

Know Your Competitor

A MySQL Developers Guide to Oracle 10g Express Edition

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Agenda

- Why?
- Some RDBMS History
- Oracle Highlights of Interest
- Getting Started
- Syntax Differences
- Interactive Demonstration



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Why?

- Oracle represents the largest RDBMS provider
 - Combined with MS SQL Server and IBM DB2
> 90% of market space
- Opportunity into commercial organisations
- You should always be abreast of competitors



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Oracle Database Products

- Current Version Oracle 10g Release 2
- Previous 9i, 8i, 7.3
 - i stands for Internet
 - g stands for Grid
 - RAC Real Application Cluster
 - OCI Oracle Call Interface
 - PL/SQL



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Oracle Products

- Many other products (Designer, Forms, Reports, Discover)
- E-Business Suite
- Oracle Technology Network (OTN)
 - Free downloads of all Oracle Products

<http://otn.oracle.com>



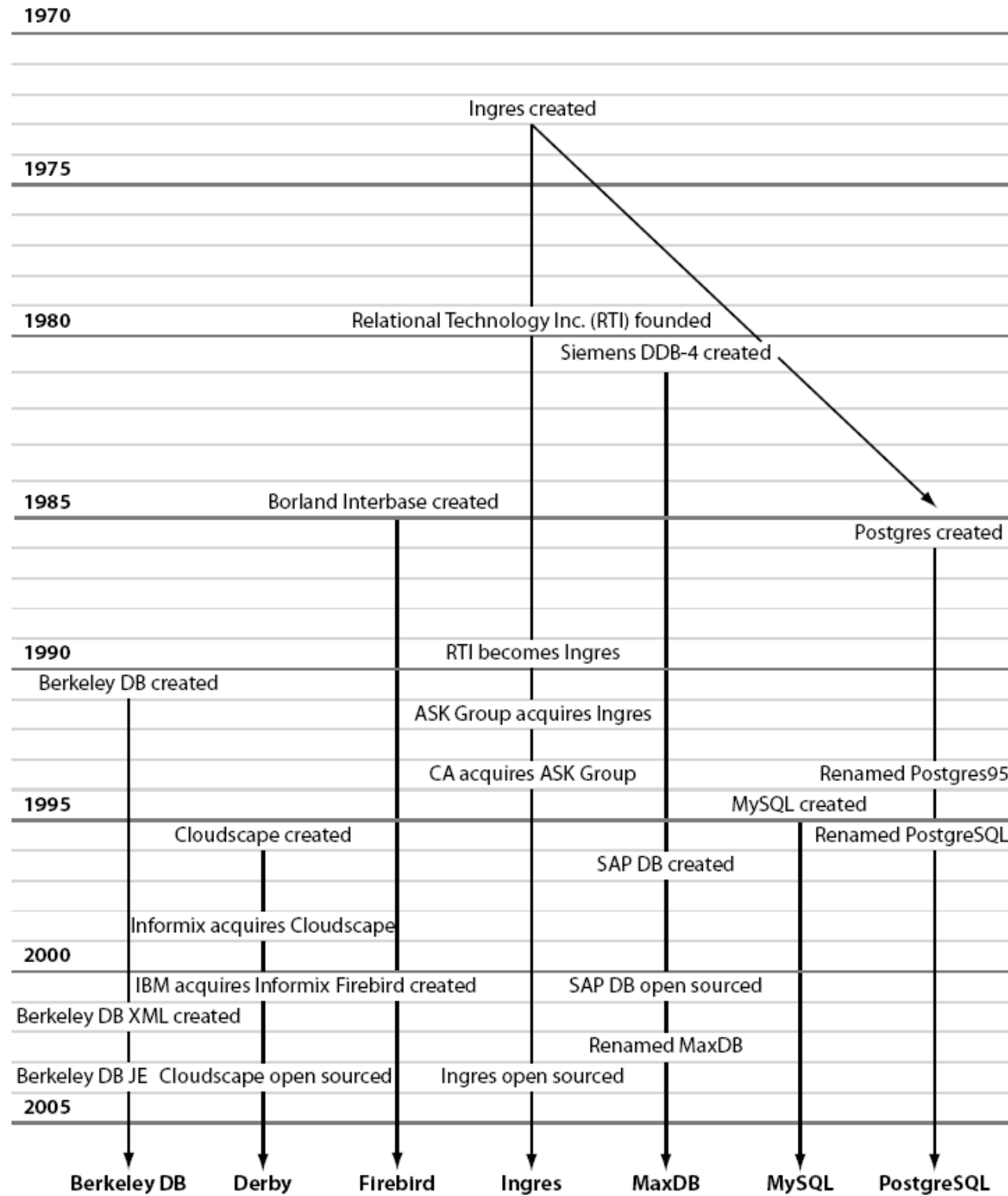
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Oracle History

