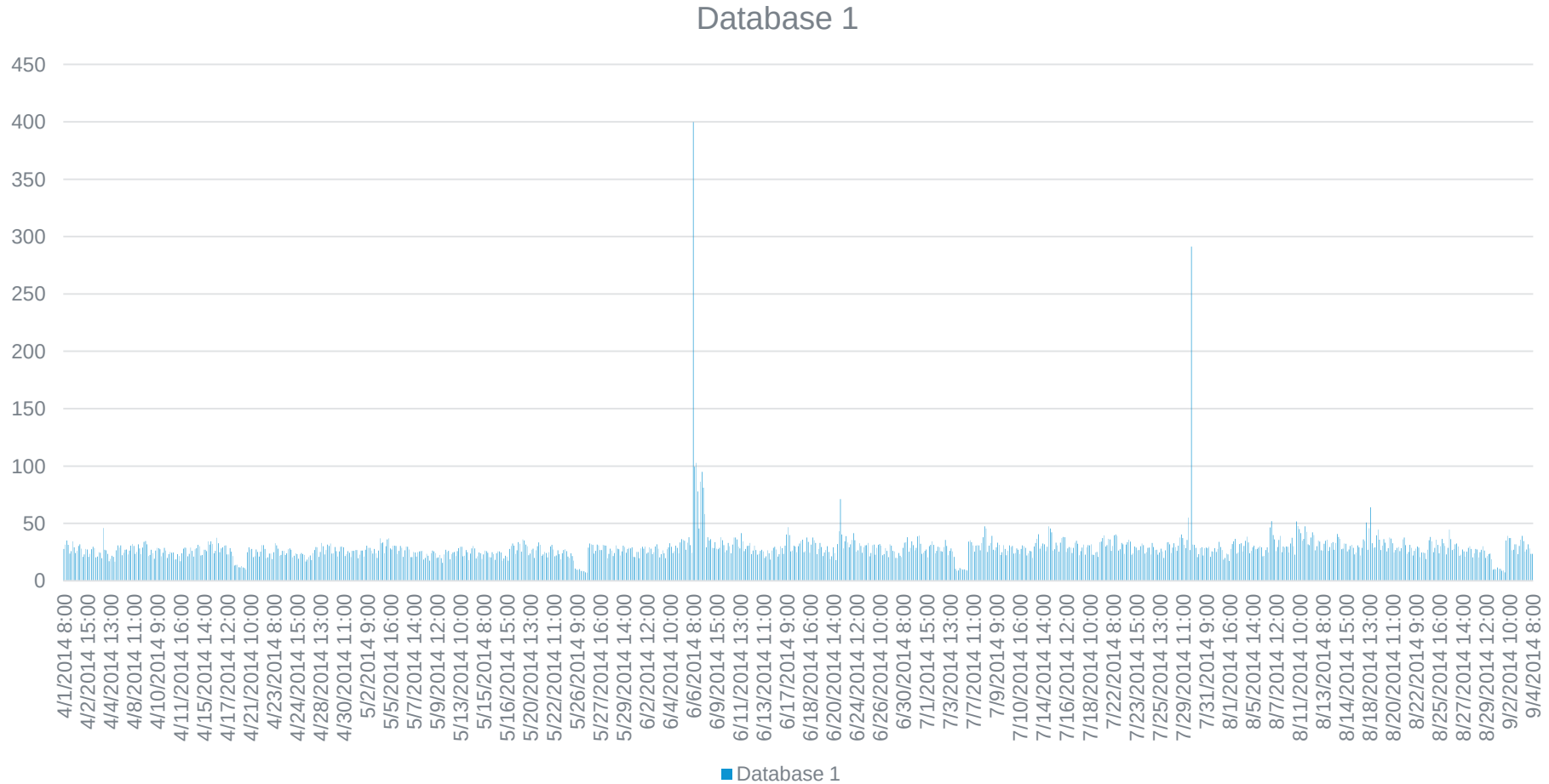
OEM – Buffer Cache Advisor



Average Active Sessions (multi-target)



