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# New Features in Database 11gR2

**... you will not hear about from Oracle**

presentation for:



**May, 2010**

# Introduction

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- Daniel Morgan – [damorgan11g@gmail.com](mailto:damorgan11g@gmail.com)
- Oracle Ace Director 
- University of Washington, retired
- The Morgan of Morgan's Library on the web
  - [www.morganslibrary.org/library.html](http://www.morganslibrary.org/library.html)
- Member: Western Washington Oracle Users Group
- Member: UK Oracle Users Group
- Former Member: Oracle Applications Users Group
- Frequent speaker . . . . .
- Oracle since version 6
- 11g beta test site



cd \$MORGAN\_HOME

---



cd \$MORGAN\_HOME



```
cd $MORGAN_HOME
```

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# What I Learned From American Web Sites

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New Ash Cloud From Eyjafjallajokull Volcano – This coming Tuesday expect the normal [flights from Europe](#) as Airlines resume there traveling program but there were concerns about the new ash cloud that was seen this morning.

The ashes from the **Eyjafjallajokull Volcano** is now going to its nearby places like the place of Britain. It is now getting worse as it is expected.

The Iceland's Eyjafjallajokull volcano spewed a new cloud of ash up to 15,000 feet in the air.

Scottish airports should be available this coming Tuesday but it seems the announcement will changed and it will be open this Tuesday afternoon.

Geologist who [keeps on](#) observing the volcano says that the status of the volcano is changing every midnight and it is not constant on erupting.

This scenario already [caused \\$200 damages](#) from the airlines and there are more than 6.8 million passengers have been affected and now thousands of people are now living in some airports since Wednesday.

**No Comment**

# What I Learned In Oslo's Airport

Time	Flight	Gate	Destination	
0630	DY1800		Malaga	Gate closed
1710	BLX692	46	Goteborg	Cancelled
1710	SK811		London/Heathrow	Cancelled
1715	SK841		Zurich	Cancelled
1715	AY660		Helsinki	Cancelled
1720	QH4796		Billund	Cancelled
1725	DY1494		Paris/Orly	Cancelled
1725	KL1148		Amsterdam	Cancelled
1725	KQ1148		Amsterdam	Cancelled
1730	SK461		Kopenhagen	Cancelled
1740	DY1866		Pisa	Cancelled
1750	DY3232		Kopenhagen	Cancelled
1805	LH3145		Munchen	Cancelled
1805	SK3681		Munchen	Cancelled
1805	SK1465		Kopenhagen	Cancelled
1810	DY1306		London/Gatwick	Cancelled
1815	DY1978		Beograd	Cancelled
1820	SK1484	36	Stockholm	Cancelled
1825	DY1108		Berlin/Schoenefeld	Cancelled
1825	BA8272		Aarhus	Cancelled
1830	DY3774		Stockholm	Cancelled
1845	FI325	46	Reykjavik	New time 1925
1855	SK3621		Frankfurt	Cancelled
1855	LH3135		Frankfurt	Cancelled
1855	SK6616	39	Helsinki	
1855	KF506	39	Helsinki	
1900	SK463		Kopenhagen	Cancelled
1905	DY1256		Amsterdam	Cancelled
1915	TP509		Lisboa	Cancelled
1915	DY1132		Dusseldorf	Cancelled
1920	WF336		Goteborg	Cancelled
1920	DY1352		Edinburgh	Cancelled
1920	SK3192		Goteborg	Cancelled
1920	QH4798		Billund	Cancelled

It is easier to arrive than to leave

# What I Learned In Iceland

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**What is the **capitol** of Iceland?**

**Reykjavik**

**What is the **capital** of Iceland?**

**120 Kr**

# What I Learned Over Greenland

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**Global warming isn't real**

# Morgan's Library: [www.morganslibrary.org](http://www.morganslibrary.org)

 **Morgan's Library**   [www.morganslibrary.org](http://www.morganslibrary.org)

**Morgan's 2010 - 2011 Calendar**

Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Stanley meets: Charles Phillips, Tom Kyte, Mark Townsend, and Willie Hardie: ... Who's next?											

