

DBA Commands and Concepts That Every Developer Should Know

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205 Certifications and counting...

Worked for **7** years in **Brazil** as a **Developer**
Worked **8** years for the Ministry of Finance
in **Angola** as a **DBA**
from March - 2007 until March - 2015



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Oracle Specializations

- Oracle Database
- Oracle Exadata
- Oracle GoldenGate
- Oracle Data Integrator
- Oracle Data Warehouse
- Oracle Real Application Clusters
- Oracle Performance Tuning
- Oracle Database Security



Global systems integrator
focused on the Oracle Database
& Engineered Systems platform



Worldwide leader in Exadata
implementations (600+)

SQLcl

SQL Developer 4.1.3

Version 4.1.3.20.78, Updated December 22, 2015

[Bugs Fixed](#), [Release Notes](#), [New Features](#), [Documentation](#)

Windows 64-bit with JDK 8 included

[Installation Notes](#)

381 MB [Download](#) 

Windows 32-bit/64-bit

[Installation Notes](#), [JDK 8](#) or above required

314 MB [Download](#) 

Mac OSX

[Installation Notes](#), [JDK 8](#) or above required

314 MB [Download](#) 

Linux RPM

[Installation Notes](#), [JDK 8](#) or above required

308 MB [Download](#) 

Other Platforms

[Installation Notes](#), [JDK 8](#) or above required

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[Troubleshooting - Previous Version](#)

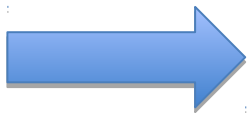
Command Line - SQLcl - Early Adopter

Updated Feb 18, 2016

All Platforms

[Getting Started Video](#)

12 MB [Download](#) 



<http://www.oracle.com/technetwork/developer-tools/sql->

DBA Commands and Concepts That Every Developer Should Know

No ~~DBA~~ access to the Database?

Carlos Sierra's Tools and Tips

Tools and Tips for
Tuning

eDB360: an Oracle database 360-degree view

with 2 comments



Overview: *eDB360* is a free tool that provides a 360-degree view of an Oracle database. Its output can be used as a foundation for a database health-check, a performance evaluation or to collect OS resource utilization needed for a sizing and provisioning plan.

With *eDB360*, a user with limited access can acquire a good understanding of an Oracle database without having to log into the server directly. This capability is of great value to developers, system administrators, 3rd party consultants, or any remote user with restricted access.

eDB360 tool is database centric. Notice that in case of RAC database(s), it only needs to be executed on one node per database. *eDB360* works for Oracle 10g to 12c databases. Each execution of *eDB360* may take several hours, thus it is recommended executing it overnight. Test *eDB360* on a lower environment before executing on Production. For FAQ or more information about *eDB360*, check links below or simply Google: *eDB360*.

Note: To execute this *eDB360* tool, the database should be licensed to use at least the Oracle Diagnostics pack. If the database is licensed for both the Tuning and the Diagnostics pack, then respond with a "T" to the only parameter this tool requires.

No ~~DBA~~ access to the Database?

eDB360 sample

No DBA access to the Database?

MAURO PAGANO'S BLOG

SQLd360, SQL diagnostics collection made faster

February 16, 2015 by Mauro Pagano | 22 Comments

Another tool to help with SQL Tuning? Yes! Hopefully with some advantage over what you used until today 😊

Collecting diagnostics around a SQL is not fun, if you've been there you know that. It requires to extract info from several different places, the amount is high and it's time-sensitive aka you should do it as quick as possible so that things around the SQL don't change!

SQLd360 is a free tool that provides a 360-degree overview around a SQL statement. The output is a single zip file that allows offline analysis, trend analysis and detailed root-cause investigations. The content of the zip is a set of small reports, each specific to an area of interest, easy to navigate through an index file.

SQLd360 doesn't require any installation and can be executed by any user that has access to dictionary views. The tool can be used by DBAs, Developers, SysAdmin, etc to investigate several aspects of the SQL, not only in terms of isolated execution but also in the context of the overall database impact, it can also help with trend analysis. The list of contents is going to grow (fast) with time so make sure you use the latest version.

