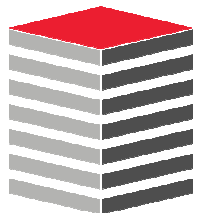


Database 12c: Things to Know and 'Gotchas'

Tuesday: September 29, 2015

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mobile: +1 206-669-2949
skype: damorgan11g



Introduction

Class Topics

- Introduction
- Physical Architecture
- Servers
- Startup and Shutdown ... Open and Close
- System Management
- DBMS_PREUP
- Miscellaneous
 - Tools
 - cron jobs -> DBMS_SCHEDULER




Instructor



- Daniel Morgan
- 🏆 Oracle ACE Director
- More than 45 years technology experience
 - First computer was an IBM 360/40 mainframe in 1970
 - Fortran IV and Punch Cards
- 🏛 Curriculum author and primary Oracle instructor at University of Washington
- 🏛 Guest lecturer on Oracle at Harvard University
- Decades of hands-on SQL, PL/SQL, and DBA experience
- The "Morgan" behind Morgan's Library on the web
www.morganslibrary.org
- 10g, 11g, and 12c Beta tester
- Contact email: dmorgan@forsythe.com



My Websites: Morgan's Library



Morgan's Library

www library

Search

International Oracle Events 2015-2016 Calendar

Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan

The Library

The library is a spam-free on-line resource with code demos for DBAs and Developers. If you would like to see new Oracle database functionality added to the library ... just email us. Oracle 12.1.0.2.0 has been released and new features will be showing up for many weeks. The first updates have already been made.

Home


Resources

- [Library](#)
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Presentations Map



MadDog Morgan




Training Events and Travels


- [IOUG, Chicago, Illinois - Mar 10](#)
- [UTOUG, Salt Lake City, Utah - Mar 11-12](#)
- [OUGN, Oslo, Norway - Mar 12-14](#)
- [Collaborate, Las Vegas, Nevada - Apr 12-16](#)
- [NYOUG, New York, NY - May 19](#)
- [GLOC, Cleveland, Ohio - May 19-20](#)

Next Event: 27 January, Redwood Shores, CA

Morgan





aboard USA-71




Library News

- [Morgan's Blog](#)
- [Join the Western Washington OUG](#)
- [Morgan's Oracle Podcast](#)
- [US Govt. Mil. STIGs \(Security Checklists\)](#)
- [Bryn Llewellyn's PL/SQL White Paper](#)
- [Bryn Llewellyn's Editioning White Paper](#)
- [Explain Plan White Paper](#)



Oracle Events




Click on the map to find an event near you

ACE News

Would you like to become an Oracle ACE? 📌

Learn more about becoming an ACE



- [ACE Directory](#)
- [ACE Google Map](#)
- [ACE Program](#)
- [Stanley's Blog](#)

Congratulations to our newest ACE Director Jim Czuprynski

My Websites: International GoldenGate Oracle Users Group



Travel Log: 2010

Time	Flight	Gate	Destination	Status
0630	DY1800		Malaga	
1710	BLX692	46	Goteborg	Gate closed
1710	SK811		London/Heathrow	Cancelled
1715	SK841		Zurich	Cancelled
1715	AY660		Helsinki	Cancelled
1720	Q84796		Bilund	Cancelled
1725	DY1494		Paris/Orly	Cancelled
1725	KL1148		Amsterdam	Cancelled
1725	KQ1148		Amsterdam	Cancelled
1730	SK461		Kobenhavn	Cancelled
1740	DY1866		Pisa	Cancelled
1750	DY3232		Kobenhavn	Cancelled
1805	LH3145		Munchen	Cancelled
1805	SK3681		Munchen	Cancelled
1805	SK1465		Kobenhavn	Cancelled
1810	DY1306		London/Gatwick	Cancelled
1815	DY1978		Beograd	Cancelled
1820	SK1484	36	Stockholm	
1825	DY1108		Berlin/Schoenef	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		Kobenhavn	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	Q84798		Bilund	Cancelled

17:44

Home Tours Find Why Touris Photo Gallery Videos
Tuesday, April 20, 2010

TOURIS tour booking - Step 1

Top Packages

The Full Circle Express.

Grand tour around Iceland including the Westfjords.

A real 4x4 highland adventure.

South Iceland at leisure.

Explore

TOUR INFORMATION

Tour: TT45
Volcano in Action - This tour is currently not available!

Season: All year
Departures: Daily
Departure times: 17:30
Duration: 6,5

Price info:
 - Adults: € 55,00
 - Age 12-17: € 27,50
 - Age 3-11: € 0,00
 - Age 0-2: € 0,00

* All prices are per person.
* Please select your details here to the right and click next to determine your total price.

Included in the price:
 - Bus tour with English speaking guidance

YOUR DETAILS

Date of tour:

Adults:

Youth (12-17):

Children (3-11):

Infants (0-2):

Comments or special wishes:

Top Day Tours

Gullfoss Geyser.

Northern Lights Mystery.

Blue Lagoon.

Reykjavik City Sightseen.

The South Coast and the Jokulsarlon Glacial Lagoon.