Average Active Sessions (single target)

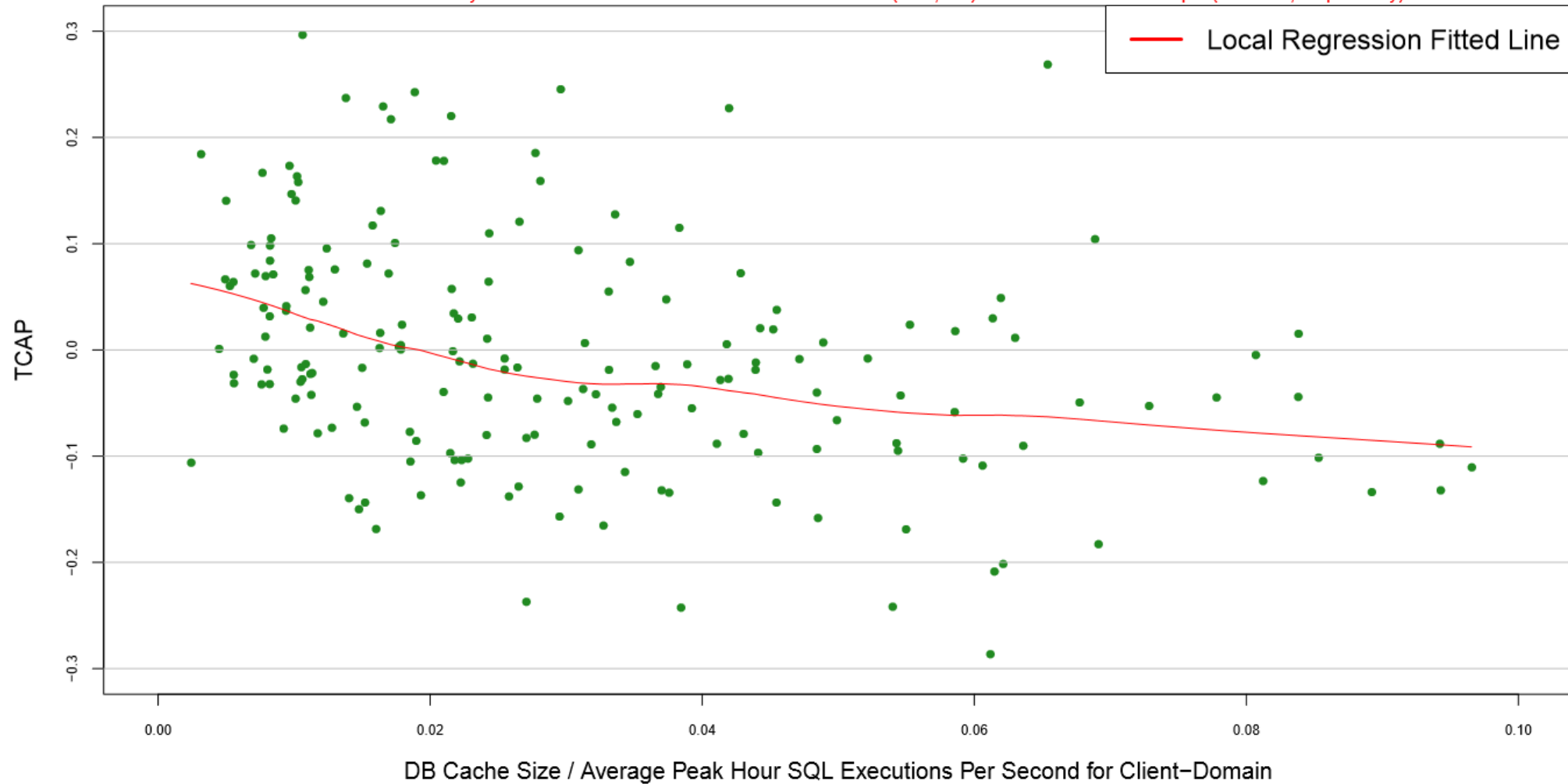


Is that it?