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**Oracle's Hiring**

**Training Events**

- [RMOUG](#) - Feb 16 - Feb 18, Denver, CO
- [VanOUG](#) - Early March: Watch for more
- [NZOUG](#) - Mar 15 - Mar 16, Rotorua, NZ
- [OUGN](#) - Apr 14-16, Oslo, Norway
- [OUGT](#) - May 17, Istanbul, Turkey
- [ORCAN](#) - May 18-19, Stockholm, Sweden
- [EMEA Harmony](#) - May 20-21, Tallinn, Estonia
- [ILOUG](#) - Jun 26, Herzlia, Israel

**Oracle Events**

**Rocky Mountain Oracle Users Group: February**

**Morgan**

aboard USA-71

**Library News**

- [Morgan's Notepad vi \(Blog\)](#)
- [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](#)
- [Troubleshooting Performance](#)

**ACE News**

Would you like to become an Oracle ACE?

Learn more about becoming an ACE

[ACE Directory](#)  
[ACE Google Map](#)  
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# How Can I?

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### A Guide To Meeting Challenges in Oracle Database 11g

### Modified

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

# ... create a data type that will only hold 0s and 1s

---

```
DECLARE
    SUBTYPE flagtype IS PLS_INTEGER RANGE 0..1;
    x flagtype;
BEGIN
    BEGIN
        x := 0;
        dbms_output.put_line('Success: ' || TO_CHAR(x));
    EXCEPTION
        WHEN others THEN
            dbms_output.put_line('Can not assign 0 to flagtype');
    END;

    BEGIN
        x := 1;
        dbms_output.put_line('Success: ' || TO_CHAR(x));
    EXCEPTION
        WHEN others THEN
            dbms_output.put_line('Can not assign 1 to flagtype');
    END;
    . . .
END;
/
```

Demo

# OpenWorld Unconference

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## Oracle OpenWorld *Unconference*

### Monday - Oct 12

2pm

Overlook I: Fundamentals of Performance (Oracle ACE Director [Cary Millsap](#))

Overlook II: Oracle Scheduler: what front end tools are available: bring your own tools and demonstrate ! ([Ronald Rood](#), [Ciber](#))

Overlook III: [Hudson community meet up](#)

### Tuesday - Oct 13

9am

Overlook I: What's New in Eleven ... Dot Two (that Oracle won't be talking about) presented by Oracle ACE Director Daniel Morgan

Overlook II: Creating Platform as a Service (PaaS) environments with WebLogic Server: Best Practices and Stories from the Trenches. (Bill Dettelback)

Overlook III: Reserved for onsite signups

10am

Overlook I: Oracle Indexes: Q & A Discussion With Oracle ACE Director Richard Foote

Overlook II: Experiences on Java programming within the databases, tips & tricks, tools, open source libraries and more. (Oracle ACE Marcelo F. Ochoa)

Overlook III: Reserved for onsite signups



# Oracle OpenWorld 2009

**Oracle Advanced Compression in Oracle Database 11g Release 2:  
Value/Performance (S307442)**  
Thursday, Oct 15 09:00-10:00 Moscone South, Room 102 Seats Available: 389

[+](#) [+](#) [Email a Friend](#)

**Track:** Database

**Secondary Track:**

**Description:** With the release of Oracle Advanced Compression in Oracle Database 11g Release 2, Oracle has implemented columnar compression and redefined the performance and value proposition. This session, hands-on in SQL\*Plus, demonstrates Oracle Advanced Compression's new columnar storage capabilities in normal and partitioned heap tables, demonstrating the syntax and compression capabilities while highlighting the ability to leverage this new feature to generate substantial financial savings on storage subsystems.

