
New Features in Database 11gR2

You will not hear about from Oracle Corp.



presentation for:
Bulgarian Oracle User Group Autumn Conference

Daniel A. Morgan

- Oracle ACE Director 
- University of Washington Oracle Instructor for 10 years
- The Morgan of Morgan's Library on the web
- Board Member: Western Washington OUG
- Member UKOUG
- Conference Speaker
 - OpenWorld, Collaborate, Kaleidoscope, Brazil, Canada, Chile, Costa Rica, Denmark, Estonia, Finland, Germany, Japan, New Zealand, Norway, Peru, Sweden, UK, US, Uruguay
- 11g Beta Tester



```
cd $MORGAN_HOME
```



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New Features in Database 11gR2 You Won't Hear About From Oracle

```
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```



America's Cup Boat USA-71



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New Features in Database 11gR2 You Won't Hear About From Oracle

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 **Morgan's Library** www library

Morgan's 2010 - 2011 Calendar

Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
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EMEA Harmony Conference
Tallinn, Estonia
May 20-21, 2010 

The first joint conference of the Finnish, Estonian, Latvian and Russian user groups! EMEA Harmony will focus on Technology, Middleware and BI
Featured speakers include Tom Kyte and ACE Director Dan Morgan 

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Presentations Map 

The Mad Dog ACE 

Morgan  aboard USA-71

Training Events

- [OUGN - Apr 14 - 16, Oslo, Norway](#)
- [ORCAN - May 18 - 19, Stockholm, Sweden](#)
- [EMEA Harmony - May 20 - 21, Tallinn, Estonia](#)
- [NoCOUG - August 2010](#)
- [AIOUG - Sep 3 - 4, Hyderabad, India](#)
- [OOW - Sep 19 - 23, San Francisco CA](#)
- [DOAG - Nov 16 - 18, Nurnberg, Germany](#)
- [UKOUG - Nov 29 - Dec 1, Birmingham UK](#)

Oracle Events 

Oracle Users Group Norway: April 14-16

Library News

- [Morgan's Notepad vi \(Blog\)](#) UPDATED
- [Join the Western Washington OUG](#)
- [Morgan's Oracle Podcast](#)
- [DBA Best Practice Guidelines](#)
- [Bryn Llewellyn's PL/SQL White Paper](#)
- [Bryn Llewellyn's Editioning White Paper](#)