SQLd360 works successfully in 10g, 11g and 12c, specifically on Linux/Unix platforms, it has not been tested on Windows.

If what described so far sounds familiar then you are probably right. SQLd360 has been created to complement eDB360 tool created by Carlos Sierra. The design is similar but at the same time different having to deal with different challenges.

No ~~DBA~~ access to the Database?

SQLD360 sample

Parallel

```
insert /*+ append parallel */ into tab1  
select /*+ parallel */ * from tab2  
nologging;
```

15 minutes to complete.

```
create table tab1 as select /*+ parallel  
*/ * from tab2 nologging;
```

2 minutes to complete.

Parallel

Enable Parallel DML Mode

A DML statement can be parallelized only if you have explicitly enabled parallel DML in the session or in the SQL statement. To enable this mode in a session, run the following SQL statement:



```
ALTER SESSION ENABLE PARALLEL DML;
```

To enable parallel DML mode in a specific SQL statement, include the **ENABLE_PARALLEL_DML** SQL hint. For example:





```
INSERT /*+ ENABLE_PARALLEL_DML */ ...
```

Parallel

```
select sid,serial#,PDML_STATUS,pddl_status,pq_status from v$session where audsid = userenv('SESSIONID');
```

Script Output x

Query Result x



SQL

All Rows Fetched: 1 in 0.008 seconds

	SID	SERIAL#	PDML_STATUS	PDDL_STATUS	PQ_STATUS
1	269	52630	DISABLED	ENABLED	ENABLED

Parallel

```
Update I$_2258193201
set IND_UPDATE = 1
where exists (
    select 1
    from    XX    T
    where   I$_2258193201.X_REF_DT = T.X_REF_DT
    and I$_2258193201XX.X_ACCT_KEY= T.X_ACCT_KEY
);
```

60 minutes to complete.

Parallel

```
Update /*+ PARALLEL */ I$_2258193201_NEW
I$_2258193201
set IND_UPDATE = 1
where exists (
    select /*+ PARALLEL */ 1
    from    XX_NEW  T
    where   I$_2258193201.X_REF_DT = T.X_REF_DT
    and I$_2258193201XX.X_ACCT_KEY= T.X_ACCT_KEY
);
```

3 minutes to complete.

***Duplicate tables “_NEW”

Parallel

```
Update /*+ PARALLEL */ I$_2258193201  
set IND_UPDATE = 1  
where exists (  
    select /*+ PARALLEL */ 1  
    from    XX    T  
    where   I$_2258193201.X_REF_DT = T.X_REF_DT  
    and I$_2258193201XX.X_ACCT_KEY= T.X_ACCT_KEY  
);
```

240 minutes to complete.