**Session Type:** Conference Session

**Tags:** [Add](#) 11gac, Database, Database Maintenance

**Length:** 60 min

**Speakers:** Daniel Morgan, *University of Washington Instructor*

**Related Sessions:** [with co-presenter: Oak Table Network member Kevin Clossen](#)

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# New in 11gR1

# New in 11gR1

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- 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

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

# New in 11gR1

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- 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

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- 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

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- 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

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- And in 11.1.0.7
  - DBMS\_AUDIT\_MANAGEMENT
  - DBMS\_BACKUP\_RESTORE
  - DBMS\_IRIncident Reporting
  - DBMS\_LOGSTDBY
  - DBMS\_METADATA
  - DBMS\_SCHEDULER
  - DBMS\_SQLPA
  - DBMS\_SQLTUNE
  - DBMS\_WORKLOAD\_CAPTURE
  - DBMS\_WORKLOAD\_REPLAY
  - DBMS\_XPLAN
  - UTL\_XML

# My OpenWorld Predictions

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What Oracle  
will talk about  
"here at OpenWorld"

# What Oracle Will Talk About

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- 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
- Advanced Compression
- Exadata V2 and Hybrid Columnar Compression

# Bryn Llewellyn's White Papers

## Library News

- [Morgan's Notepad vi \(Blog\)](#)
- [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](#)
- [Troubleshooting Performance](#)

## Doing SQL from PL/SQL: Best and Worst Practices

*An Oracle White Paper  
September 2008*

PL/SQL-specific syntax.

```
-- Code 3
<<b>>declare
  Some_Value t.PK&type := 42;
  The_Result t%rowtype;
begin
  select    a.*
  into      b.The_Result
  from      t a
  where     a.PK = b.Some_Value;

  The_Result.v1 := 'New text';

  update   t a
  set      row = b.The_Result
  where    a.PK = b.The_Result.PK;

  The_Result.PK := -Some_Value;
  insert   into t
  values   The_Result;
end;
```

Resolution of names in embedded SQL statements.

# Bryn Llewellyn's White Papers

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## Caveat

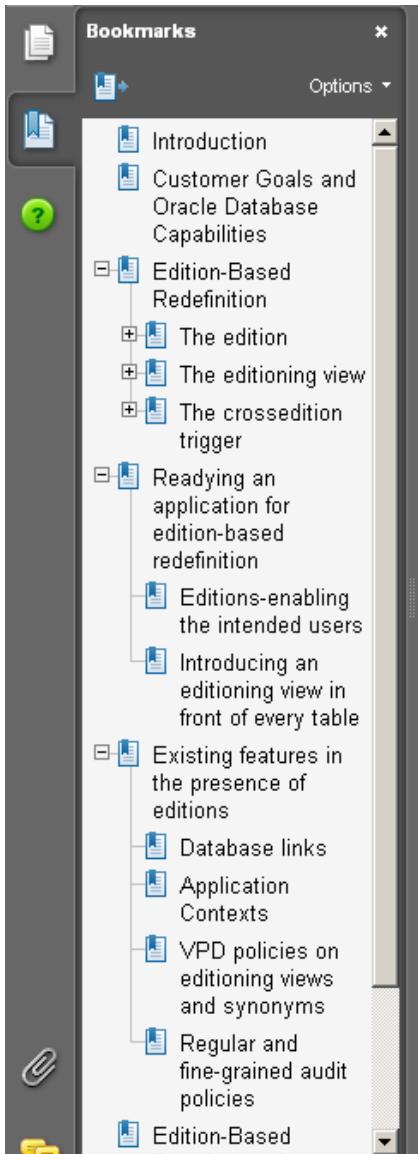
Prescribing best practice principles for programming any 3GL is phenomenally difficult. One of the hardest challenges is the safety of the assumption that the reader starts out with these qualities:

- Has chosen the right parents<sup>3</sup>.
- Has natural common sense coupled with well-developed verbal reasoning skills.
- Has an ability to visualize mechanical systems.
- Requires excellence from self and others.
- Has first class negotiating skills. (Good code takes longer to write and test than bad code; managers want code delivered in aggressive timeframes.)
- Has received a first class education.
- Can write excellent technical prose. (How else can you write the requirements for your code, write the test specifications, and discuss problems that arise along the way?)

Then, the reader would be fortunate enough to work in an environment which provides intellectual succor:

- Has easy access to one or several excellent mentors.