- SQL Statistics
 - 370 million rows
- Table Statistics
 - 235 million rows
- SQL Tuning Advisor
 - 72,000 rows
- Historical Metrics
 - 520 million

TCAP vs. Memory Allocation Measure (using 09/08/14 – 09/12/14 data)

Data Points with Memory Allocation Measure over 0.10 or TCAP outside of (-0.3, 0.3) were removed from sample (15 and 5, respectively)



DBA Scorecard

	Incident Management				Database Health		
Average	20	22	12%	763	8.7	7.0	2.2
DBA	Incident Score	Total Currently Open	% Ack.	Minutes to Close (Avg)	SQLTA Score	Parameters	Patches
Sawyer	7	5	13%	1757	4	5	5
Kate	17	157	7%	480	57	6	3
Jack	0	0	0%	0	0	0	3
John	5	9	0%	1089	5	5	2
Charlie	16	8	15%	970	6	5	2
Sayid	18	7	0%	225	3	2	1
Desmond	22	16	52%	1206	3	2	2

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Easiest query to fix in the enterprise?

Worst query in the enterprise?

Advanced Diagnostics and Monitoring with Oracle Enterprise Manager 12c

AWR Warehouse

Courtney Llamas
Strategic Customer Programs, Enterprise Manager
October 2, 2014

AWR Warehouse - Business Drivers



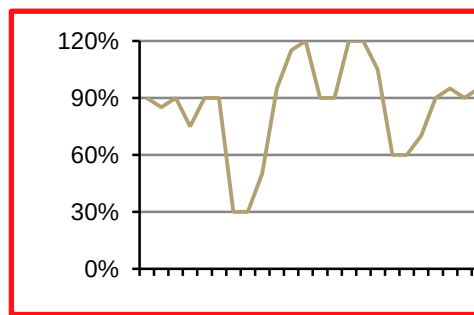
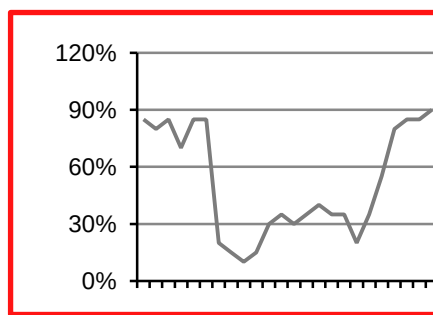
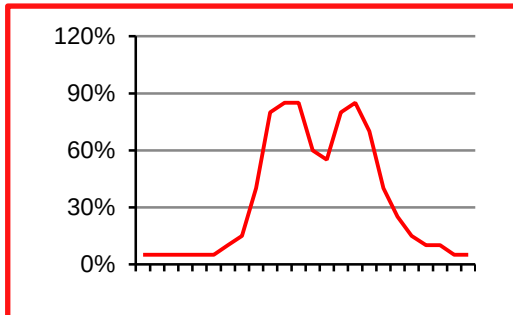
Finance