- [Tom Kyte's Oracle Performance](#)

ACE News

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A Guide To Meeting Challenges in Oracle Database 11g

Modified

1	Guarantee case insensitive uniqueness	Click Here	28-Oct-2009
2	Read a list of operating system files into a PL/SQL array (without using C or Java)	Click Here	28-Oct-2009
3	Identify the columns and data types in a weakly typed ref cursor	Click Here	29-Oct-2009
4	Write a CLOB to a file	Click Here	14-Nov-2009
5	Track the parts of my application that are in use	Click Here	02-Nov-2009
6	Create a data type that will only hold the values 0 and 1	Click Here	21-Nov-2009
7	Create a single check constraint across multiple columns guaranteeing only one is used	Click Here	16-Nov-2009
8	Trap, in a table trigger, the name of the column being updated	Click Here	19-Nov-2009
9	Only report the rows from a query if the number of rows exceeds a limiting value	Click Here	20-Nov-2009
10	Work effectively with the deprecated LONG data type	Click Here	11-Jan-2010
11	Write block corruption alerts to my alert log	Click Here	02-Feb-2010
12	Verify that a string passed into a function or procedure does not contain malicious code (SQL Injection)	Click Here	Soon



This is the start of a new Morgan's Library feature.
For the next couple of years, while we learn more about 11gR2,
we will be focusing our efforts here.
Please join us while we grow this section
and learn how to index it so you can find what you need.

Can we code it?

Yes we can!

New in 11gR1

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New Features in Database 11gR2 You Won't Hear About From Oracle

New in 11gR1

- Oracle Database introduced a large number of new features. Among the most notable:
 - ADR
 - Compound Triggers
 - Continue Statement
 - Flashback Archive
 - Follows Clause
 - Invisible Indexes
 - Native Compilation Improvements
 - Partitioning Options
 - Partition by Interval
 - Partition by Reference
 - Partition by System
 - Many new composite partitioning options
 - Pivot & Unpivot Operators

New in 11gR1

- PL/Scope
- Simple Integer Data Type
- SKIP LOCKED
- New XML Functions