# Bryn Llewellyn's White Paper



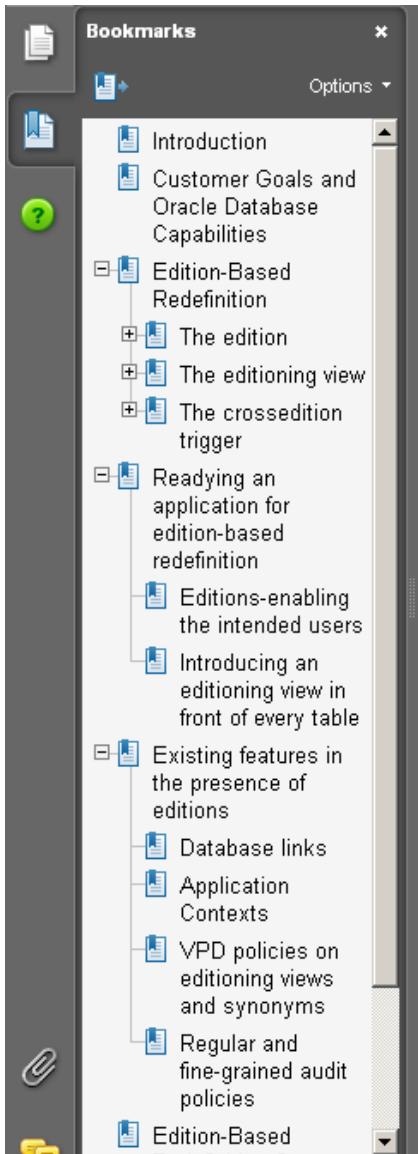
An Oracle White Paper  
July 2009

## Edition-Based Redefinition

a new capability in Oracle Database 11g Release 2  
to support online application upgrade

# Bryn Llewellyn's White Paper

---



Bryn started off doing image analysis and pattern recognition at Oxford University (programming in FORTRAN!) and then worked in Oslo, first at the Norwegian Computing Center, then in a startup, and then at the Norwegian Institute for Public Health. In Norway, Bryn programmed in Simula (its inventors were his close colleagues) a language recognized as the first object-oriented programming language and the inspiration for Smalltalk and C++.

An Oracle White Paper  
July 2009

## Edition-Based Redefinition

a new capability in Oracle Database 11g Release 2 to support online application upgrade

We all have our favorite customers: This is mine

---



Store  
More  
Data

Maintain  
Performance

Honor  
the same  
Service  
Level  
Agreement

GB, TB, **PB**, EB  
What's the  
big deal?

# Hybrid Columnar Compression on Exadata V2

## Warehouse Compression

- 10x average storage savings
- 10x reduction in Scan IO

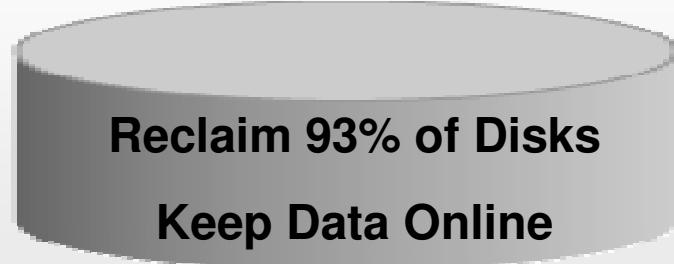
Optimized for Speed



## Archive Compression

- 15x average storage savings
  - Up to 70x on some data
- Some access overhead
- For cold or historical data

Optimized for Space



**Totally application transparent**

# How Traditional Compression Works

---

- A grossly oversimplified "how it works"
  1. Oracle examines full blocks for duplicates
  2. Creates a symbol that is stored in the block header
  3. Rewrites the block substituting the symbol for the values it represents
- **Compression is performed at the block level**  
not the table like DB2

City	State	Postal Code
Hot Springs National Park	AR	71901
Hot Springs National Park	AR	71902
Hot Springs National Park	AR	71903
Hot Springs National Park	AR	71913

**128 bbytes**

City	State	Postal Code
Hot Springs National Park	AR	71901
"	"	"02
"	"	"03
"	"	"13