CRM

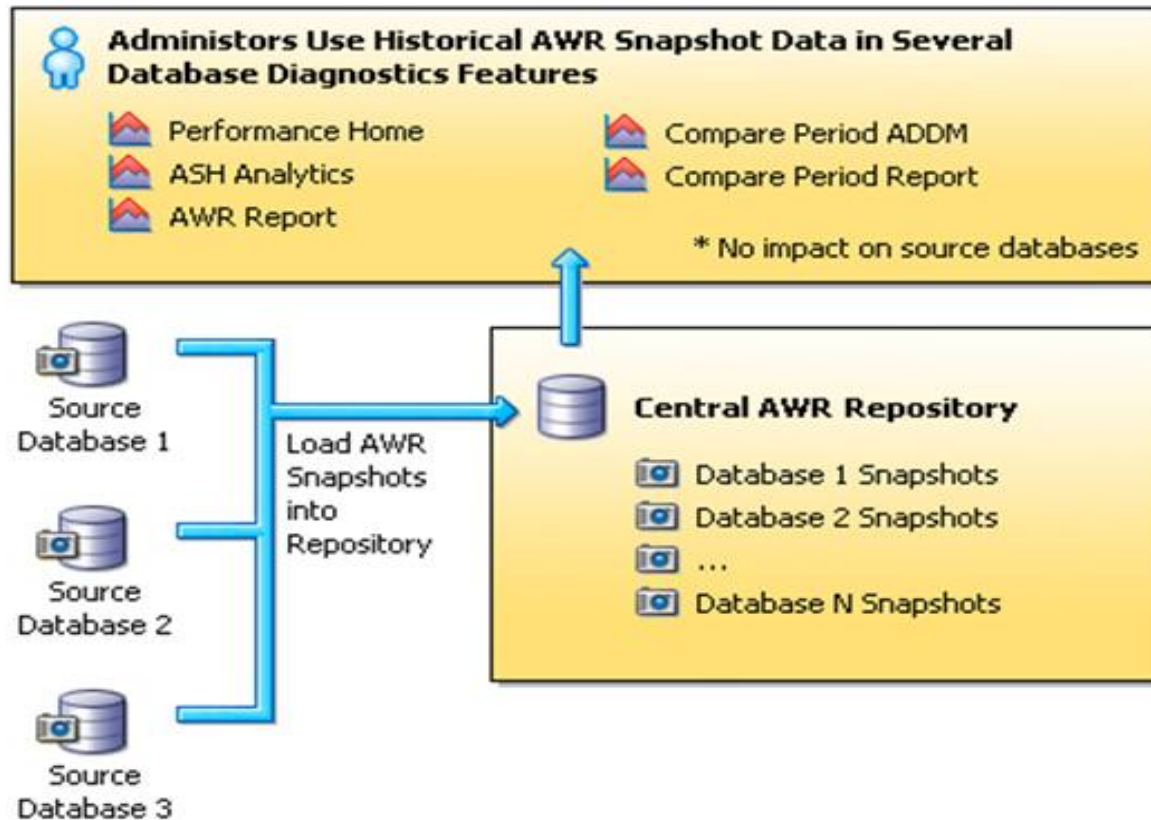


Supply Chain



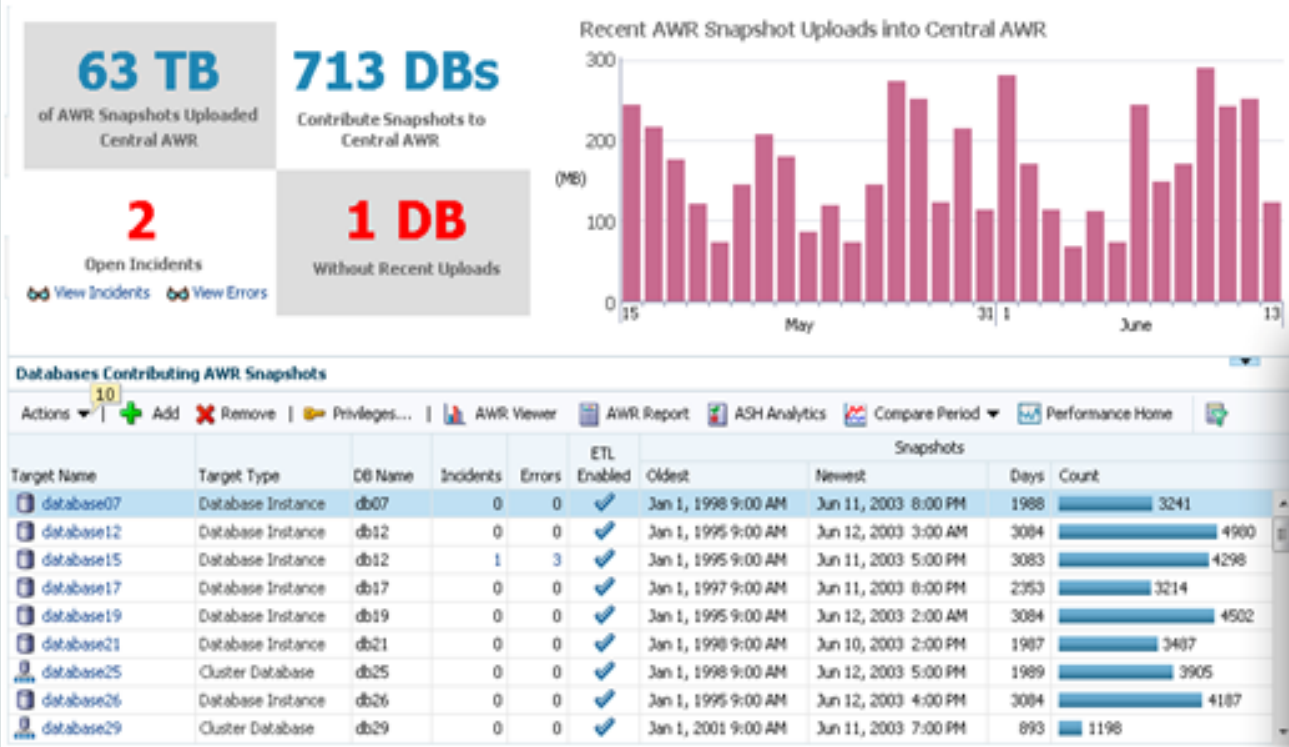
- Automatic Workload Repository (AWR) is the *de facto* performance repository for Oracle databases since 10g
- Default retention period of 8 days prevents diagnosis of long term performance problems (“Compare performance during this quarter’s books close with last quarter’s”)
- Increasing AWR retention period increases overhead and cost in critical production environments

AWR Warehouse - Architecture



- Central warehouse configured for long term AWR data retention
- Historical and ongoing AWR snapshots collected from databases enabled for AWR warehouse
- ETL jobs moves snapshots from source databases into AWR warehouse
- Retention period configurable for weeks, months, years or forever (default)

AWR Warehouse Features



- Warehouse dashboard tracking ETL jobs
- All AWR features available on long term AWR data
 - Performance page
 - AWR report
 - ASH analytics
 - Compare Period ADDM
 - Compare Period Report
- Integrated seamlessly into EM UI
- Zero runtime overhead on source Production databases

AWR Warehouse – Availability Licensing Details

- AWR Warehouse is a licensable feature of Database Diagnostics Pack
- Functionality available EM 12.1.0.4 with DB 12.1.0.6 + Bundle 2
 - [Documentation: 2-Day DBA Performance Tuning Guide \(12.1.0.2\)](#)
- AWR Warehouse includes free restricted use Database EE license
- Non-system or user usage of additional options requires separate per product licenses, for e.g., RAC, Partitioning, etc.

AWR Warehouse - Requirements

- EM 12.1.0.4, DB Plugin 12.1.0.6 + 19391521
- AWR Warehouse
 - Best practice recommendation - do not co-locate EM and AWR Warehouse
 - DB 12.1.0.2+ or 11.2.0.4 + Patch 18547891
- Target Databases
 - Agent 12.1.0.4 + 19051570, DB Plugin + 19391503
 - Database discovered as target
 - Database version 10.2.0.4 and higher
 - DB User with execute on sys.dbms_swrf_internal package and DBA role