- 1977 - Software Development Laboratories (SDL)
 - Founded by Larry Ellison
- **1992 - Version 7 (RI, triggers, stored procedures)**
- 1997 - Version 8 (object orientated, multimedia)
- 1999 - Version 8i (Native JVM)
- 2001 - Version 9i (RAC)
- 2003 - Version 10g (Grid computing ready)





Oracle

1977 Founded

1992 Version 7 ***

1997 Version 8

1999 Version 8i

2001 Version 9i

2003 Version 10g

Forrester Research

December 29, 2004
Open Source
Databases Come
Of Age



Source: Forrester Research, Inc.

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Current Oracle Trends

Linux is the default development environment

- Considered a large boast to Linux uptake
- Buying into Open Source
 - Jboss (tried and failed)
 - Sleepycat (Berkeley DB)
 - Xen
 - Innobase (InnoDB)



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What is Oracle 10g Express Edition (XE)

Free to develop, deploy, and distribute

Oracle Database 10g Express Edition (Oracle Database XE) is an entry-level, small-footprint database based on the Oracle Database 10g Release 2 code base that's free to develop, deploy, and distribute; fast to download; and simple to administer. Oracle Database XE is a great starter database for:

- Developers working on PHP, Java, .NET, and Open Source applications
- DBAs who need a free, starter database for training and deployment
- Independent Software Vendors (ISVs) and hardware vendors who want a starter database to distribute free of charge
- Educational institutions and students who need a free database for their curriculum



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What is Oracle 10g Express Edition (XE)

With Oracle Database XE, you can now develop and deploy applications with a powerful, proven, industry-leading infrastructure, and then upgrade when necessary without costly and complex migrations. Read what users say about Oracle Database XE.

Oracle Database XE can be installed on any size host machine with any number of CPUs, but this free version of the world's leading database will store up to 4GB of user data, use up to 1GB of memory, and use one CPU on the host machine.

Information from: www.oracle.com/technology/products/database/xe/



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XE Deployments

- Red Hat Enterprise Linux RHEL3 and RHEL4
- Suse SLES-9
- Fedora Core 4
- Red Flag DC Server 5.0/MIRACLE LINUX V4.0/Haansoft Linux 2006 Server (Asianux 2.0 Inside)
- Debian 3.1
- Oracle Application Express (HTMLDB)
- PHP Development Centre

<http://www.oracle.com/technology/tech/php>

- Zend Core

<http://www.oracle.com/technology/tech/php/zendcore>



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Documentation

A very strong point

- Getting Started

http://download-west.oracle.com/docs/cd/B25329_01/doc/admin.102/b25610/toc.htm

- 2 Day Plus PHP Developer Guide

http://download-west.oracle.com/docs/cd/B25329_01/doc/appdev.102/b25317/toc.htm

- Tutorial

<http://st-curriculum.oracle.com/tutorial/DBXETutorial/index.htm>



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Oracle Open Source Projects

http://www.oracle.com/technology/community/opensource_projects.html

- Ruby OCI/Python Interface/SOAP/tcl/LOG4PLSQL
- Unit Testing PL/SQL
- ProNuke. Postnuke To Oracle
- Oracle Editor

<http://tim.digicol.de/oraedit/>

- PhpOraAdmin

<http://phporaadmin.sourceforge.net>



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Getting Started

Download from Product Page

www.oracle.com/technology/products/database/xe/

- Linux Install
- Linux Services
- Confirmed Access
 - Processes
 - sqlplus
 - Web (Application Express)