**38 bbytes**

## 9.2 Data Segment Compression

---

- Heap Organized Tables
- Materialized Views

```
CREATE TABLE reg_tab AS
SELECT *
FROM dba_tables;

CREATE TABLE COMPRESS comp_tab AS
SELECT *
FROM dba_tables;

exec dbms_stats.gather_table_stats(USER, 'REG_TAB');
exec dbms_stats.gather_table_stats(USER, 'COMP_TAB');

SELECT table_name, blocks
FROM user_tables
WHERE table_name LIKE '%TAB';

SELECT table_name, blocks FROM user_tables WHERE table_name LIKE '%TAB';

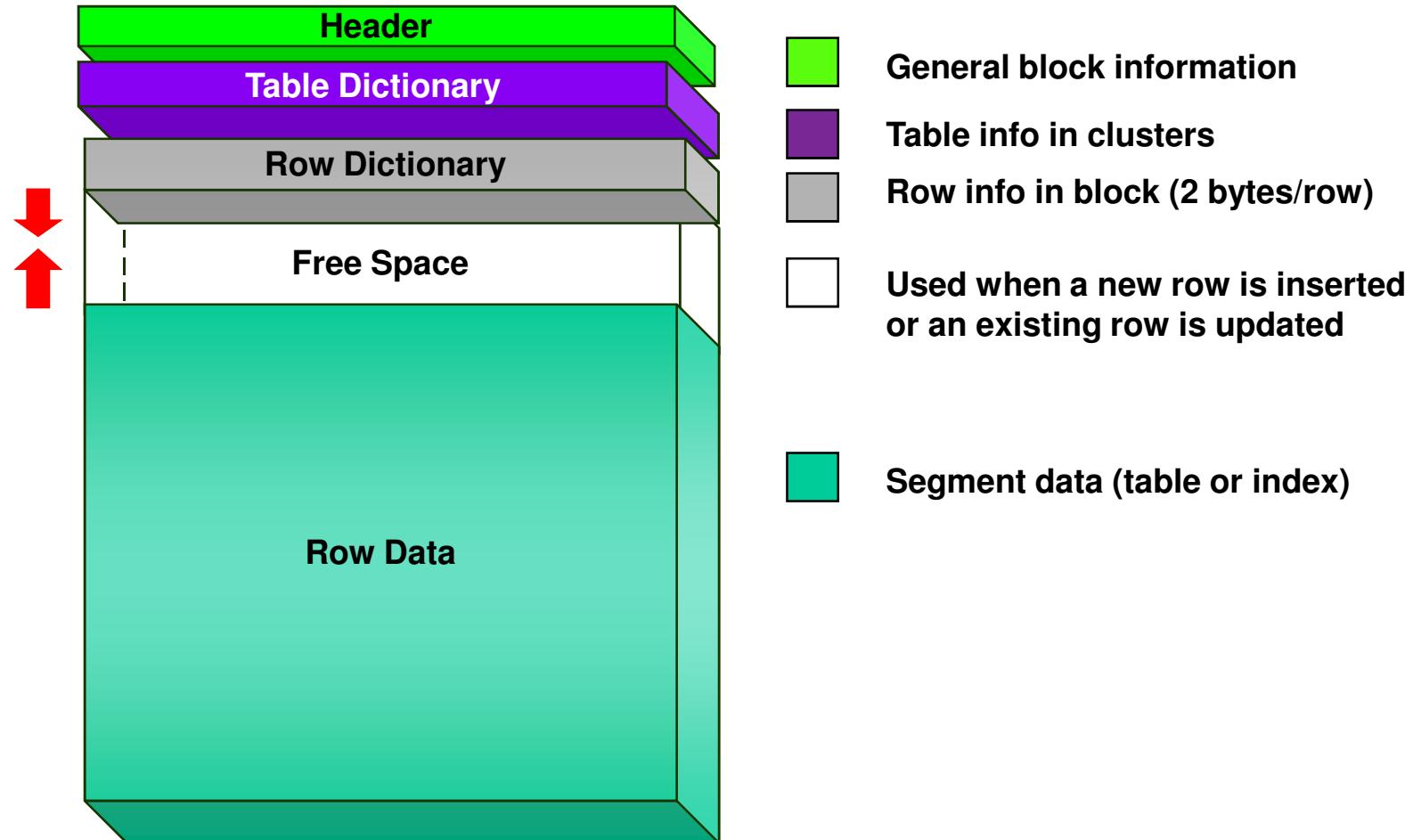


| TABLE_NAME      | BLOCKS    |
|-----------------|-----------|
| REG_TAB         | 108       |
| <b>COMP_TAB</b> | <b>18</b> |