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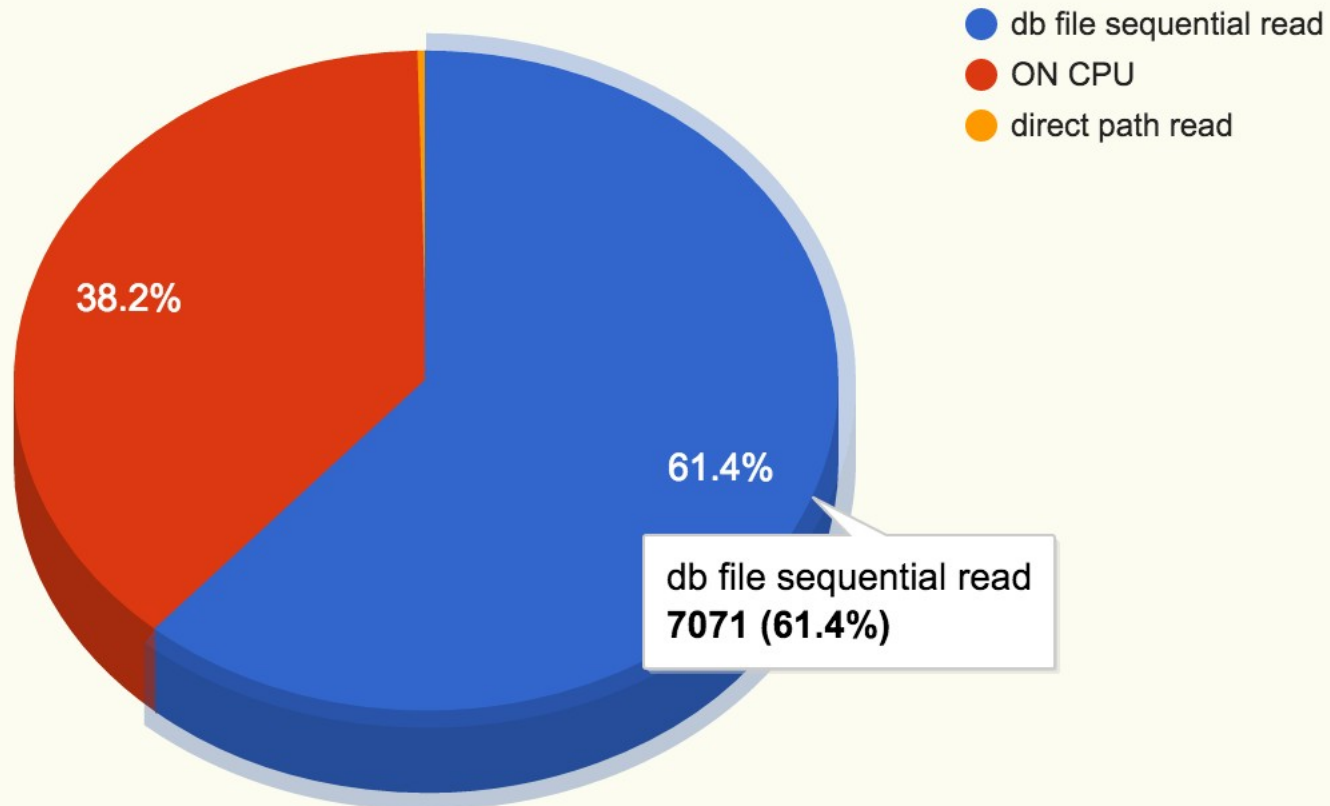
Parallel

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time	Pstart	Pstop	TQ	IN-OUT	PQ Distrib
0	UPDATE STATEMENT				101K(100)						
1	PX COORDINATOR										
2	PX SEND QC (RANDOM)	:TQ10004	1	210	101K (2)	00:23:45			Q1,04	P->S	QC (RAND)
3	INDEX MAINTENANCE	I\$_2258193201							Q1,04	PCWP	
4	PX RECEIVE		1	210	101K (2)	00:23:45			Q1,04	PCWP	RANGE
5	PX SEND RANGE	:TQ10003	1	210	101K (2)	00:23:45			Q1,03	P->P	
6	UPDATE	I\$_2258193201							Q1,03	PCWP	HASH (BLOCK)
7	PX RECEIVE		1	210	101K (2)	00:23:45			Q1,03	PCWP	
8	PX SEND HASH (BLOCK ADDRESS)	:TQ10002	1	210	101K (2)	00:23:45			Q1,02	P->P	HASH
9	HASH JOIN SEMI BUFFERED		1	210	101K (2)	00:23:45			Q1,02	PCWP	
10	PX RECEIVE		9795K	1550M	193 (2)	00:00:03			Q1,02	PCWP	HASH
11	PX SEND HASH	:TQ10000	9795K	1550M	193 (2)	00:00:03			Q1,00	P->P	
12	PX BLOCK ITERATOR		9795K	1550M	193 (2)	00:00:03			Q1,00	PCWC	HASH
13	TABLE ACCESS FULL	I\$_2258193201	9795K	1550M	193 (2)	00:00:03			Q1,00	PCWP	
14	PX RECEIVE		4401M	180G	101K (1)	00:23:39			Q1,02	PCWP	HASH
15	PX SEND HASH	:TQ10001	4401M	180G	101K (1)	00:23:39			Q1,01	P->P	
16	PX BLOCK ITERATOR		4401M	180G	101K (1)	00:23:39	1	1048575	Q1,01	PCWC	HASH
17	TABLE ACCESS FULL	XX	4401M	180G	101K (1)	00:23:39	1	1048575	Q1,01	PCWP	