See my Blog at <http://blog.arabx.com.au/?p=32>



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Getting Started - Installation

```
$ rpm -ivh oracle-xe-10.2.0.1-1.0.i386.rpm
```

```
$ /etc/init.d/oracle-xe configure
```

```
$ . /usr/lib/oracle/xe/app/oracle/product/  
10.2.0/server/bin/oracle_env.sh
```

```
$ sqlplus system/[passwd]
```

```
http://localhost:8080/apex
```

```
$ rpm -ev oracle-xe
```

Oracle Database 10g Express Edition Configuration

This will configure on-boot properties of Oracle Database 10g Express Edition. The following questions will determine whether the database should be starting upon system boot, the ports it will use, and the passwords that will be used for database accounts. Press <Enter> to accept the defaults. Ctrl-C will abort.

Specify the HTTP port that will be used for Oracle Application Express [8080]:

Specify a port that will be used for the database listener [1521]:

Specify a password to be used for database accounts. Note that the same password will be used for SYS and SYSTEM. Oracle recommends the use of different passwords for each database account. This can be done after initial configuration:

Confirm the password:

Do you want Oracle Database 10g Express Edition to be started on boot (y/n) [y]:

Starting Oracle Net Listener... Done

Configuring Database... Done

Starting Oracle Database 10g Express Edition Instance...Done

Installation Completed Successfully.

To access the Database Home Page go to "http://127.0.0.1:8080/apex"



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Getting Started – File System

- /etc/passwd oracle
- /etc/group dba
- /usr/lib/oracle
 - Not OFA compliant
- /usr/share
- du /usr/lib/oracle
 - 1.4G footprint

```
...
440 ./xe/app/oracle/doc
102536 ./xe/app/oracle/flash_recovery_area/XE/onlineolog
102544 ./xe/app/oracle/flash_recovery_area/XE
102552 ./xe/app/oracle/flash_recovery_area
64 ./xe/app/oracle/admin/XE/adump
8 ./xe/app/oracle/admin/XE/dbs
8 ./xe/app/oracle/admin/XE/dpdump
8 ./xe/app/oracle/admin/XE/pfile
8 ./xe/app/oracle/admin/XE/cdump
40 ./xe/app/oracle/admin/XE/udump
36 ./xe/app/oracle/admin/XE/bdump
180 ./xe/app/oracle/admin/XE
8 ./xe/app/oracle/admin/cfgtoollogs/dbca/XE
16 ./xe/app/oracle/admin/cfgtoollogs/dbca
24 ./xe/app/oracle/admin/cfgtoollogs
212 ./xe/app/oracle/admin
152 ./xe/app/oracle/product/10.2.0/server/demo/schema/human_resources
160 ./xe/app/oracle/product/10.2.0/server/demo/schema
168 ./xe/app/oracle/product/10.2.0/server/demo
97576 ./xe/app/oracle/product/10.2.0/server/bin
...
84 ./xe/app/oracle/product/10.2.0/server/network/admin
...
12792 ./xe/app/oracle/product/10.2.0/server/rdbms/jlib
55668 ./xe/app/oracle/product/10.2.0/server/rdbms
405348 ./xe/app/oracle/product/10.2.0/server
405356 ./xe/app/oracle/product/10.2.0
405364 ./xe/app/oracle/product
508576 ./xe/app/oracle
508584 ./xe/app
898816 ./xe/oradata/XE
898824 ./xe/oradata
1407416 ./xe
```