```

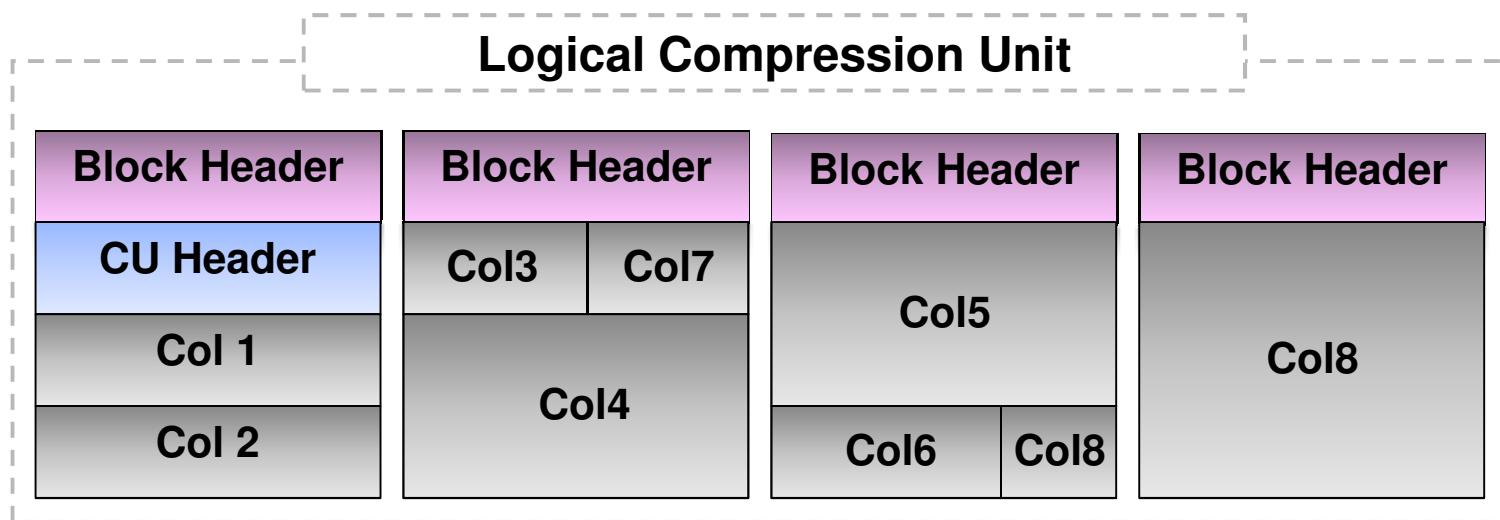
Demo

# Database Block Anatomy



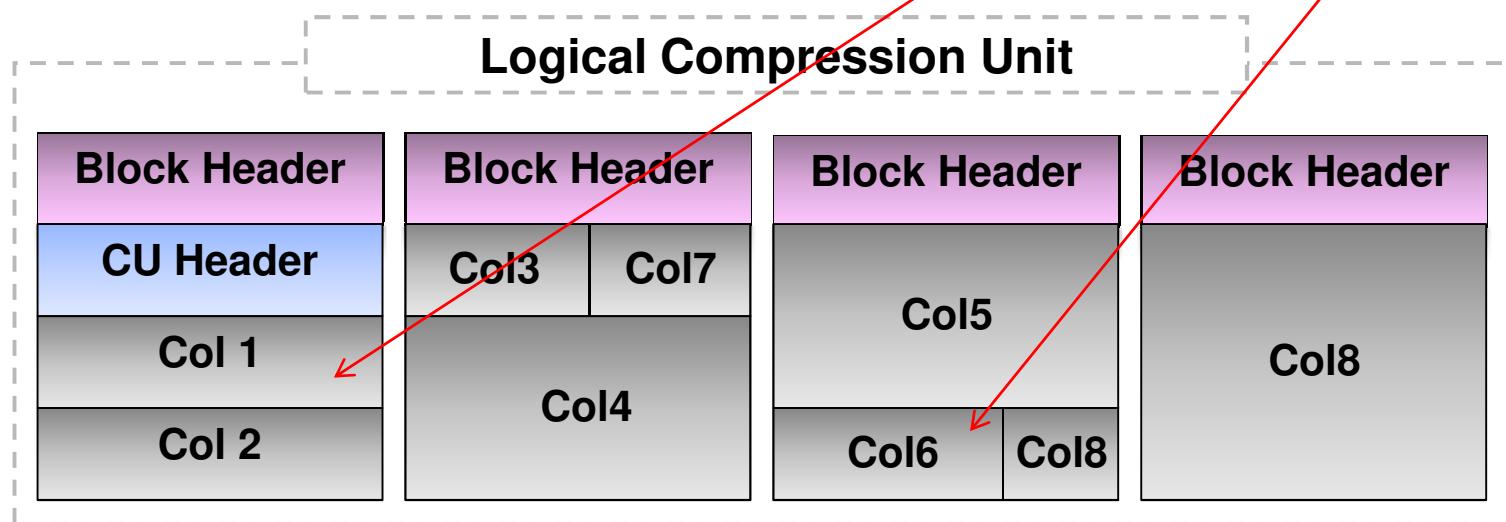
# Logical Compression Unit

- 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));
```



# Business as Usual

---

- Fully supported with...
  - B-Tree, Bitmap Indexes, Text indexes
  - Materialized Views
  - Exadata Server and Cells
  - Partitioning
  - Parallel Query, PDML, PDDL
  - Schema Evolution support, online, metadata-only add/drop columns
  - Data Guard Physical Standby Support
- Will be supported in a future release
  - Logical Standby
  - Streams

# HCC: Things to Consider ...

---

- When a row is updated
  - It is automatically migrated to OLTP Table Compression
  - Table size will increase moderately
  - All rows in the compression unit are locked
- When tables are queried
  - Table scans are faster due to less I/O
  - Index lookups are usually slower
    - Need to decompress the compression unit to read entire row

# HCC's Performance Characteristics

	GB/s Physical	4 GFC HBAs	EHCC Reinflated Data Flow (GB/s)	Required Cores for "Primary Processing"
Generic System *	4	10	40	6.8
Database Machine	21 (disk)	N/A	210	35.7
	50 (flash)	N/A	500	85

- Division of work: Sun Oracle Database Machine has 112 processor cores for decompression and filtration
- A hypothetical equivalent non-Exadata system would need on the order of 10 cluster nodes just for decompression and filtration if provisioned 21 GB/s I/O

