



DBA Competence Center

Introduction to Database Metrics

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Automatic Performance Stats

- Cumulative statistics
- ASH
- **Metrics**
- All statistics are initially in memory and then optionally preserved on disk in AWR



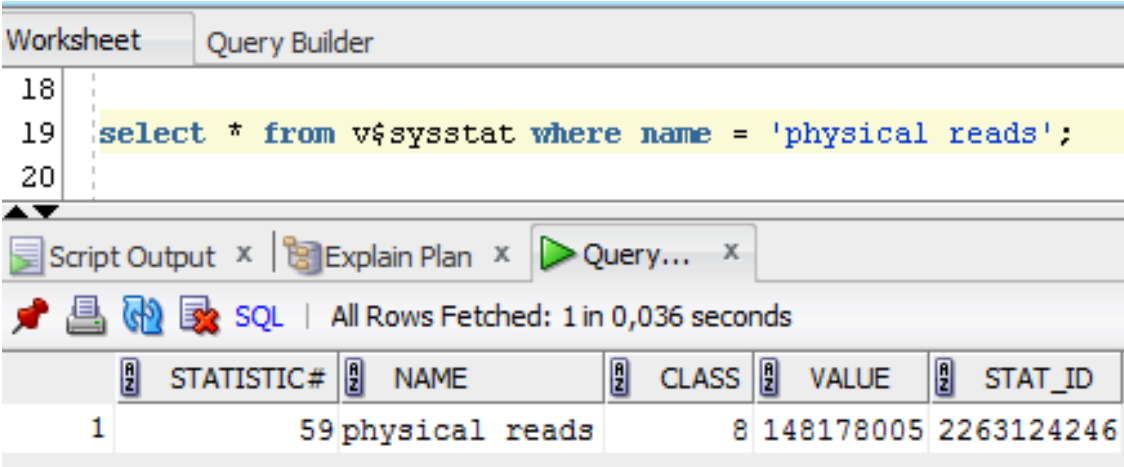
Cumulative Statistics

- Wait model
- Time model
- Event counters

- Are in-memory and reset with database restart
- Preserved on disk in AWR by MMON



Meaning Of Statistics



The screenshot shows a SQL query builder interface. The query entered is: `select * from v$sysstat where name = 'physical reads';`. The results are displayed in a table with the following columns: STATISTIC#, NAME, CLASS, VALUE, and STAT_ID.

STATISTIC#	NAME	CLASS	VALUE	STAT_ID
1	59 physical reads	8	148178005	2263124246

- ~~Meaningless since we do not know the dynamics of change~~

Delta Tools

- AWR snapshots
- STATSPACK snapshots
- Manual scripts

Instance Activity Stats

Statistic	Total	per Second	per Trans
physical reads	101,913	28.59	2.87
physical reads cache	10,147	2.85	0.29
physical reads cache prefetch	101	0.03	0.00
physical reads direct	91,766	25.74	2.59
physical reads direct (lob)	65,906	18.49	1.86
physical reads direct temporary tablespace	65,027	18.24	1.83



Metrics

- **Already built-in delta tool** in Oracle Database starting with 10g
- **Computes** delta for statistics over **periods** of time
 - Long duration – 60sec
 - Short duration – 15sec
 - Wait event and class, system, session, service, file and tablespace



Base Statistics

```
37
38 with stats as (
39     select sn.dbid,
40            st.stat_name,
41            to_char(cast(begin_interval_time as date ), 'YYYY/MM/DD HH24:MI') btime,
42            Lag (st.value) OVER( PARTITION BY st.stat_name,st.dbid ORDER BY sn.snap_id)
43                value_beg,
44            st.value      value_end,
45            (cast(end_interval_time as date) - cast(begin_interval_time as date )) * (2.
46
47     from
48         DBA_HIST_SYSSTAT st,
49         DBA_HIST_SNAPSHOT sn
50
51     where
52         sn.snap_id=st.snap_id and
53         sn.dbid=st.dbid and
54         (st.stat_name= 'physical read total bytes')
55     order by begin_interval_time
56 )
57 select
58     dbid, btime,
59     round((value_end-value_beg)/delta) rate_per_sec
60 from stats
61 where (value_end-value_beg) > 0
62 ;
```