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Getting Started - Processes

- `ps - ef | grep oracle`

Some Processes

- Log Writer (lgwr)
- Checkpoint (ckpt)
- Database Writer (dbwr)
- Process Monitor (pmon)

```
oracle 16110 1 0 14:52 ? 00:00:00 /usr/lib/oracle/xe/app/oracle/product/10.2.0/
server/bin/tnslsnr LISTENER -inherit
oracle 16249 1 0 15:00 ? 00:00:00 xe_pmon_XE
oracle 16251 1 0 15:00 ? 00:00:00 xe_psp0_XE
oracle 16253 1 0 15:00 ? 00:00:00 xe_mman_XE
oracle 16255 1 0 15:00 ? 00:00:00 xe_dbw0_XE
oracle 16257 1 0 15:00 ? 00:00:00 xe_lgwr_XE
oracle 16259 1 0 15:00 ? 00:00:00 xe_ckpt_XE
oracle 16261 1 0 15:00 ? 00:00:00 xe_smon_XE
oracle 16263 1 0 15:00 ? 00:00:00 xe_reco_XE
oracle 16265 1 0 15:00 ? 00:00:00 xe_cjq0_XE
oracle 16267 1 0 15:00 ? 00:00:01 xe_mmon_XE
oracle 16269 1 0 15:00 ? 00:00:00 xe_mmln_XE
oracle 16271 1 0 15:00 ? 00:00:00 xe_d000_XE
oracle 16273 1 0 15:00 ? 00:00:00 xe_s000_XE
oracle 16275 1 0 15:00 ? 00:00:00 xe_s001_XE
oracle 16277 1 0 15:00 ? 00:00:00 xe_s002_XE
oracle 16279 1 0 15:00 ? 00:00:00 xe_s003_XE
oracle 16286 1 0 15:00 ? 00:00:00 xe_qmnc_XE
oracle 16289 1 0 15:01 ? 00:00:00 xe_q000_XE
oracle 16292 1 0 15:01 ? 00:00:00 xe_q001_XE
root 16322 15618 0 15:03 pts/2 00:00:00 grep oracle
```

- `v$session`



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Getting Started – Key Processes

LGWR

- The Log Writer writes the redo log buffer from the SGA to the online redo log file.

DBWR

- The Database Writer writes dirty blocks from the database buffer to the datafiles. How many DBWn Processes are started is determined by the initialization parameter DB_WRITER_PROCESSES. DBWR also writes the actual SCN with the Block.

CKPT

- The Checkpoint Process regularly initiates a checkpoint which uses DBWR to write all dirty blocks back to the datafiles, thus synchronizing the database. Since a Checkpoint records the current SCN, in a recovery only redo records with a SCN higher than that of the last checkpoint need to be applied.

ARCH

- The Archiver Process archives redo log files if ARCHIVELOG is enabled.



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Getting Started – Key Processes

MMAN

- The memory manager

SMON

- The System Monitor carries out a crash recovery when a crashed instance is started up again. It also cleans temporary segments.

PMON

- The Process Monitor checks if a user process fails and if so, does all cleaning up of resources that the user process has acquired.

Snnn

- The Shared Server Process is used in a shared server environment.

Dnnn

- The Dispatcher Process is used in a shared server environment



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Terminology

ORACLE_HOME=/usr/lib/oracle/xe/app/oracle/product/10.2.0/server

Initialisation Parameters

- init.ora (\$ORACLE_HOME/dbs)
http://download-west.oracle.com/docs/cd/B19306_01/server.102/b14237/initparams.htm
- Oracle Net Listener (tnslsnr)
 - tnsnames.ora (\$ORACLE_HOME/network/admin)
- Oracle Log File
 - /usr/lib/oracle/xe/app/oracle/admin/XE/bdump/alert_XE.log



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Terminology

- System Global Area (SGA)
- Program Global Area (PGA)

NOTE: 1GB XE Limit SGA+PGA

- Database
- Database Instance
- Schema User
- Database Link
- TableSpace - Data File/Segment/Extent



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Significant Differences

- Client SQL Access

MySQL `mysql -u[user] -p[passwd] [dbname]`

Oracle `sqlplus [user]/[passwd][@net service]`

NOTE: ORACLE_SID Environment variable

`sqlplus -h`

`sqlplus [user]/[password] AS [SYSDBA|SYSOPER]`



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Significant Differences

- Client SQL Access

- SQL statement termination

MySQL ; \G Oracle ; or /

- SQL statement Execution

MySQL source or . Oracle @

- SQL Comments

MySQL /* .. */ -- # Oracle /* .. */ --



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Significant Differences

- Case Sensitivity
 - Table/Column Names
(consider uppercase only, or like Microsoft Installation)
 - Data Values
(consider text/varchar as always BINARY)



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Significant Differences

MySQL CREATE TABLE SampleTable

Oracle CREATE TABLE SampleTable produces SAMPLETABLE

MySQL SELECT * FROM SampleTable WHERE name LIKE 'sm%'

Oracle SELECT * FROM SampleTable WHERE LOWER(name) LIKE 'sm%'

MySQL SELECT * FROM SampleTable WHERE num like '4%'