<< Previous
Next >>

Travel Log: 2010



Travel Log: 2014



Why Meta7

- The Oracle Only division of Forsythe dedicated to the Oracle Red Stack
 - Highly skilled consultants with extensive experience across multiple industries
 - Internationally recognized experts in
 - Oracle Database
 - Oracle GoldenGate
 - Oracle Engineered Systems
 - Reliable on-time and on-budget delivery
 - A professional and agile team of Oracle technical experts
 - New, State of the Art Technology Evaluation Center
 - Secure hosting and Managed Services
 - Flexible financial support



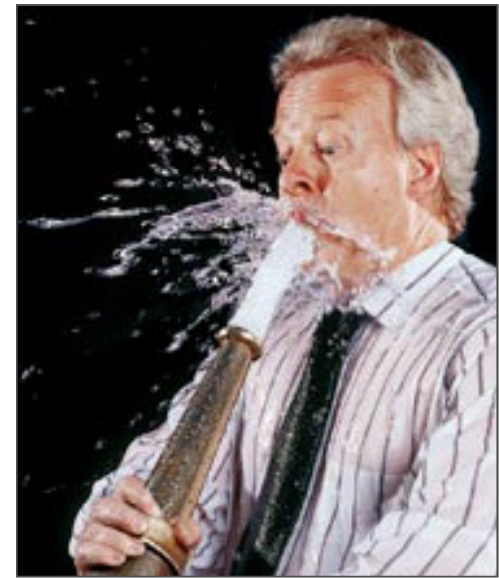
Content Warning