AWR Home Page

ORACLE

Enterprise Manager

Cloud Control 12c

Setup | TESTSUPERADMIN

Enterprise | Targets | Favorites | History

Search Target Name

Automatic Workload Repository Warehouse

Page Refreshed Jul 5, 2014 3:00:13 PM PDT

5648 MB

of AWR Snapshots Uploaded to AWR Warehouse

21 DBs

Contribute Snapshots to AWR Warehouse

3

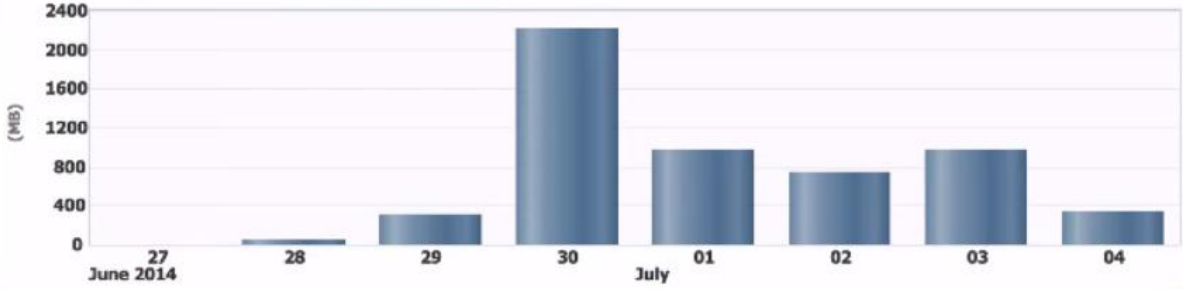
Open Incidents

[View Incidents](#) [View Errors](#)

4 DBs

Without Recent Uploads

Recent AWR Snapshot Uploads into AWR Warehouse



Date	Uploads (MB)
27 June 2014	0
28	~50
29	~300
30	~2200
01 July	~1000
02	~800
03	~1000
04	~400