- Pragma Inline
- Read Only Tables
- Virtual Columns

New in 11gR1

- Many new packages, objects, and parameters in
 - CTX_DDL
 - DBMS_ADVISOR
 - DBMS_AQ and DBMS_AQELM
 - DBMS_AUTO_TASK
 - DBMS_AW
 - DBMS_CAPTURE_ADMIN
 - DBMS_CDC_PUBLISH
 - DBMS_CONNECTION_POOL
 - DBMS_DATAPUMP
 - DBMS_DRS
 - DBMS_EXTENDED_TTS_CHECKS
 - DBMS_FLASHBACK
 - DBMS_HM

Connection Pool Management

Transaction Backout

Health Management

New in 11gR1

- DBMS_LOB
- DBMS_METADATA
- DBMS_MONITOR
- DBMS_NETWORK_ACL_ADMIN Access Control Lists
- DBMS_ODCI
- DBMS_PREDICTIVE_ANALYTICS
- DBMS_REGISTRY
- DBMS_RESOURCE_MANAGER
- DBMS_RESULT_CACHE Result Cache
- DBMS_SCHEDULER
- DBMS_SERVICE
- DBMS_SESSION
- DBMS_SHARED_POOL
- DBMS_SQL
- DBMS_SQLDIAG
- DBMS_SQLPA
- DBMS_SQLTUNE
- DBMS_STATS

New in 11gR1

- DBMS_STREAMS Streams
- DBMS_SYSTEM PL/SQL Warnings
- DBMS_TTS Real Application Testing
- DBMS_WARNING Distributed Transactions
- DBMS_WORKLOAD_CAPTURE Explain Plan
- DBMS_WORKLOAD_REPLAY
- DBMS_XA
- DBMS_XPLAN
- UTL_XML

New in 11gR1

- And in 11.1.0.7
 - DBMS_AUDIT_MANAGEMENT
 - DBMS_BACKUP_RESTORE
 - DBMS_IR
 - DBMS_LOGSTDBY
 - DBMS_METADATA
 - DBMS_SCHEDULER
 - DBMS_SQLPA
 - DBMS_SQLTUNE
 - DBMS_WORKLOAD_CAPTURE
 - DBMS_WORKLOAD_REPLAY
 - DBMS_XPLAN
 - UTL_XML

Incident Reporting

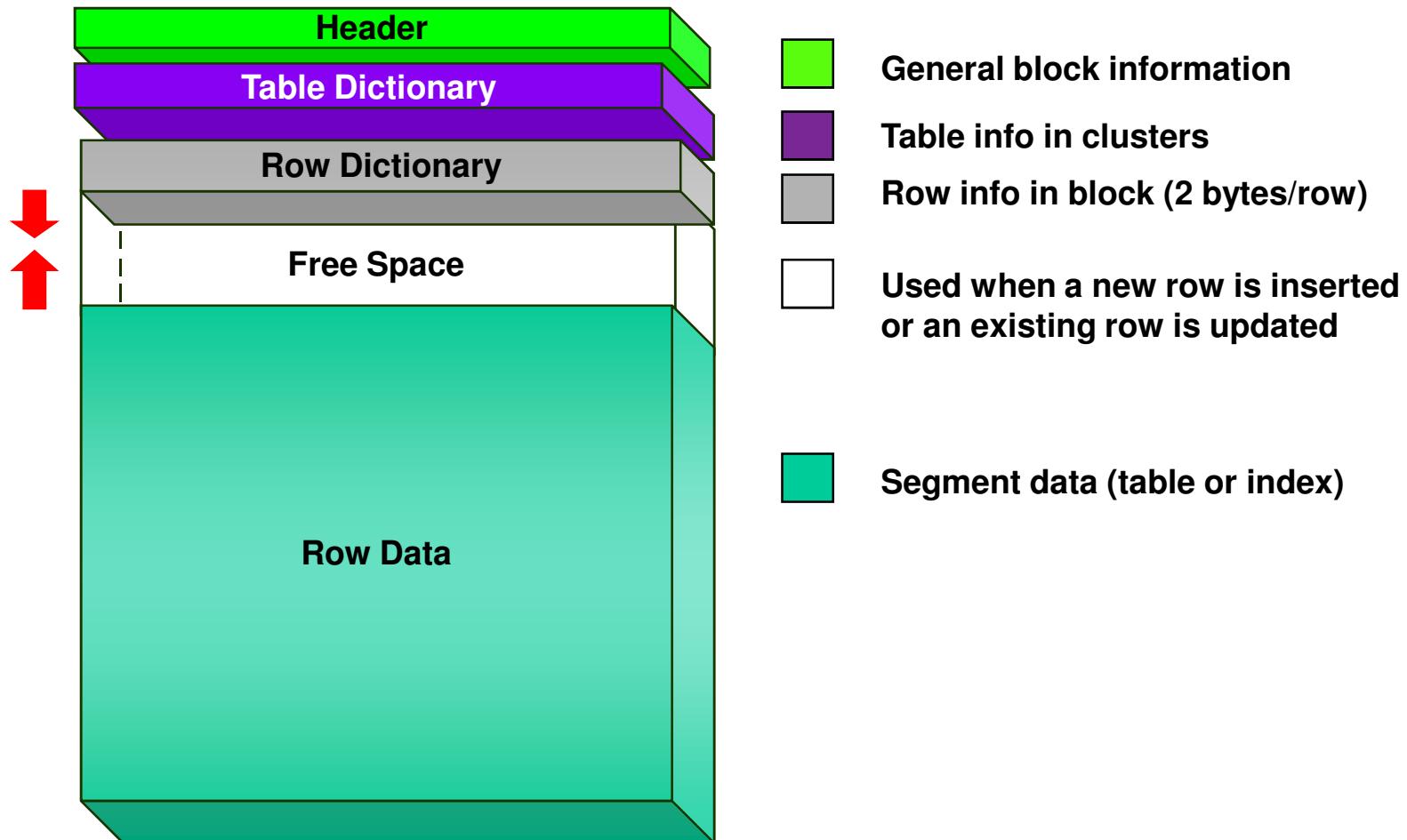
My OpenWorld Predictions

What Oracle
will talk about
"here at OpenWorld"

What Oracle Will Talk About

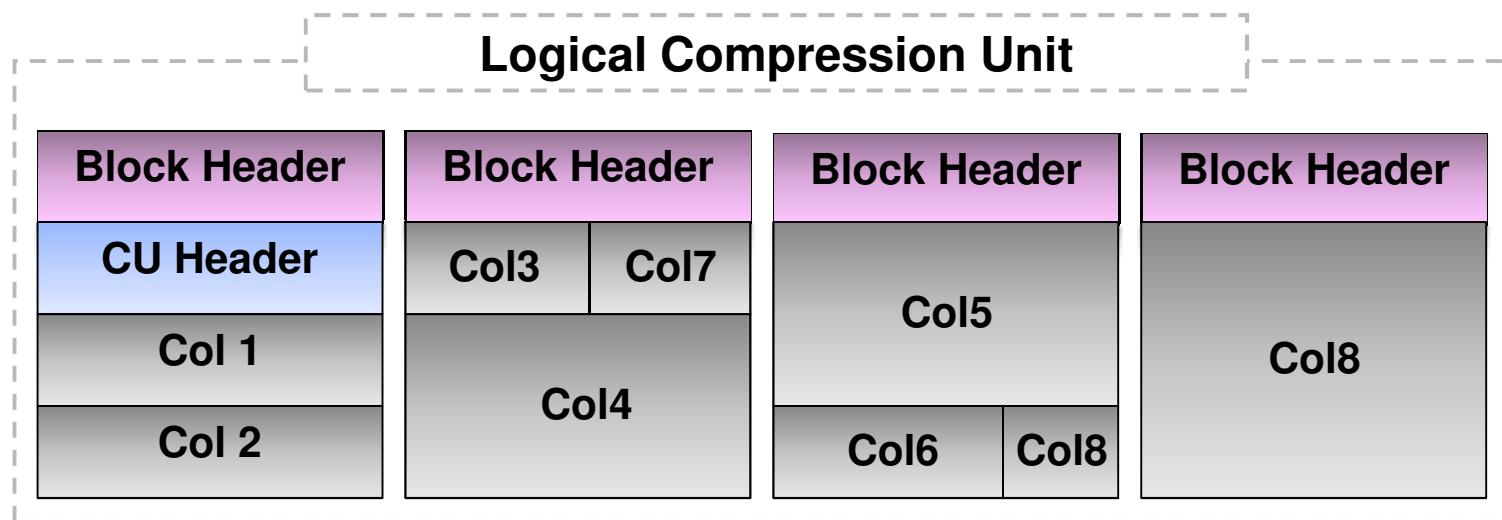
- Edition Based Redefinition - 11.2.0.1
 - Functions, Packages, Procedures, Synonyms, and Views
- New Grid Features
 - Single Node RAC
 - New ASM Capabilities
 - Omotion
 - DBFS
 - the Grid
- In Memory Parallel Query
- Advanced Compression
- Exadata V2 and Hybrid Columnar Compression

Database Block Anatomy



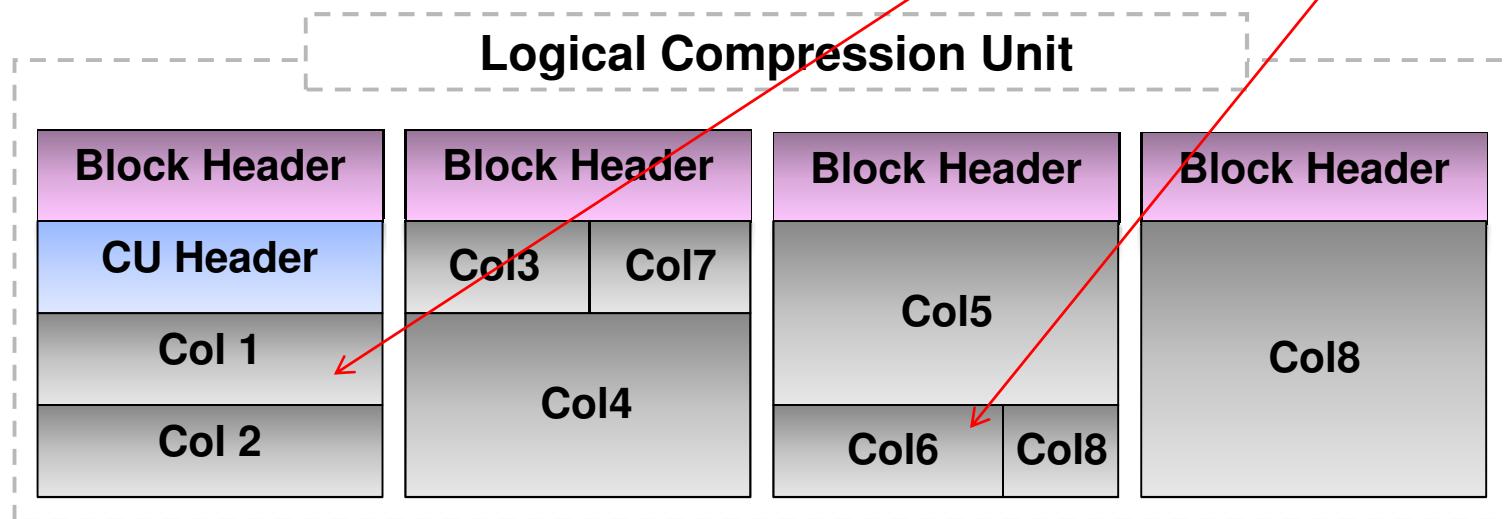
Logical Compression Unit

- Tables are organized into Compression Units (CU)
 - CU's are logical structure spanning multiple database blocks
 - Typically 32K - (4 x 8K block size)
 - Data is organized by column during data load
 - Each column is compressed separately
 - Column organization brings similar values close together



Logical Compression Unit