Oracle Does not support numerical LIKE



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Significant Differences

- Data Values
- Oracle more strict (e.g. Invalid dates)

MySQL INSERT INTO tbl (date_column) VALUES ('2005-02-31')

Oracle not possible

Strict compatibility (sql_mode)



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Significant Differences

Locking

- Oracle Provides Row or Table Locking
- Exclusive lock mode (X)
- Share lock mode (S)

Oracle

- LOCK TABLE table IN ROW EXCLUSIVE MODE
- LOCK TABLE table IN SHARE ROW EXCLUSIVE MODE
- LOCK TABLE table IN EXCLUSIVE MODE



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Significant Differences

- Transactions
 - Default mode in Oracle is ON
 - Default mode in MySQL is OFF



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Significant Differences

<u>MySQL</u>	START TRANSACTION BEGIN WORK;	LOCK TABLE [table];
	SAVEPOINT <savepoint>	UNLOCK TABLES;
	ROLLBACK [WORK] TO <savepoint>;	
	COMMIT [WORK];	
	SET AUTOCOMMIT=0 1;	

<u>Oracle</u>	SAVEPOINT <savepoint>;
	ROLLBACK [WORK] [<savepoint>;
	COMMIT [WORK];
	SET TRANSACTION ...



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Significant Differences

- Sequences replaces AUTO_INCREMENT
 - No limitation to how many columns per table
 - Not assigned to specific table.column
 - Can be used system wide
 - seq.CURRVAL, seq.NEXTVAL



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MySQL CREATE TABLE test1 (id INT NOT NULL *AUTO_INCREMENT*,
col VARCHAR(10));

INSERT INTO test (col) VALUES ('x');

INSERT INTO test (id,col) VALUES(NULL,'y');

Oracle CREATE TABLE test1 (id INT NOT NULL ,
col VARCHAR(10));

CREATE SEQUENCE seq;

INSERT INTO test (col) VALUES ('x'); ** Fails

INSERT INTO test (id,col) VALUES (seq.NEXTVAL, 'x');

INSERT INTO test (id,col) VALUES (NULL, 'y'); -- with trigger



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Significant Differences

- Required FROM TABLE
 - Oracle has special table called DUAL

MySQL `SELECT 1+1`

Oracle `SELECT 1+1 FROM DUAL`

NOTE: DUAL included in MySQL for compatibility



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Significant Differences

- Date Functions

MySQL `SELECT SYSDATE(), NOW(), CURDATE()`

Oracle `SELECT SYSDATE FROM DUAL`

NOTE: SYSDATE() included in MySQL for near compatibility



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Significant Differences

- LIMIT replaced in part with ROWNUM

MySQL SELECT * FROM SampleTable LIMIT 10

Oracle SELECT * FROM SampleTable WHERE ROWNUM <= 10

NOTE: No LIMIT n,y capability



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Significant Differences

- No space character for table/column names

MySQL CREATE TABLE `table name`

Oracle not possible



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Significant Differences

- Reserved words not allowed

MySQL CREATE TABLE `group`

Oracle not possible

- Oracle has far greater Reserved Words

<http://dev.mysql.com/doc/refman/5.0/en/reserved-words.html>

http://download-west.oracle.com/docs/cd/B19306_01/server.102/b14200/ap_keywd.htm

Oracle SELECT * FROM V\$RESERVED_WORDS



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SQL Commands

- Selecting Data **SELECT/WHERE/ORDER BY** **SELECT/WHERE/ORDER BY**
- SubQueries **WITH syntax**
- Nulls **IS NULL, IS NOT NULL** **IS NULL, IS NOT NULL**
 - **IFNULL(), COALESCE()** **NVL() COALESCE()**
- If/then handling **CASE/IF** **CASE/DECODE**
- Table Joins **INNER JOIN, LEFT OUTER JOIN, RIGHT OUTER JOIN**
ON, NATURAL, USING
PARTITION BY
 - **(+) following column names**
- Summaries **GROUP BY/HAVING** **GROUP BY requires all non-scalar columns**