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Parallel

Top 15 Wait events for PHV 568089278



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Parallel

Bug 17264297 : HIGHER NUMBER OF SINGLE BLOCK READS PERFORMED WHEN TABLE HAS CHAINED ROWS IN 11G

▼ **Bug Attributes**

Type	B - Defect	Fixed in Product Version	12.2
Severity	1 - Complete Loss of Service	Product Version	11.2.0.3
Status	80 - Development to QA/Fix Delivered Internal	Platform	212 - IBM AIX on POWER Systems (64-bit)
Created	Aug 2, 2013	Platform Version	6.1
Updated	Mar 25, 2016	Base Bug	N/A
Database Version	11.2.0.3	Affects Platforms	Generic
Product Source	Oracle	Knowledge, Patches and Bugs related to this bug	

Parallel

```
ANALYZE TABLE XX_NEW LIST  
CHAINED ROWS;
```

```
SELECT count(*) FROM chained_rows;
```

0 rows

```
ANALYZE TABLE XX LIST CHAINED  
ROWS;
```

```
SELECT (*) FROM chained_rows;  
110,000 rows
```

Explain Plan

How many people are
using Explain Plan ?

Explain Plan

Explain Plan Lies

Explain Plan

Explain Plan just try to predict the Plan.

AUTOTRACE experiences a similar "problem", especially when the SQL statement uses bind variables.

Explain Plan

Solution ?

DBMS_XPLAN.DISPLAY_CURSOR

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Oracle Flashback Query

- Flashback Query (SELECT AS OF)
 - AS OF TIMESTAMP
- Flashback Version Query
 - VERSIONS BETWEEN { SCN | TIMESTAMP } start AND end
- Flashback Transaction Query
 - SELECT FROM
flashback transaction query

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DEMO

Oracle Flashback Query

- Retrieve old versions of procedures:

```
select text from dba_source  
      as of timestamp systimestamp - interval '5'  
minute  
      where name='MY_PROC' order by line;
```

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Oracle Flashback Query

The maximum available versions are dependent on the `UNDO_RETENTION` parameter.

The default is 900 seconds (15 minutes).

Oracle Flashback Table

Reinstating an accidentally dropped table.

Parameter **recyclebin = on** (default).

Oracle Flashback Table

```
SELECT OWNER,OBJECT_NAME,  
ORIGINAL_NAME, TYPE, DROPTIME  
FROM DBA_RECYCLEBIN  
WHERE ORIGINAL_NAME='TAB_TEST';
```

```
FLASHBACK TABLE TAB_TEST TO BEFORE  
DROP;
```

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RMAN Table Recovery in 12c

RMAN enables you to recover one or more tables or table partitions to a specified point in time.

RMAN Table Recovery in 12c

```
RMAN> RECOVER TABLE  
HR.REGIONS
```

```
UNTIL TIME "TO_DATE('01/10/2013  
09:33:39','DD/MM/RRRR HH24:MI:SS')"
```

```
AUXILIARY DESTINATION  
'/tmp/backups'
```

Schema Management DDL Wait Option

```
SQL> alter table invoice add (code number);
```

```
alter table invoice add (code number)
```

```
*
```

ERROR at line 1:

ORA-00054: resource busy and acquire with NOWAIT specified or timeout expired

Schema Management DDL Wait Option

Parameter **DDL_LOCK_TIMEOUT** (default = 0)

It will wait for N seconds.

In that **N** seconds, it continually re-tries the DDL operation until it's successful or this time expires.

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Schema Management

Adding Columns with a Default Value

Table T1 □ 3 millions rows

10.2.0.4.0 > alter table t1 add C_DDL number default 42 not null;
Table altered.
Elapsed: 00:00:48.53

11.2.0.3.0> alter table t1 add C_DDL number default 42 not null;
Table altered.
Elapsed: 00:00:00.04

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Rollback

How much longer?

```
select *  
  from v$session_longops  
where sid = sid_of_the_session_doing_rollback
```

Rollback

V\$SESSION_LONGOPS

V\$SESSION_LONGOPS displays the status of various operations that run for longer than 6 seconds (in absolute time). These operations currently include many backup and recovery functions, statistics gathering, and query execution, and more operations are added for every Oracle release.