```
CREATE TABLE demo (
  person_id      NUMBER(10),
  first_name     VARCHAR2(20),
  mid_initial    VARCHAR2(4),
  last_name      VARCHAR2(35),
  date_of_birth  DATE,
  hire_date      DATE,
  status          VARCHAR2(5),
  comments        VARCHAR2(500));
```



New in 11.2.0.1 and you won't hear about from your Oracle rep

What's Deprecated

- **ALTER USER AUTHENTICATED USING PASSWORD**
 - "has been deprecated for this release. If you use this clause, Oracle Database converts it to the AUTHENTICATION REQUIRED clause. If you do not specify the AUTHENTICATION REQUIRED clause, then Oracle Database uses either the AUTHENTICATED USING CERTIFICATE clause or the AUTHENTICATED USING DISTINGUISHED NAME clause."
- **DB_EXTENDED Audit Syntax**
 - Instead, use the DB, EXTENDED
- **Listener Passwords**
 - "This does not cause a loss of security because authentication is enforced through local operating system authentication."
- **WKUSER Role and Ultra Search Schemas Deprecated**
- **DBCA no longer provides default security settings**

Database Level Changes

- Structure changes in the ADR
- DataGuard Compressed Table Support for Logical Standby and LogMiner
- DataPump Legacy Mode

Execute for Directory Objects

- In 10g we granted READ and/or WRITE
- But this also allowed executing the ORACLE_LOADER access driver
- Only a user that has been given EXECUTE access to the directory object is allowed to run programs in it