Script Output x Autotrace x Query Result x

SQL | Fetched 50 rows in 0,064 seconds

	DBID	BTIME	RATE_PER_SEC
1	809111378	2013/06/09 23:00	157023



Metrics

The screenshot shows a SQL query editor window with a toolbar at the top. The query is as follows:

```
7 select begin_time, round(average)
8 from v$sysmetric_summary
9 where metric_name= 'Physical Read Total Bytes Per Sec'
10 order by begin_time;
11
```

Below the query editor, there are tabs for 'Explain Plan', 'Autotrace', 'Script Output', and 'Query Result'. The 'Query Result' tab is active, showing the following data:

	BEGIN_TIME	ROUND(AVERAGE)
1	2013.06.17	155390

Metric Views

V\$METRICNAME

V\$METRICGROUP

V\$SYSMETRIC

V\$SYSMETRIC_HISTORY

V\$SYSMETRIC_SUMMARY

V\$SESSMETRIC

V\$FILEMETRIC

V\$FILEMETRIC_HISTORY

V\$EVENTMETRIC

V\$WAITCLASSMETRIC

V\$WAITCLASSMETRIC_HISTORY

V\$SERVICEMETRIC

V\$SERVICEMETRIC_HISTORY

V\$METRIC

V\$METRIC_HISTORY



V\$METRICGROUP

Worksheet Query Builder

```
28  
29 select * from v$metricgroup;  
30
```

Script Output x Autotrace x Query Result x

SQL | All Rows Fetched: 10 in 0,004 seconds

	GROUP_ID	NAME	INTERVAL_SIZE	MAX_INTERVAL
1	0	Event Metrics	6000	1
2	1	Event Class Metrics	6000	60
3	2	System Metrics Long Duration	6000	60
4	3	System Metrics Short Duration	1500	12
5	4	Session Metrics Long Duration	6000	60
6	5	Session Metrics Short Duration	1500	1
7	6	Service Metrics	6000	60
8	7	File Metrics Long Duration	60000	6
9	9	Tablespace Metrics Long Duration	6000	0
10	10	Service Metrics (Short)	500	24

V\$METRICNAME

Worksheet Query Builder

```
30  
31 select * from v$metricname;  
32
```

Script Output x Autotrace x Query Result x

SQL | Fetched 50 rows in 0,026 seconds

	GROUP_ID	GROUP_NAME	METRIC_ID	METRIC_NAME	METRIC_UNIT
1	0	Event Metrics	2	Total Wait Counts	Waits
2	0	Event Metrics	1	Total Time Waited	CentiSeconds
3	0	Event Metrics	0	Number of Sessions Waiting (Event)	Sessions
4	1	Event Class Metrics	1002	Total Wait Counts	Waits
5	1	Event Class Metrics	1003	Total Time Waited	CentiSeconds
205	7	File Metrics Long Duration	7000	Average File Read Time (Files-Long)	CentiSeconds Per Read
206	9	Tablespace Metrics Long D...	9001	Tablespace Bytes Space Usage	Tablespace KiloBytes
207	9	Tablespace Metrics Long D...	9000	Tablespace Space Usage	Tablespace Blocks
208	10	Service Metrics (Short)	6003	DB Time Per Second	CentiSeconds
209	10	Service Metrics (Short)	6002	User Calls Per Second	User Calls Per Second
210	10	Service Metrics (Short)	6001	CPU Time Per User Call	Microseconds Per Call
211	10	Service Metrics (Short)	6004	DB Time Per User Call	Microseconds Per Call
212	10	Service Metrics (Short)	6000	Elapsed Time Per User Call	Microseconds Per Call



```
desc v$sysmetric
```