Rollback

```
SID                : 26
SERIAL#            : 30832
OPNAME              : Transaction Rollback
TARGET             :
TARGET_DESC         : xid:0x000e.01c.00000012
SOFAR               : 1211
TOTALWORK          : 21244
UNITS               : Blocks
START_TIME          : 15-nov-2015 16:20:07
LAST_UPDATE_TIME    : 15-nov-2015 16:21:24
TIME_REMAINING      : 55
ELAPSED_SECONDS     : 5
CONTEXT             : 0
MESSAGE             : Transaction Rollback: .... USERNAME
                    : alex_zaballa
SQL_ADDRESS         : 00000000DF79A840
SQL_HASH_VALUE      : 72257521
SQL_ID              : 4wv9a0h24x3zj
```

Pending Statistics

We have the option of keeping the newly gathered statistics in a pending state for testing purposes, until you choose to publish them.

Set table preferences:

```
begin
  dbms_stats.set_table_prefs (
    ownname => 'SCOTT',
    tabname => 'EMP',
    pname   => 'PUBLISH',
    pvalue  => 'FALSE'
  );
end;
```

Collect the statistics.

Pending Statistics

```
select num_rows,  
       to_char(last_analyzed,'dd/mm/yyyy  
hh24:mi:ss')  
from all_tab_pending_stats  
where table_name = 'EMP';
```


Pending Statistics

```
alter session set  
optimizer_use_pending_statistics  
= true;
```

Test the queries.

Pending Statistics

If it's ok:

```
dbms_stats.publish_pending_stats('SCOTT',  
'EMP');
```

Or:

```
dbms_stats.delete_pending_stats('SCOTT','EMP');
```

Restore Statistics from History

Check the retention:

```
select  
DBMS_STATS.GET_STATS_HISTORY_RETENTION from dual;
```

Default is 31 days.

Restore Statistics from History

Statistics available for the table:

```
SELECT OWNER,  
        TABLE_NAME,  
        STATS_UPDATE_TIME  
FROM dba_tab_stats_history  
WHERE table_name='MY_TABLE';
```

Restore Statistics from History

Begin

```
dbms_stats.restore_table_stats(  
  'SCOTT',  
  'EMP',  
  '08-NOV-15 11.38.05.015640 AM  
+08:00');  
End;
```

Export and Import schema statistics

```
begin
  dbms_stats.CREATE_STAT_TABLE( ownname=>user
                                , statab=>'MY_STATS_TABLE'
                                );
end;
```

```
begin
  dbms_stats.export_schema_stats( ownname=>user
                                  , statab=>'MY_STATS_TABLE'
                                  , statid=>'CURRENT_STATS'
                                  );
End;
```

EXPDP / IMPDP

```
begin
  dbms_stats.import_schema_stats( ownname=>user
                                  , statab=>'MY_STATS_TABLE'
                                  , statid=>'CURRENT_STATS'
                                  );
End;
```

DBMS_APPLICATION_INFO

Allows programs to add information to the V\$SESSION.

Use **SET_MODULE** to set the name for the program that the user is currently executing. Optionally you can also set an action name.

Use **SET_ACTION** for subsequent processing.

Use **SET_CLIENT_INFO** for any additional information.

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Row-by-Row Processing vs Bulk Processing

Instead of fetching a single row at a time it is possible to use the bulk features.

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Oracle Virtual Private Database (VPD)

- VPD enables you to create security policies to control database access at the row and column level.
- VPD adds a dynamic WHERE clause to a SQL statement.
- VPD enforces security directly on database tables, views, or synonyms.