```
CREATE DIRECTORY stage ON /home/oracle/stage  
  
GRANT read ON stage;  
  
GRANT write ON stage;  
  
GRANT execute ON stage;
```

RMAN

- Automatic Block Repair

```
RMAN> BLOCKRECOVER DATAFILE 2 BLOCK 12,13 DATAFILE 3  
      BLOCK 5,98,99 DATAFILE 4 BLOCK 19;  
  
RMAN> BACKUP VALIDATE DATABASE;  
RMAN> BLOCKRECOVER CORRUPTION LIST;
```

- New options for DUPLICATE DATABASE
 - DUPLICATE can be performed without connecting to a target database: Requires connecting to a catalog and auxiliary database.
- Enhanced Tablespace **Point-In-Time-Recovery**
 - Recover a dropped tablespace.
 - Can be repeated multiple times for the same tablespace
 - DBMS_TTS.TRANSPORT_SET_CHECK is run automatically

Storage

- Tablespaces
 - Enhancements to SecureFiles (learn about DBFS)
 - New Tablespace Master Rekey
- Indexes
 - Zero-size unusable indexes & index partitions
- Tables
 - Segment creation on demand (deferred segment creation)

Demo

SQL

- New Analytic Functions
 - LISTAGG
 - NTH_VALUE
 - RESPECT or IGNORE NULLS

```
SELECT department_id "Dept.",  
LISTAGG(last_name, ' ; ') WITHIN GROUP (ORDER BY hire_date) "Employees"  
FROM employees  
GROUP BY department_id;  
  
SELECT prod_id, channel_id, MIN(amount_sold),  
NTH_VALUE(MIN(amount_sold), 2)  
OVER (PARTITION BY prod_id ORDER BY channel_id ROWS  
BETWEEN UNBOUNDED PRECEDING AND UNBOUNDED FOLLOWING) NV  
FROM sales  
WHERE prod_id BETWEEN 13 AND 16  
GROUP BY prod_id, channel_id;  
  
FIRST_VALUE(<expression> [<RESPECT | IGNORE> NULLS]) OVER (<analytic clause>)
```

SQL

- ALTER DATABASE LINK
- IGNORE_ROW_ON_DUPKEY_INDEX Hint
 - To ignore collisions and insert the rows that do not collide with existing rows, put the hint in the INSERT statement
- Improved Flashback Archive allows more DDL
- DATABASE_ROLE constant for SYS_CONTEXT
 - PRIMARY
 - PHYSICAL STANDBY
 - LOGICAL STANDBY
 - SNAPSHOT STANDBY

```
SELECT sys_context('USERENV', 'DATABASE_ROLE') FROM dual;
```

SQL

- Recursive Queries
 - CONNECT BY
- Recursive Common Table Expressions (WITH)