Content Density Warning

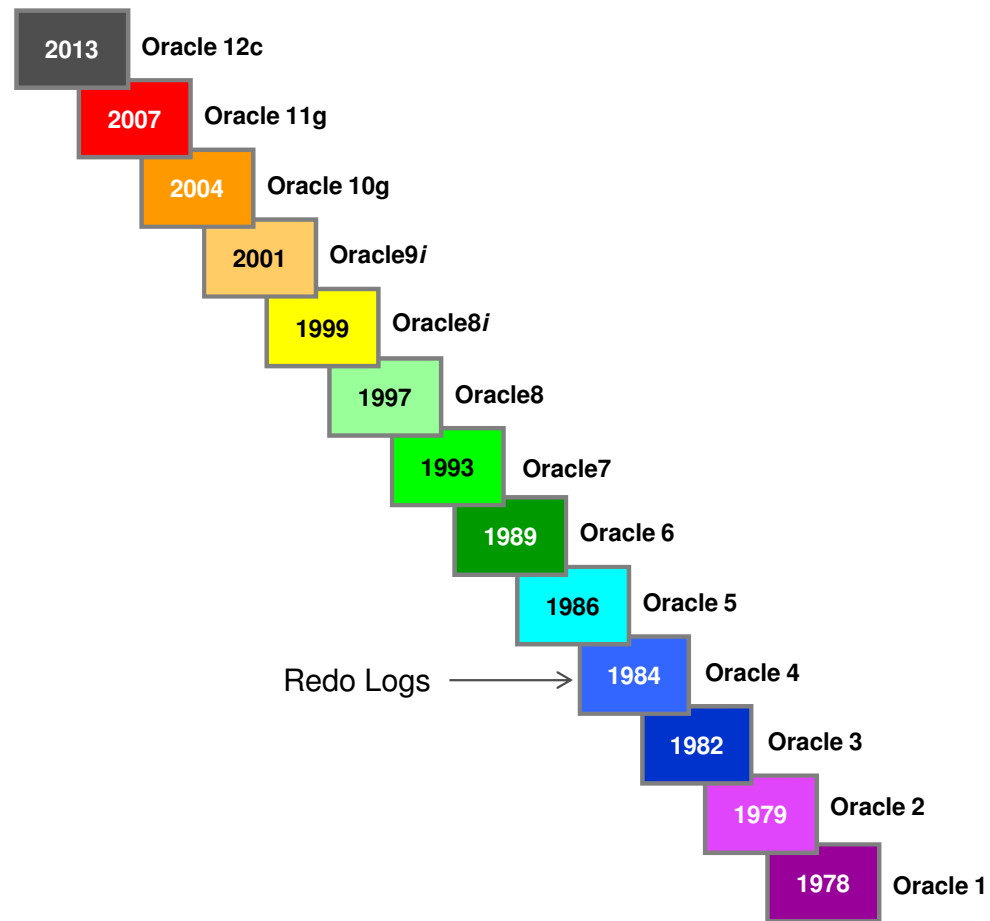


Take Notes ... Ask Questions

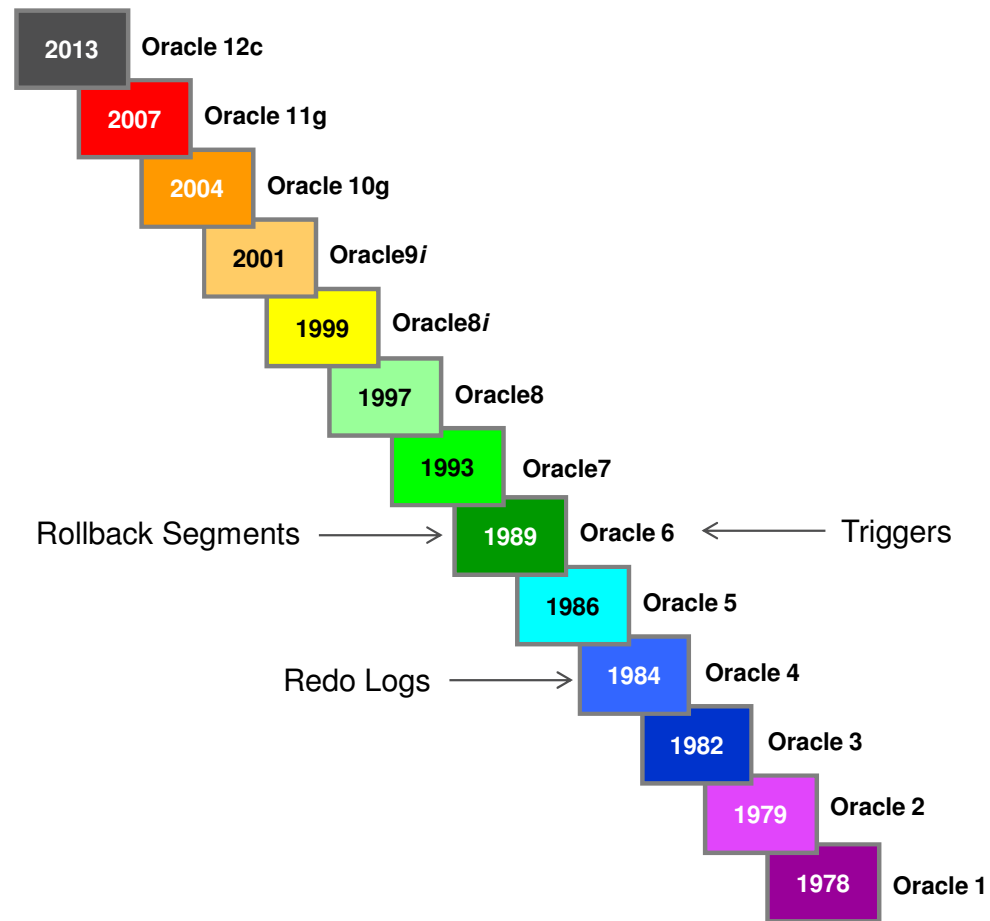


Introduction

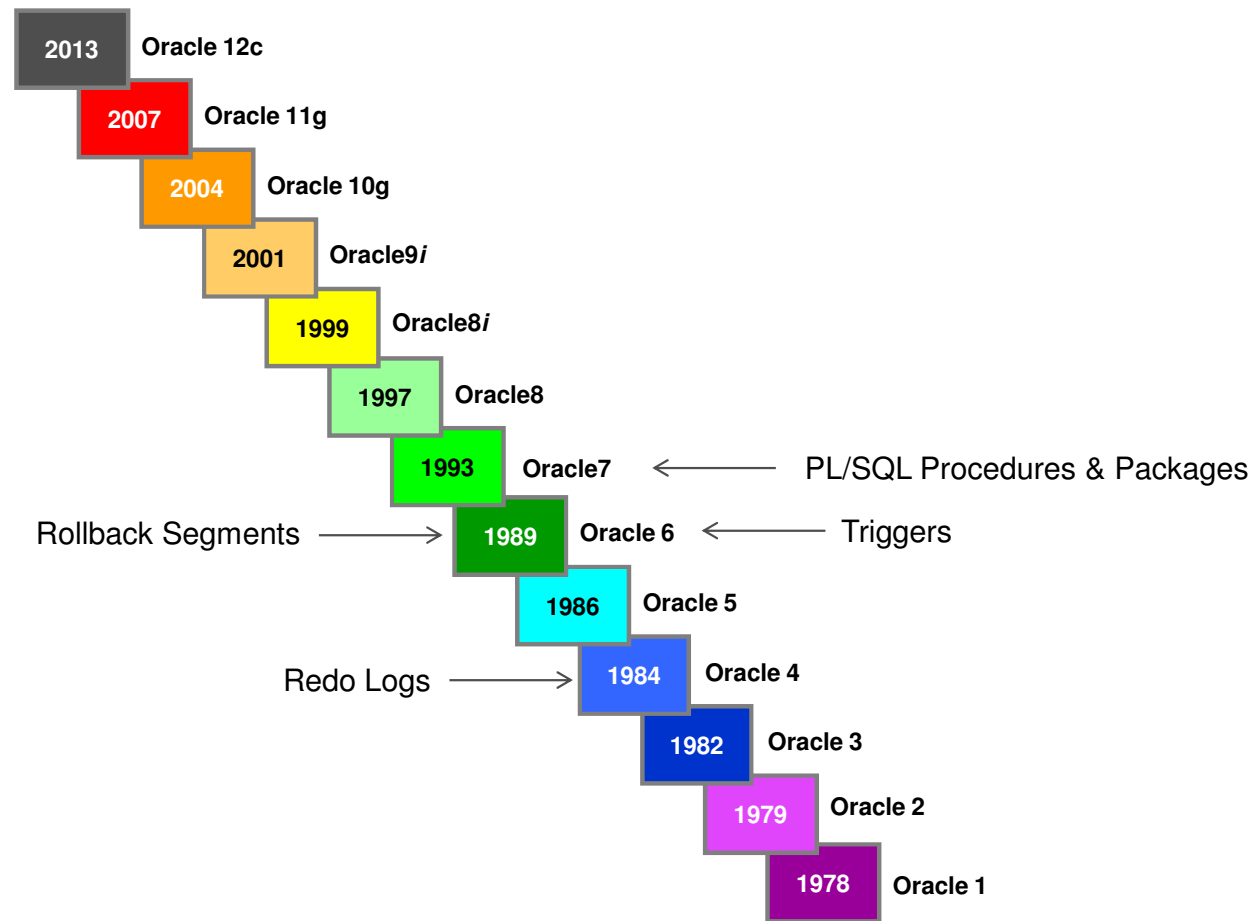
A Brief History of the Oracle Database



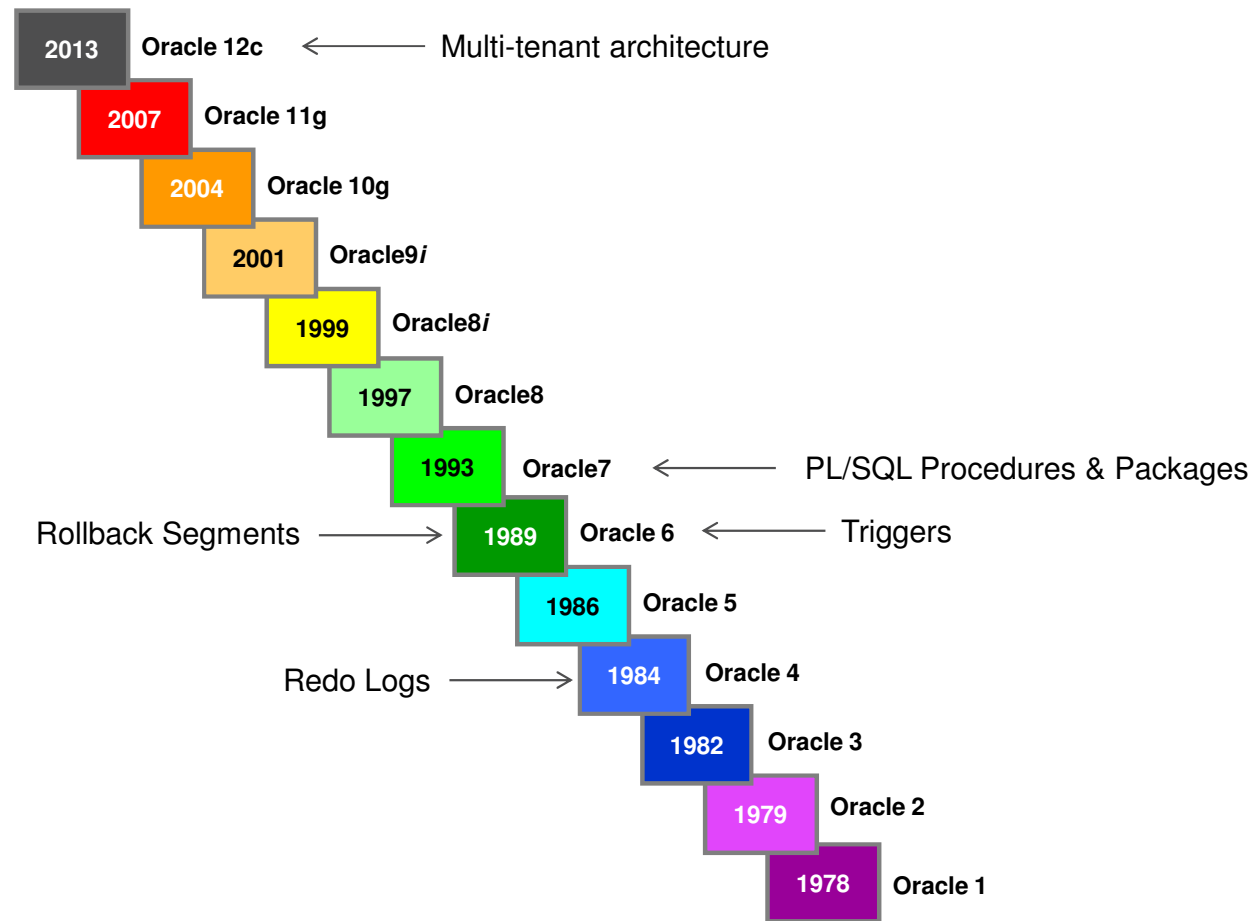
A Brief History of the Oracle Database