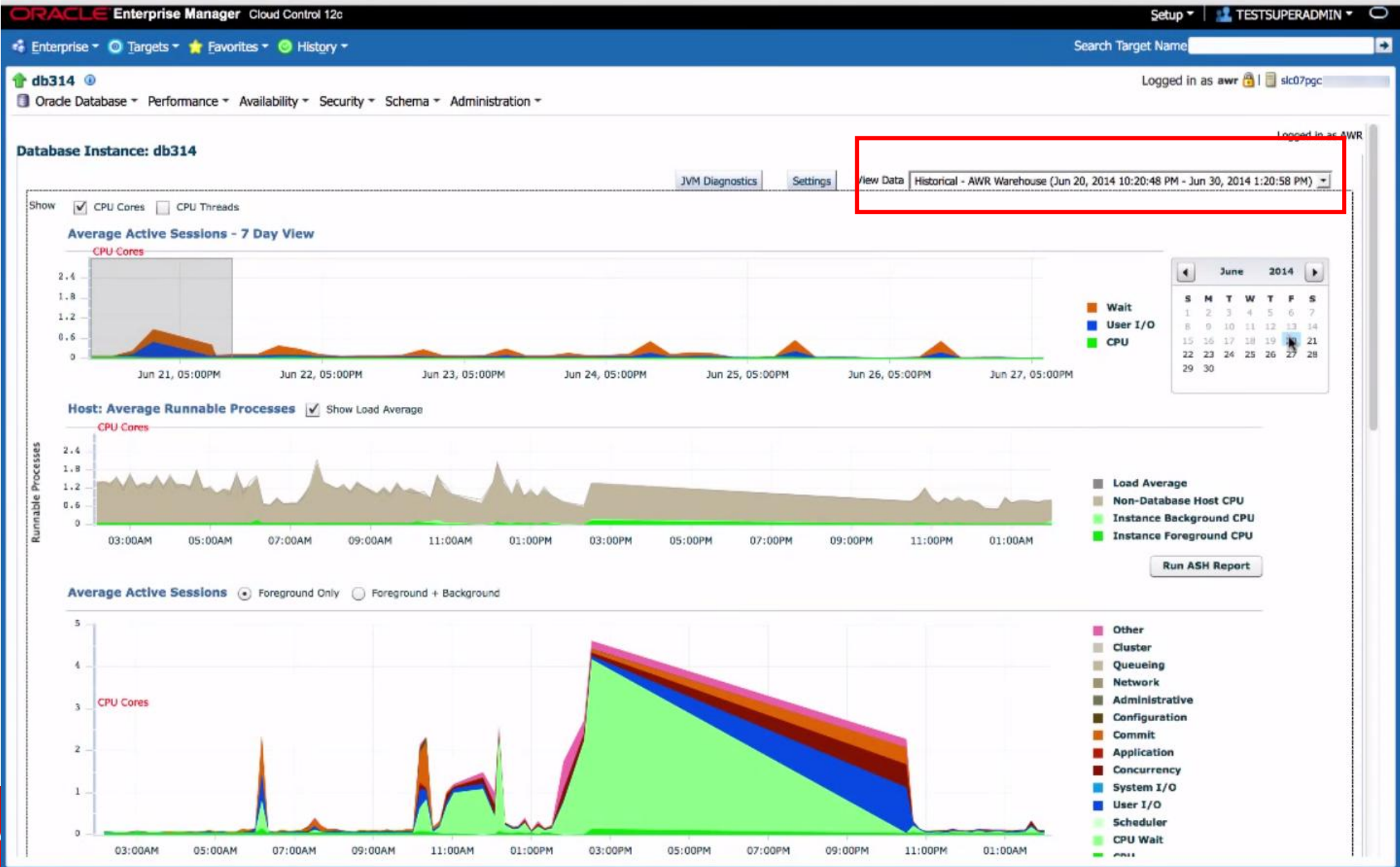
Databases Uploading AWR Snapshots

Actions | View | Add | Remove | View Errors | Privileges... | ASH Analytics | AWR Report | Compare Period | Performance Home

Target Name	Target Type	DB Name	Version	Owner	Snapshot Upload Enabled	Oldest	Newest	Snapshots	Days	Count
Oemrep_Database	Database Instance	SH3	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-28 00:13:00.029 -7:00	2014-07-04 18:00:31.89 -7:00		6	163
db306	Database Instance	DB306	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-21 23:20:46.647 +0:00	2014-07-04 17:40:01.769 +0:00		12	320
db301	Database Instance	DB301	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-21 22:46:39.566 +0:00	2014-07-04 00:41:36.573 +0:00		12	399
dbm01	Cluster Database	DBM01	11.2.0.4.0	TESTSUPERADMIN	✓	2014-06-22 00:59:29.534 -7:00	2014-07-03 01:00:30.779 -7:00		11	265
db304	Database Instance	DB304	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-21 23:21:42.362 +0:00	2014-06-30 21:50:52.487 +0:00		8	256
db305	Database Instance	DB305	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-22 00:43:43.71 +0:00	2014-06-30 21:50:30.428 +0:00		8	227
db307	Database Instance	DB307	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-22 01:10:03.71 +0:00	2014-06-30 21:50:26.863 +0:00		8	233
db308	Database Instance	DB308	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-22 00:31:54.144 +0:00	2014-06-30 21:50:25.664 +0:00		8	247
dbm02	Cluster Database	DBM02	11.2.0.4.0	TESTSUPERADMIN	✓	2014-06-21 17:59:19.554 -7:00	2014-06-30 08:58:41.878 -7:00		8	208
db303	Database Instance	DB303	11.2.0.3.0	TESTSUPERADMIN	✗	2014-06-21 22:58:05.957 +0:00	2014-06-30 15:41:01.371 +0:00		8	200
db314	Database Instance	DB314	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-20 22:30:48.563 +0:00	2014-06-30 13:20:58.261 +0:00		9	1330
db302	Database Instance	DB302	11.2.0.3.0	TESTSUPERADMIN	✗	2014-06-22 00:00:45.17 +0:00	2014-06-28 23:50:21.927 +0:00		6	124
db310	Database Instance	DB310	11.2.0.3.0	TESTSUPERADMIN	✗	2014-06-22 21:46:11.602 +0:00	2014-06-28 23:50:15.074 +0:00		6	153
db318	Database Instance	DB318	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-21 22:10:50.229 +0:00	2014-06-27 13:50:11.661 +0:00		5	460
db319	Database Instance	DB319	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-22 13:11:11.258 +0:00	2014-06-27 13:40:23.784 +0:00		5	450
db313	Database Instance	DB313	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-22 22:20:59.159 +0:00	2014-06-27 12:20:49.833 +0:00		4	380
db317	Database Instance	DB317	11.2.0.3.0	TESTSUPERADMIN	✓	2014-06-21 07:20:34.666 +0:00	2014-06-27 09:50:54.563 +0:00		6	430