```
WITH <alias> AS
  (subquery_sql_statement)
  SEARCH <BREADTH | DEPTH>
  FIRST BY <column_name> [ASC | DESC] [NULLS FIRST | NULLS LAST]
  SET <ordering_column>
  CYCLE (alias) SET <cycle_mark_alias>
  TO <cycle_value> DEFAULT <no_cycle_value>
  SELECT <column_name_list>
  FROM <alias_one>, <alias_two>
  WHERE <join_condition>;
```

PL/SQL

- New NO_DATA_NEEDED Predefined Exception
 - ORA-06548: For parallel access and pipelined table functions
The caller of a pipelined function does not need more rows to be produced by the pipelined function.
- Improved fine grained dependency tracking
- Warnings
 - Severe
 - 5018 - omitted optional AUTHID clause
 - 5019 - deprecated language element
 - 5020 - parameter name must be identified
 - Informative
 - 6016 - native code generation turned off (size/time)
 - 6017 - operation will raise an exception
 - 6018 - an infinity or NaN value computed or used
 - Performance
 - None

Built-in Packages

- New Packages (26 in all)
 - DBMS_COMPRESSION HCC
 - DBMS_CUBE_LOG Control logging of OLAP components
 - DBMS_PARALLEL_EXECUTE RAC
- Packages with new Functions and Procedures (108)
 - DBMS_BACKUP_RESTORE Restore blocks from Standby
 - DBMS_CUBE Create CUBE Materialized View
 - DBMS_LOB Set Content Type for BLOBS + DBFS
 - DBMS_LOGSTDBY DB IS LOGSTDBY & IS APPLY SERVER
 - DBMS_METADATA
 - DBMS_METADATA_UTIL
 - DBMS_NETWORK_ACL_ADMIN Assign ACL to a Wallet
 - DBMS_RESULT_CACHE Delete Dependency
 - DBMS_SCHEDULER File Watcher

Built-in Packages

■ Packages with new Functions and Procedures

■ DBMS_SESSION	Get package memory utilization & EBR
■ DBMS_SPACE_ADMIN	Segment Repair (NOT!)
■ DBMS_SPM	Migrate Stored Outlines
■ DBMS_SQLDIAG	Dump Trace File
■ DBMS_SQLPA	DBMS_SPA "Undocumented" <g>
■ DBMS_SQLTUNE	REPORT_SQL_MONITOR enhanced
■ DBMS_STATS	
■ DBMS_STREAMS & STREAMS_ADMIN	
■ DBMS.Utility	WAIT_ON_PENDING_DML
■ DBMS_WLM	
■ DBMS_WORKLOAD_CAPTURE & REPLAY	
■ DBMS_WORKLOAD_REPOSITORY	GLOBAL_DIFF_REPORT
■ DBMS_XPLAN	DIFF_PLAN procs

Demo

Built-in Packages

- Packages with new Functions and Procedures
 - UTL_HTTP SET_AUTHENTICATION_FROM_WALLET
 - UTL_SMTP CLOSE_CONNECTION
- And many have new overloads (39+)
- And new parameters (13+)
- And new types (1+)
- And new constants (4+)
- Adding new and enhanced functionality

New in 11.2.0.2 and
you won't hear about
from your Oracle rep
or find in the documentation

New Packages

CTX_TREE (owned by CTXSYS)		
DBMS_ADR	DBMS_ADR	02-Oct-2010
DBMS_AUTO_SQLTUNE	DBMS_AUTO_SQLTUNE	30-Oct-2010
DBMS_DNFS	DBMS_DNFS	04-Oct-2010