Name	Null	Type
BEGIN_TIME		DATE
END_TIME		DATE
INTSIZE_CSEC		NUMBER
GROUP_ID		NUMBER
METRIC_ID		NUMBER
METRIC_NAME		VARCHAR2 (64)
VALUE		NUMBER
METRIC_UNIT		VARCHAR2 (64)



```
desc v$sysmetric_summary
```

Name	Null	Type
BEGIN_TIME		DATE
END_TIME		DATE
INTSIZE_CSEC		NUMBER
GROUP_ID		NUMBER
METRIC_ID		NUMBER
METRIC_NAME		VARCHAR2 (64)
NUM_INTERVAL		NUMBER
MAXVAL		NUMBER
MINVAL		NUMBER
AVERAGE		NUMBER
STANDARD_DEVIATION		NUMBER
METRIC_UNIT		VARCHAR2 (64)



desc v\$sesmetric

Name	Null	Type
-----	-----	-----
BEGIN_TIME		DATE
END_TIME		DATE
INTSIZE_CSEC		NUMBER
SESSION_ID		NUMBER
SESSION_SERIAL_NUM		NUMBER
CPU		NUMBER
PHYSICAL_READS		NUMBER
LOGICAL_READS		NUMBER
PGA_MEMORY		NUMBER
HARD_PARSSES		NUMBER
SOFT_PARSSES		NUMBER
PHYSICAL_READ_PCT		NUMBER
LOGICAL_READ_PCT		NUMBER



```
desc v$eventmetric
```

Name	Null	Type
-----	-----	-----
BEGIN_TIME		DATE
END_TIME		DATE
INTSIZE_CSEC		NUMBER
EVENT#		NUMBER
EVENT_ID		NUMBER
NUM_SESS_WAITING		NUMBER
TIME_WAITED		NUMBER
WAIT_COUNT		NUMBER



```
desc v$waitclassmetric
```

Name	Null	Type
-----	-----	-----
BEGIN_TIME		DATE
END_TIME		DATE
INTSIZE_CSEC		NUMBER
WAIT_CLASS#		NUMBER
WAIT_CLASS_ID		NUMBER
AVERAGE_WAITER_COUNT		NUMBER
DBTIME_IN_WAIT		NUMBER
TIME_WAITED		NUMBER
WAIT_COUNT		NUMBER