A Brief History of the Oracle Database



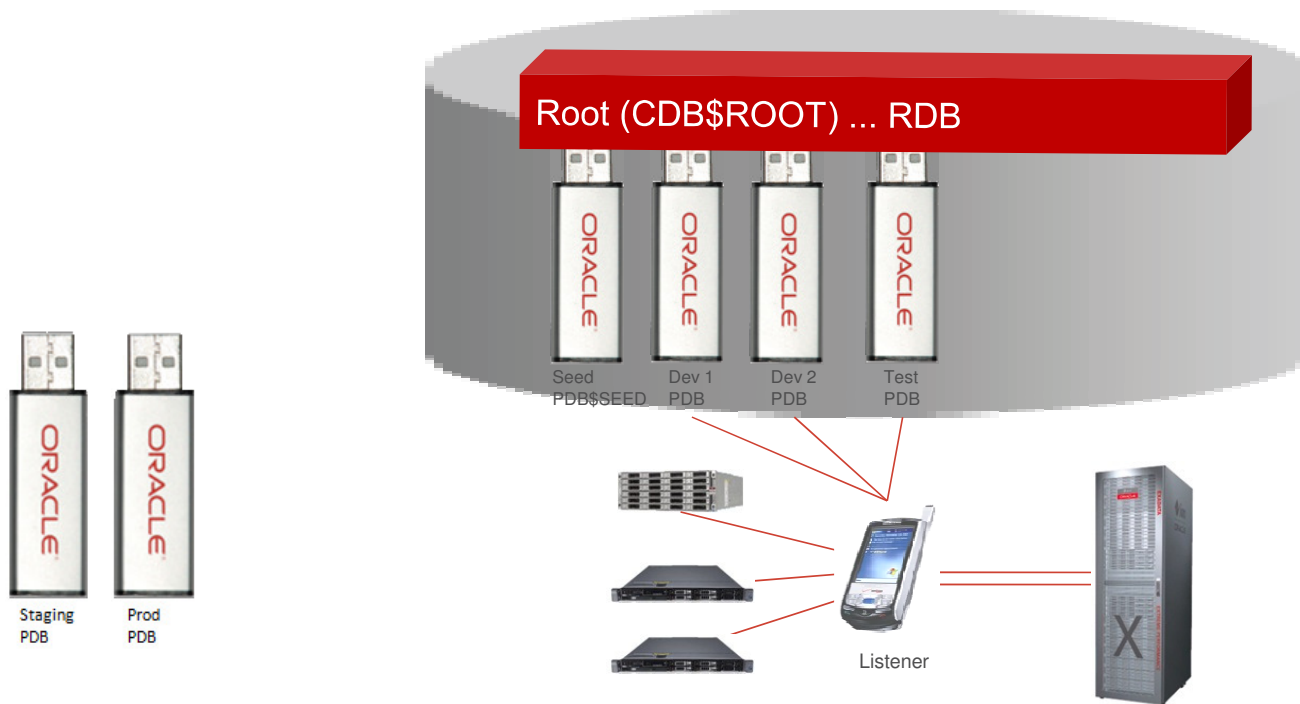
A Brief History of the Oracle Database



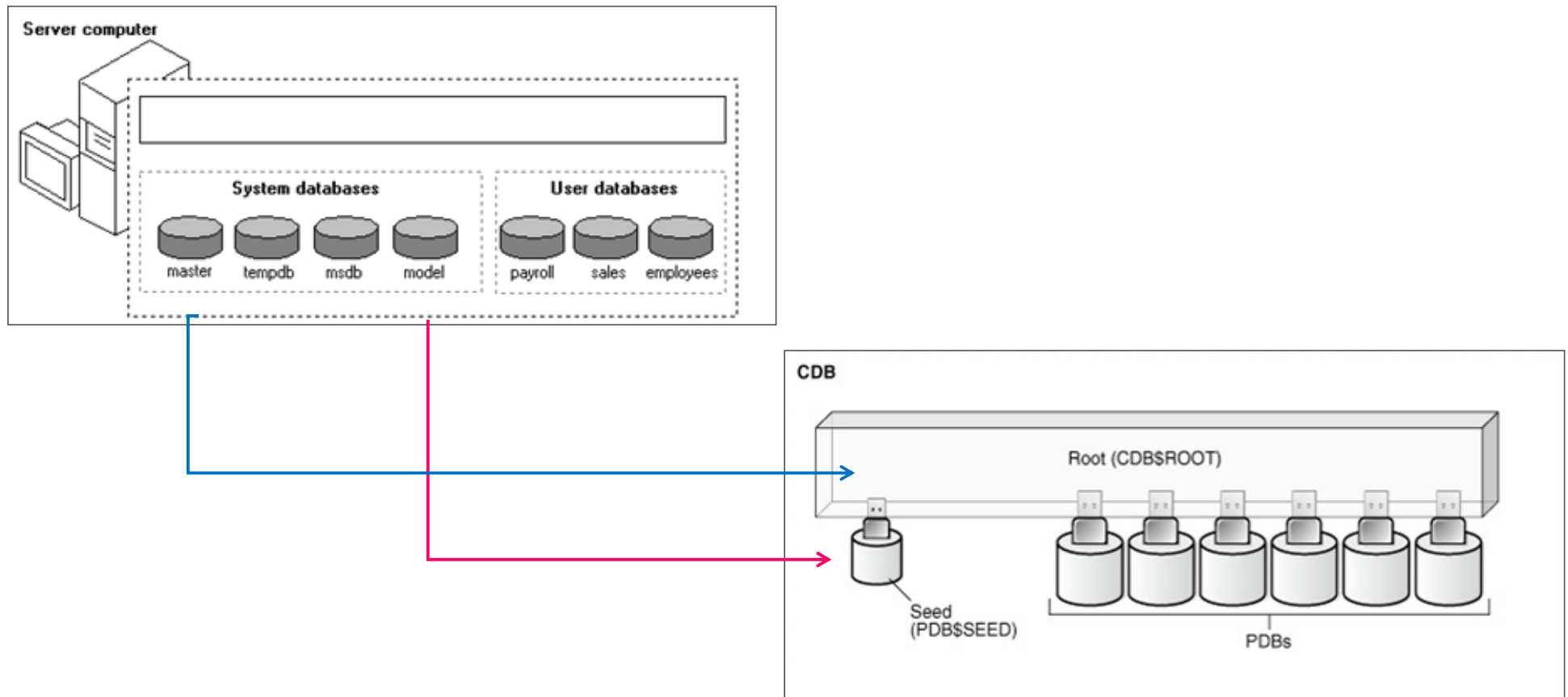


Physical Architecture

What Is Different: Container Architecture



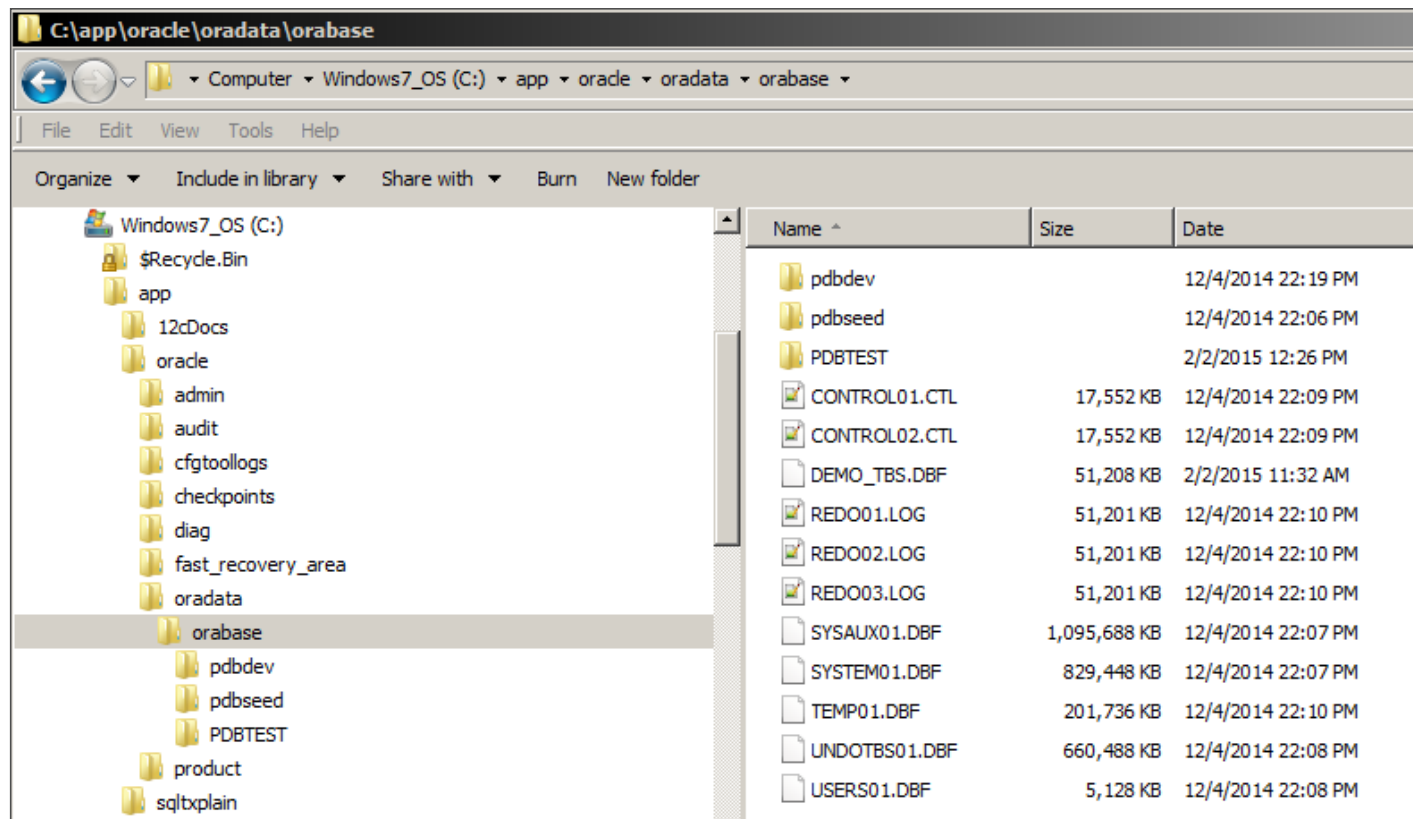