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SQL Commands

- Unions **UNION** **UNION, UNION ALL, MINUS, INTERSECTS**
- Partition Operations **PARTITION, SUBPARTITION**
- Modeling Data **MODEL Clause Syntax**
- Inserting Data **INSERT/INSERT** **DEFAULT keyword**
 - **ALTER TABLE COURSE ADD (course_hours NUMBER DEFAULT 4);**
 - **INSERT INTO COURSE (... ,course_hours) VALUES (... , DEFAULT);**
- Multitable Inserts **INSERT ALL ... WHEN**
 - Oracle does not have multi row insert in single statement
 - **INSERT <table> SET col=name not in Oracle**



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SQL Commands

- Updating `UPDATE/UPDATE`
 - Noncorrelated
 - Correlated
- Deleting `DELETE/DELETE` no `DELETE .. LIMIT`
- Deleting All rows `TRUNCATE TABLE/TRUNCATE TABLE`
- Replacement `REPLACE/MERGE` (very cumbersome)



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SQL Commands

- Loading Data `LOAD DATA INFILE` \$ imp
- Exporting Data `SELECT INTO OUTFILE` \$ exp
- Deleting All rows `TRUNCATE TABLE/TRUNCATE TABLE`
- Replacement `REPLACE/MERGE` (very cumbersome)

- Changing Schema `USE <database> CONNECT <user>/<passwd>@<net>`



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SQL Explain

- EXPLAIN PLAN
- DBMS_XPLAN ()
- PLAN_TABLE
- Using Optimizer Hints
 - Hit query blocks
 - Optimizer goal hints
 - Access method hints
 - Join order hints
 - Join operation hints
 - Query transformation hints
 - Miscellaneous hints



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Oracle Data Dictionary

- Oracle's Information Schema (100's of tables)
- [DBA_|USER_|ALL_] Tables

USER_TABLES, USER_TAB_COLUMNS, USER_VIEWS

DBA_USERS, DBA_ROLES, DBA_TABLESPACES, DBA_SEGMENTS

http://download-west.oracle.com/docs/cd/B19306_01/server.102/b14237/toc.htm



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Dynamic Performance Views (V\$)

- Oracle contains a set of underlying views that are maintained by the database server and accessible to the database administrator user SYS. These views are called dynamic performance views because they are continuously updated while a database is open and in use, and their contents relate primarily to performance.
- Although these views appear to be regular database tables, they are not. These views provide data on internal disk structures and memory structures. You can select from these views, but you can never update or alter them.
 - V\$SESSION, V\$SYSSTAT, V\$SQLAREA, V\$SYSTEM_EVENT
 - Over 350 views

http://download-west.oracle.com/docs/cd/B19306_01/server.102/b14237/dynviews_1001.htm



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Sqlplus Formatting Text Reports

- Quite Powerful to produce simple reports

COLUMN name HEADING "Employee Name"

COLUMN name HEADING "Employee|Name" JUSTIFY [RIGHT|CENTER]

COLUMN name FORMAT a30

SET LINESIZE 60

SET PAGESIZE 50

TITLE LEFT "text" CENTER "text" RIGHT "text"

BREAK ON column

COMPUTER COUNT OF column ON column

SPOOL <file>|OFF



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Sample Data Dictionary Statements

```
SELECT SUBSTR(TO_CHAR(session_id),1,5) "SID",  
       SUBSTR(lock_type,1,15) "Lock Type",  
       SUBSTR(mode_held,1,15) "Mode Held",  
       SUBSTR(blocking_others,1,15) "Blocking?"  
FROM dba_locks;
```

```
SELECT COLUMN_NAME, DATA_TYPE, DATA_LENGTH, DATA_PRECISION,  
       DATA_SCALE, NULLABLE, DATA_DEFAULT  
FROM   USER_TAB_COLUMNS  
WHERE  TABLE_NAME = 'TABLE_NAME'
```

```
SELECT UV.VIEW_NAME, UV.TEXT, UTC.COMMENTS  
FROM   USER_VIEWS UV, USER_TAB_COMMENTS UTC  
WHERE  UV.VIEW_NAME = UTC.TABLE_NAME(+)
```



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Some Advanced Oracle Features

- Alternative block size table spaces (OLTP/Batch)
- Flashback Queries
- `alter session set nls_date_format = 'dd.mm.yyyy hh24:mi:ss';`



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For access to this paper, more detailed notes
and other information, please visit.

<http://www.arabx.com.au>