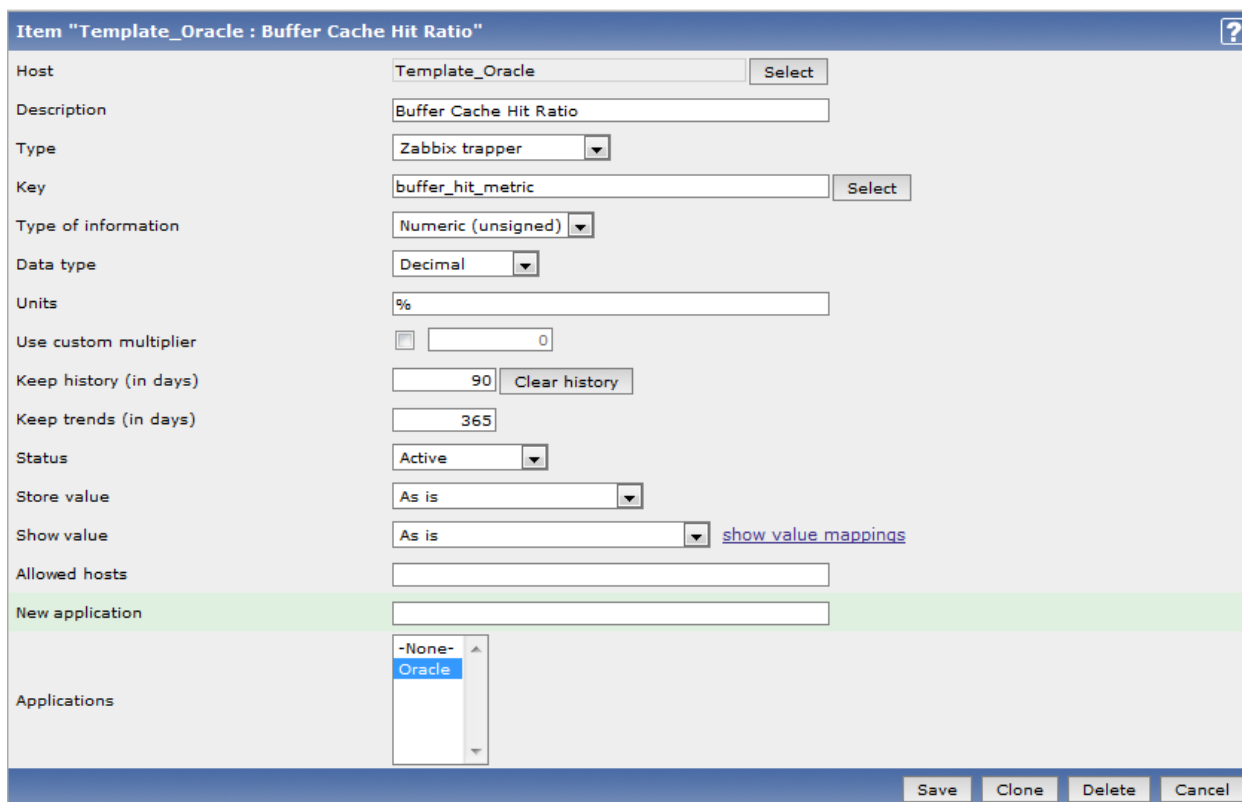
desc v\$servicemetric

Name	Null	Type
BEGIN_TIME		DATE
END_TIME		DATE
INTSIZE_CSEC		NUMBER
GROUP_ID		NUMBER
SERVICE_NAME_HASH		NUMBER
SERVICE_NAME		VARCHAR2 (64)
CTMHASH		NUMBER
ELAPSEDCALL		NUMBER
CPUPERCALL		NUMBER
DBTIMEPERCALL		NUMBER
CALLSPERSEC		NUMBER
DBTIMEPERSEC		NUMBER
GOODNESS		NUMBER
DELTA		NUMBER
FLAGS		NUMBER



Using Orabbix (Zabbix Plugin)

```
root@DBACC-MON2:/opt/orabbix/conf# tail -1 query.props
buffer_hit_metric.Query=select value from v$sysmetric where group_id = 2 and metric_name = 'Buffer Cache Hit Ratio'
root@DBACC-MON2:/opt/orabbix/conf#
```