New 12c Container Database Architecture



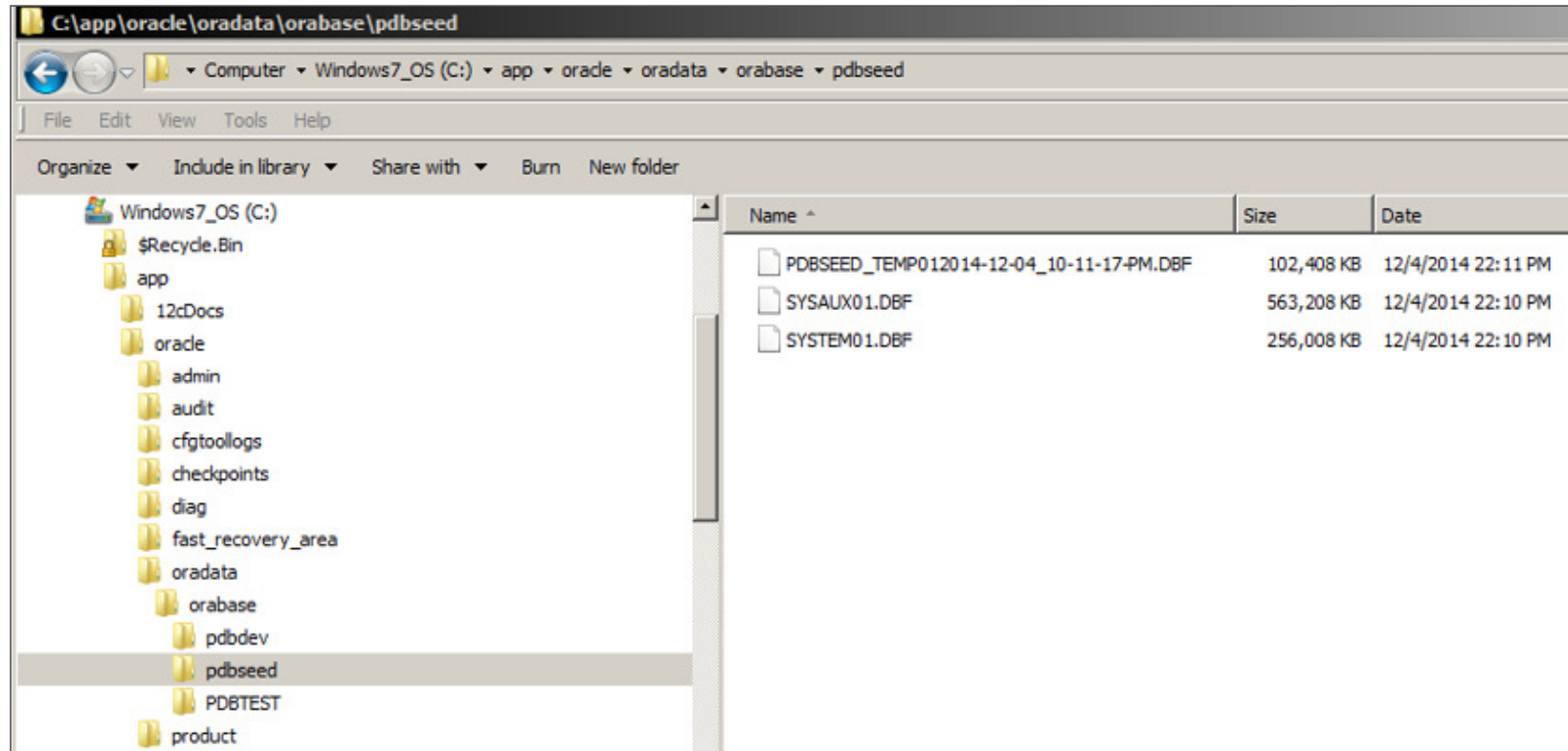
Storage Changes

- The control files are owned by the instance ... not the database ... one set for a container database
- The redo logs are owned by the instance ... not the database ... one set of groups and members for a container database
- The UNDO tablespace is owned by the instance ... not the database ... one, and only one, for a CDB
- Every container contains a SYSTEM and SYSAUX tablespace
- A single TEMP tablespace can be shared among all containers or each container can have its own TEMP tablespace or multiple dedicated TEMP tablespaces