Oracle Virtual Private Database (VPD)

Original Select:

```
SELECT * FROM ORDERS;
```

VPD policy dynamically appends:

```
SELECT * FROM ORDERS  
WHERE COMPANY_ID = 1;
```

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More on 12c

Extended Data Types

```
SQL> create table  
tabela_teste(campo01  
varchar2(4001));
```

*

ERROR at line 1:

ORA-00910: specified length too long
for its datatype

Extended Data Types

- VARCHAR2 : 32767 bytes
- NVARCHAR2 : 32767 bytes
- RAW : 32767 bytes

Extended Data Types

```
SHUTDOWN IMMEDIATE;  
STARTUP UPGRADE;  
ALTER SYSTEM SET  
max_string_size=extended;  
@?/rdbms/admin/utl32k.sql  
SHUTDOWN IMMEDIATE;  
STARTUP;
```

****Once you switch to extended data types you can't switch back**

SQL Text Expansion

```
SQL> variable retorno clob
```

```
SQL> begin
```

```
dbms_utility.expand_sql_text( input  
_sql_text => 'select * from emp',  
output_sql_text=> :retorno );  
end;
```

SQL Text Expansion

- Views
- VPDs

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Identity Columns

```
CREATE TABLE tabela_teste (  
  id NUMBER GENERATED ALWAYS AS  
  IDENTITY,
```

```
  coluna1 VARCHAR2(30)).
```

```
SQL> INSERT INTO tabela_teste (coluna1) VALUES ('teste');
```

```
1 row created.
```

```
SQL> INSERT INTO tabela_teste (id, coluna1) VALUES (NULL, 'teste2');  
INSERT INTO tabela_teste (id, coluna1) VALUES (NULL, 'teste2')
```

```
*
```

```
ERROR at line 1:
```

```
ORA-32795: cannot insert into a generated always identity column
```

Identity Columns

```
CREATE TABLE tabela_teste (  
  id NUMBER GENERATED BY DEFAULT AS  
  IDENTITY,  
  coluna1 VARCHAR2(30);
```

```
SQL> INSERT INTO tabela_teste (coluna1) VALUES ('teste');
```

```
1 row created.
```

```
SQL> INSERT INTO tabela_teste (id, coluna1) VALUES (0, 'teste2');
```

```
1 row created.
```

Identity Columns

```
CREATE TABLE tabela_teste (  
  id NUMBER GENERATED BY DEFAULT ON  
NULL AS IDENTITY,  
  coluna1 VARCHAR2(30));
```

```
SQL> INSERT INTO tabela_teste (coluna1) VALUES ('teste');
```

```
1 row created.
```

```
SQL> INSERT INTO tabela_teste (id, coluna1) VALUES (NULL, 'teste2');
```

```
1 row created.
```

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READ Object Privilege and READ ANY TABLE System Privilege

What is the difference to **SELECT** and
SELECT ANY TABLE?

READ Object Privilege and READ ANY TABLE System Privilege

SELECT and **SELECT ANY TABLE** provides the ability to **lock rows**:

LOCK TABLE table_name IN EXCLUSIVE
MODE;

SELECT ... FROM table_name FOR
UPDATE;

READ Object Privilege and READ ANY TABLE System Privilege

```
SQL> grant select on scott.emp to  
teste;
```

Grant succeeded.

```
SQL> lock table scott.emp in exclusive  
mode;
```

Table(s) Locked.

READ Object Privilege and READ ANY TABLE System Privilege

```
SQL> grant read on scott.emp to teste;  
Grant succeeded.
```

```
SQL> lock table scott.emp in exclusive mode;  
lock table scott.emp in exclusive mode
```

*

```
ERROR at line 1:
```

```
ORA-01031: insufficient privileges
```

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Virtual Columns

“Virtual columns appear to be normal table columns, but their values are derived rather than being stored on disc.”

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UTL_CALL_STACK

This package allow programmatic access to the call stack and error stack.

Before 12c:

DBMS_UTILITY.FORMAT_CALL_STACK

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Online Table Redefinition (DBMS_REDEFINITION)

You can change the structure of a table that is already in use and is impossible to get a maintenance downtime.

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Thank You

Slides Available:
<http://www.slideshare.net/>