DBMS_FINE_GRAIN_DEP	DBMS_FINE_GRAIN_DEP	07-Oct-2010
DBMS_GOLDENGATE_AUTH	DBMS_GOLDENGATE_AUTH	09-Oct-2010
DBMS_MGD_ID_UTL	DBMS_MGD_ID_UTL	03-Nov-2010
DBMS_RULE_INTERNAL		
DBMS_XSTREAM_ADM_INTERNAL		
DBMS_XSTREAM_AUTH		
DBMS_XSTREAM_GG		
DBMS_XSTREAM_GG_ADM		
DBMS_XSTREAM_UTL_IVK		
MGMT_PREFERENCES		

Packages with new functions and procedures

New RESET_AUTO_OPTIMIZE_STATUS and STOP_OPTIMIZE procedures	CTX_ADMIN	-
Many New procedures and functions	CTX_DDL	-
New VALIDATE_INDEX procedure	CTX_REPORT	-
Four new procedures	DBMS_AQ_INV	-
New GET_CONNECT_IDENTIFIER and SWITCH_PRIMARY_BCT functions	DBMS_BACKUP_RESTORE	30-Oct-2010
New SET_XOUT_PARAMS	DBMS_CAPTURE_ADMIN_INTERNAL	-
New VERIFY_CDC_NAME procedure	DBMS_CDC.Utility	30-Oct-2010
New CREATE_EXPORT_OPTIONS, CREATE_IMPORT_OPTIONS, and UPGRADE_AW procedures	DBMS_CUBE	30-Oct-2010
New INSTANCE_INFO_IMP_DS_11_2_0_2 procedure	DBMS_CUBE_EXP	-
New COMPLETE_OPLOG, START_OPLOG, WRITE_TO_OPLOG procedures	DBMS_CUBE_LOG	31-Oct-2010
New GET_DIMENSION_SPECIAL_MEMBER function	DBMS_CUBE_UTIL	-
New IMPORT_PMMI_MODEL procedure	DBMS_DATA_MINING_INTERNAL	-
New GETATTR_VIEW function and LISTCURSOR procedure	DBMS_DBFS_CONTENT	-
Four new procedures	DBMS_DBFS_CONTENT_SPI	-
Forty-eight new functions and procedures	DBMS_DBFS_SFS	01-Nov-2010
Five new functions and procedures	DBMS_DBFS_SFS_ADMIN	-
New VALIDATE_ITEM procedure	DBMS_EXPFIL_DR	-
New VALIDATE_EXPR procedure	DBMS_EXPFIL_UTL	-
New SET_HAKAN_EVENT procedure	DBMS_EXPORT_EXTENSION	-
New FS_GETATTR_VIEW function	DBMS_FUSE	-
Six new procedures and functions	DBMS_INTERNAL_LOGSTDBY	-
New DROP_CHANGE_TABLE procedure	DBMS_IPUBLISH	-
New EVALUATE_RULESET, GET_NOTIFICATIONS, and GET_STEP_STATE_CF procedures	DBMS_ISCHED	-
New STEP_TABLE_POPULATED procedure	DBMS_ISCHED_CHAIN_CONDITION	-
New FETCH_OBJNUMS_NAMES and IS_ATTR_VALID_ON_10 functions	DBMS_METADATA	19-Nov-2010
New BEGIN_SQL_BLOCK and END_SQL_BLOCK procedures	DBMS_RESOURCE_MANAGER	28-Sep-2010
New MARKHOT and UNMARKHOT procedures	DBMS_SHARED_POOL	09-Oct-2010

new functions and procedures continued

New DROP_EMPTY_SEGMENTS and MATERIALIZE_DEFERRED_SEGMENTS procedures	DBMS_SPACE_ADMIN	18-Nov-2010
New REPORT_COL_USAGE function and RESET_COL_USAGE procedure	DBMS_STATS	21-Oct-2010
New COMPARE_SQLSET_REPORT, REUSE_REPLAY_FILTER_SET and SET_REPLAY_TIMEOUT procedures	DBMS_WORKLOAD_REPLAY	28-Sep-2010
New UPDATE_OBJECT_INFO procedure	DBMS_WORKLOAD_REPOSITORY	06-Nov-2010
New AUTH and STARTTLS procedures	UTL_SMTP	08-Oct-2010
New SHOW_STATS_HTML procedure	UTL_SPADV	18-Oct-2010