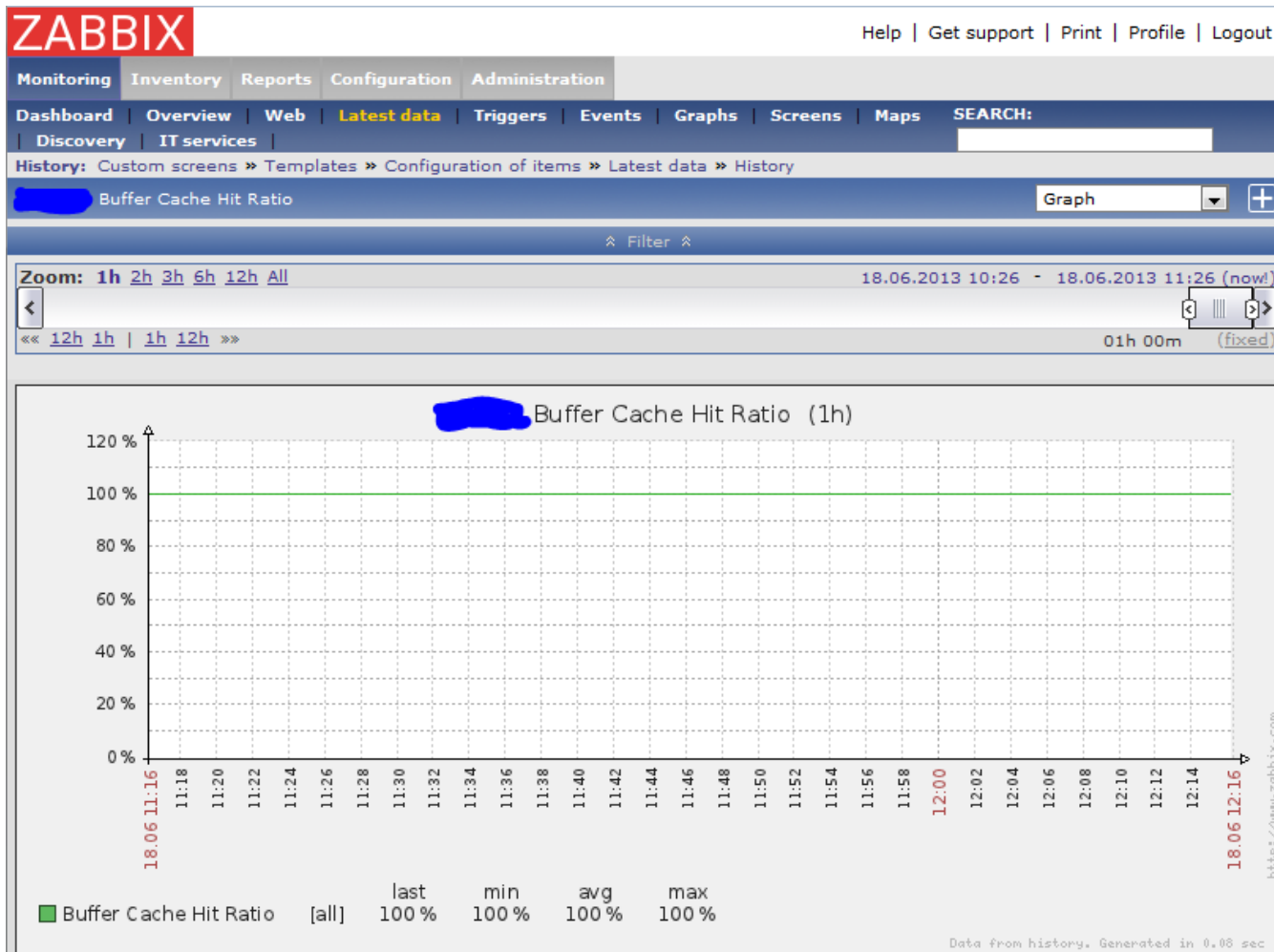
The screenshot displays the Zabbix web interface for configuring a new item. The item is titled "Template_Oracle : Buffer Cache Hit Ratio". The configuration is as follows:

- Host:** Template_Oracle (with a "Select" button)
- Description:** Buffer Cache Hit Ratio
- Type:** Zabbix trapper (dropdown menu)
- Key:** buffer_hit_metric (with a "Select" button)
- Type of information:** Numeric (unsigned) (dropdown menu)
- Data type:** Decimal (dropdown menu)
- Units:** %
- Use custom multiplier:** 0
- Keep history (in days):** 90 (with a "Clear history" button)
- Keep trends (in days):** 365
- Status:** Active (dropdown menu)
- Store value:** As is (dropdown menu)
- Show value:** As is (dropdown menu) with a [show value mappings](#) link
- Allowed hosts:** (empty text field)
- New application:** (empty text field)
- Applications:** A dropdown menu with "-None-" selected and "Oracle" highlighted.

At the bottom right of the interface, there are buttons for "Save", "Clone", "Delete", and "Cancel".



Using Orabbix (Zabbix Plugin)



Licensing

- **DBA_HIST_%METRIC%** views are **part of Enterprise Management Diagnostics Pack**
- All dynamic views **v\$%metric%** are for **free**



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