ORACLE

Performance Pages



Compare ADDM

ORACLE Enterprise Manager Cloud Control 12c

Enterprise Targets Favorites History

db314 Oracle Database

Run Compare Pe

Step 1: Select

Time Zone GMT

Begin Time n

End Time n

Step 2: Select

Database 197

Time Zone GMT

Offset

Offset On

Baseline

Baseline

Customize

Begin Time

End Time

db314

Oracle Database Performance Availability Security Schema Administration

Compare Period ADDM Report

Overview

SQL Commonality 56%

Base Period

Database D8314

Instances 1

Begin Time 2014-06-21 07:00:27 GMT 00:00

Duration 1.0h

Comparison Period

Database D8314

Instances 1

Begin Time 2014-06-28 07:00:12 GMT 00:00

Duration 1.0h

Average Active Session .19

Average Active Session .05

Details

Configuration Finding Resource

Performance Difference	Change Impact(%)	Base Period	Comparison Period
Commits and Rollbacks	42	.09	.01
Session Connect and Disconnect	28	.05	0
Top Missing SQLs	27	.05	0
Checkpoints Due to Log File Size	19	.04	0
Unusual 'User I/O' Wait Event	16	.04	.01
PL/SQL Execution	6	.02	.01

Display: Change Impact (Absolute Value) >= 5 % Regression Improvement

Description

Significant number of active sessions were found waiting on wait event "log file sync" while performing COMMIT and ROLLBACK operations. Impact changed from 0.09 active sessions to 0.01 active sessions by 42%

System Change Breakdown

Run



ASH Analytics



Getting More Data from AWR

- Query the AWR Warehouse directly
- Use dbsnmp.caw_dbid_mapping to map DBID to DB Name
- Compare multiple SQL ID's in one database
- Compare same SQL ID's across many databases (Dev, Prod, etc.)
- Look for multiple hash plans for the same SQL ID

Multiple Hash Plans for Same Query

```
SQL> select SQL_ID
, PLAN_HASH_VALUE
, sum(EXECUTIONS_DELTA) EXECUTIONS
, sum(ROWS_PROCESSED_DELTA) CROWS
, trunc(sum(CPU_TIME_DELTA)/1000000/60) CPU_MINS
, trunc(sum(ELAPSED_TIME_DELTA)/1000000/60) ELA_MINS
from DBA_HIST_SQLSTAT S, DBSNMP.CAW_DBID_MAPPING M
where LOWER(M.TARGET_NAME) = '&dbname'
and M.NEW_DBID = S.DBID
and S.SQL_ID in ('&sqlid')
group by SQL_ID , PLAN_HASH_VALUE
order by SQL_ID, CPU_MINS;
```

Multiple Hash Plans for Same Query

SQL_ID	PLAN_HASH_VALUE	EXECUTIONS	CROWS	CPU_MINS	ELA_MINS
d17f7tqcaa416	3035679780	1	1	0	0
d17f7tqcaa416	8947562239	1	1	2.21	1.79

Resources

- [OTN Screenwatch: Analyze Long-term Performance Across Enterprise Databases Using AWR Warehouse](#)
- [Documentation: 2-Day DBA Performance Tuning Guide \(12.1.0.2\)](#)
- Blogs: courtneyllamas.com, blogs.oracle.com/oem, DBAKevlar.com
- [OTN: Advanced Usage of the AWR Warehouse](#)