\* Hypothetical as HCC is an Exadata Feature

# Compression Advisor

---

- DBMS\_COMPRESSION built-in package
  - GET\_COMPRESSION\_RATIO
    - >Returns the possible compression ratio for an uncompressed table or materialized view and estimates achievable compression
  - GET\_COMPRESSION\_TYPE
    - >Inspects data and reports what compression type is in use by row
- Enterprise Manager Segment Advisor
  - Estimates OLTP Table Compression automatically
  - Advises tables that will benefit from OLTP Compression

# GET\_COMPRESSION\_RATIO

---

```
CREATE TABLE comp_test1 AS
SELECT * FROM dba_objects;

set serveroutput on

DECLARE
  blkcnt_comp PLS_INTEGER;
  blkcnt_uncm PLS_INTEGER;
  row_comp    PLS_INTEGER;
  row_uncm    PLS_INTEGER;
  comp_ratio  PLS_INTEGER;
  comp_type   VARCHAR2(30);
  tablespace      owner      table name      partition
BEGIN
  dbms_compression.get_compression_ratio('UWDATA', 'UWCLASS', 'COMP_TEST1', NULL,
  dbms_compression.comp_for.oltp, blkcnt_cmp, blkcnt_uncmp, row_comp, row_uncm,
  comp_ratio, comp_type);

  dbms_output.put_line('Block Count Compressed: ' || TO_CHAR(blkcnt_comp));
  dbms_output.put_line('Block Count UnCompressed: ' || TO_CHAR(blkcnt_uncm));
  dbms_output.put_line('Row Count Compressed: ' || TO_CHAR(row_comp));
  dbms_output.put_line('Row Count UnCompressed: ' || TO_CHAR(row_uncm));
  dbms_output.put_line('Block Count Compressed: ' || TO_CHAR(comp_ratio));
  dbms_output.put_line('Compression Type: ' || comp_type);