New SECURE_CONNECTION procedure	UTL_TCP	27-Sep-2010
New WINDOWS32 procedure	UTL_XML	27-Oct-2010

New Overloads

New DECLARE_REWRITE_EQUIVALENCE overload	DBMS_ADVANCED_REWRITE	22-Sep-2010
New overload 3 for BMRSTART and NETWORKFILETRANSFER	DBMS_BACKUP_RESTORE	30-Oct-2010
New overloads 5 and 6 for IMPORT_XML	DBMS_CUBE	30-Oct-2010
New overloads for GET_ENCODED_PKGVARs_FOR_CLIENT, GET_ENCODED_STACK_FOR_CLIENT, GET_VALUE, PRINT_BACKTRACE, and SHOW_BREAKPOINTS	DBMS_DEBUG	19-Nov-2010
New CREATE_EXTENDED_STATS overload	DBMS_STATS	21-Oct-2010
New PREPARE_REPLAY overload and new parameters for the original procedure	DBMS_WORKLOAD_REPLAY	28-Sep-2010

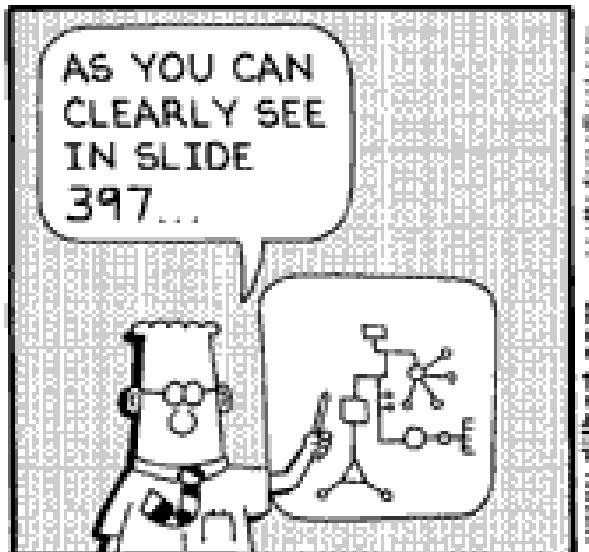
New Parameters

New CLEANUP parameter for the REGISTER procedure	DBMS_ALERT	22-Sep-2010
New DESTQ parameter for RECOVER_PROPAGATION procedure	DBMS_AQADM	29-Oct-2010
New START_TIME parameter for the ALTER_CAPTURE and CREATE_CAPTURE procedures	DBMS_CAPTUREADM	28-Sep-2010
New parameters for the BUILD, BUILD_SLAVE, and REFRESH_MVIEW procedures	DBMS_CUBE	30-Oct-2010
New CREATE_PLAN_DIRECTIVE and UPDATE_PLAN_DIRECTIVE parameters	DBMS_RESOURCE_MANAGER	28-Sep-2010
New Edition Enabled services	DBMS_SERVICE	30-Sep-2010
New STAT_CATEGORY parameters for EXPORT... and IMPORT... procedures, new CONTEXT parameter for GATHER_TABLE_STATS	DBMS_STATS	21-Oct-2010
New START_CAPTURE parameters	DBMS_WORKLOAD_CAPTURE	28-Sep-2010
New ADD_OUTBOUND and ALTER_OUTBOUND default and parameters	DBMS_XSTREAMADM	09-Oct-2010
New WALLET_PATH and WALLET_PASSWORD parameters in OPEN_CONNECTION	UTL_SMTP	08-Oct-2010
New WALLET_PATH and WALLET_PASSWORD parameters in OPEN_CONNECTION	UTL_TCP	27-Sep-2010

New Constants, Exceptions, and Types

New EXPORT_ERRQ_ERROR exception	DBMS_APPLY_ADM	18-Nov-2010
New parameters for SET_PARAMETER in Oracle docs	DBMS_CAPTURE_ADM	28-Sep-2010
New transform controlling the segment creation clause	DBMS_DATAPUMP	19-Nov-2010
New runs with AUTHID CURRENT_USER	DBMS_RECTIFIER_DIFF	18-Nov-2010
New 11.2.0.2 related constants	DBMS_REGISTRY	08-Nov-2010
New STATUS_CORR constant	DBMS_RESULT_CACHE	09-Oct-2010
New constants and exceptions	DBMS_SERVICE	30-Sep-2010
New DEFAULT_STAT_CATEGORY constant	DBMS_STATS	21-Oct-2010
New IS_ORACLE_FORMS constant	UTL_IDENT	06-Oct-2010

Due to complaints made to the European Union's
Directorate General of Health and Consumer Protection ...



you are now entering ...



Questions

ERROR at line 1:

ORA-00028: your session has been killed



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