END;
/
```

# GET\_COMPRESSION\_TYPE

---

```
CREATE TABLE comp_test2
  COMPRESS FOR OLTP AS
  SELECT * FROM dba_objects;

  set serveroutput on

  DECLARE
    rid ROWID;
    n   NUMBER;
  BEGIN
    SELECT MAX(rowid)
    INTO rid
    FROM comp_test2;

    n := dbms_compression.get_compression_type(USER, 'COMP_TEST2', rid);
    dbms_output.put_line(n);          owner    table name    rowid
  END;
  /
```

---

New in 11gR2 and  
you won't hear about  
from your Oracle rep

# What's Deprecated

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- **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

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- Structure changes in the ADR
- DataGuard Compressed Table Support for Logical Standby and LogMiner
- DataPump Legacy Mode
- `ALTER SYSTEM SET cpu_count = 4;`

Demo

# 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;
```

# RAC Clusters

---

## ■ In-Memory Parallel Query

- Traditionally, parallel execution has access to large amounts of data by taking full advantage of the system's I/O capacity
- In an Oracle RAC environment, Oracle maps fragments of the object into each of the buffer caches on the active instances
- As clusters scale-out this new functionality optimizes large parallel operations by minimizing or eliminating physical I/O if parallel operation can be satisfied in memory

```
parallel_adaptive_multi_user=TRUE  
parallel_automatic_tuning=FALSE  
parallel_degree_limit=CPU  
parallel_force_local=FALSE
```

```
PARALLEL_DEGREE_POLICY = {MANUAL | LIMITED | AUTO}  
parallel_degree_limit=AUTO
```

Ok they did have one session on IMPQ

# 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

# How Can I #11

```
BEGIN
  SELECT COUNT(*)
  INTO i
  FROM gv$backup_corruption;

  IF i <> 0 THEN
    dbms_system.ksdfls;
    dbms_system.ksdddt;
    dbms_system.ksdwrt(2,'ORA-20341: GV$BACKUP_CORRUPTION contains '|| TO_CHAR(i)||' corruption
records');
  END IF;

  SELECT COUNT(*)
  INTO j
  FROM gv$copy_corruption;

  IF j <> 0 THEN
    dbms_system.ksdfls;
    dbms_system.ksdddt;
    dbms_system.ksdwrt(2,'ORA-20342: GV$COPY_CORRUPTION contains '|| TO_CHAR(j)||' corruption
records');
  END IF;

  SELECT COUNT(*)
  INTO k
  FROM gv$database_block_corruption;

  IF k <> 0 THEN
    dbms_system.ksdfls;
    dbms_system.ksdddt;
    dbms_system.ksdwrt(2,'ORA-20343: GV$DATABASE_BLOCK_CORRUPTION contains '||TO_CHAR(k)||'
corruption records');
```

# 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;
```

Demo

# 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

Demo

# 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	<a href="#">Get package memory utilization &amp; EBR</a>
■ DBMS_SPACE_ADMIN	<a href="#">Segment Repair (NOT!)</a>
■ 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	<a href="#">WAIT_ON_PENDING_DML</a>
■ DBMS_WLM	
■ DBMS_WORKLOAD_CAPTURE & REPLAY	
■ DBMS_WORKLOAD_REPOSITORY	<a href="#">GLOBAL_DIFF_REPORT</a>
■ DBMS_XPLAN	<a href="#">DIFF_PLAN procs</a>

# 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 Database 11.2 Summary

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..... We did not come here to fear the future



# Questions

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**ERROR at line 1:**

**ORA-00028: your session has been killed**

**All demos at [morganslibrary.org](http://morganslibrary.org)**

- **Library**
- **How Can I?**

**[damorgan11g@gmail.com](mailto:damorgan11g@gmail.com)**

**Thank you**