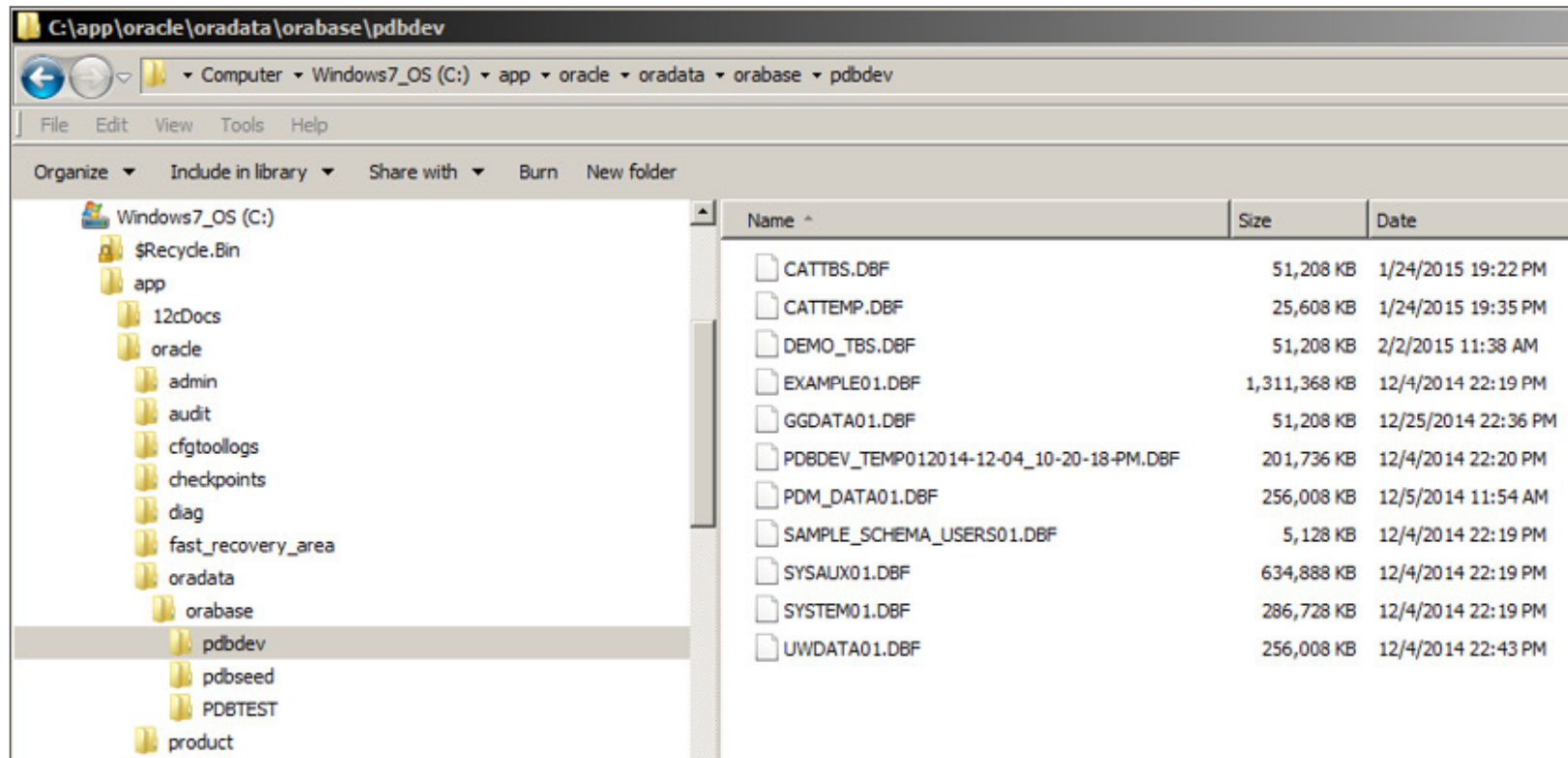
Root Physical Architecture



PDB\$SEED Physical Architecture



PDB Physical Architecture



Tablespaces and Users

```
SQL> SELECT tablespace_name, COUNT(*)
2 FROM cdb_tablespaces
3 GROUP BY tablespace_name
4 ORDER BY 1;
```

TABLESPACE_NAME	COUNT (*)
CATTBSP	1
CATTEMP	1
EXAMPLE	1
ORADATA	1
SYSAUX	4
SYSTEM	4
TEMP	4
UNDOTBS1	1
USERS	2
UWDATA	1

10 rows selected.

```
SQL> SELECT username, COUNT(*)
2 FROM cdb_users
3 GROUP BY username
4 ORDER BY 1;
```

USERNAME	COUNT (*)
APEX_040200	4
AUDSYS	4
BI	1
HR	1
MDSYS	4
MLIB	1
OE	1
PDBADMIN	1
PM	1
SCOTT	1
SH	1
SYS	4
SYSBACKUP	4
SYSDG	4
SYSKM	4
SYSTEM	4
UWCLASS	2

Storage Architecture Summary

- What you touch matters ... it is very easy to create, alter, and drop the wrong thing with substantial consequences
- The word "database" can get you into trouble ... specify the container
- To understand what has been created you must be clear about the difference between an instance and a container

Servers

What Is Different? Multitenant Consolidation

- What are the implications of consolidation?
 - Processes
 - Transactions
 - Connections
 - Memory
 - CPU
 - I/O
 - Do you really want to use only one TEMP tablespace?
 - How do you calculate space allocation for UNDO?
 - What is size and distribution of the AWR data in the SYSAUX tablespace?
 - Networks Latency and Bandwidth
 - Backups and Restores
 - DataGuard Replication
 - Resource Management

What Is Different? Multitenant Consolidation

- Can we use our current servers for consolidation ... or more importantly "should" we use our current servers?
 - Pizza Boxes (1U, 2U, 3U)
 - Blades (H/P and Cisco UCS) ... the best servers I know for making unstable RAC clusters
 - M10 (Fujitsu)
 - P Series (IBM)
 - Z Series (IBM)
 - T Series (Sun-Oracle)
 - M Series (Sun-Oracle)
 - Fujitsu M10
 - ODA
 - Sparc SuperCluster (T5-8)
 - Exadata

Don't Take Your Eye Off The Network

- It is easy to quantify and consolidate things you can easily count
 - GB and TB
 - Processes
 - Transactions
 - Simultaneous Users
 - CPU
 - Memory
- It is far more difficult to quantify and consolidate what you can't easily observe
 - HBA Card Traffic
 - SAN Switch Traffic
 - NIC Card Traffic
 - TCP/IP Switch Traffic
 - Real bandwidth resulting from the ubiquitous deployment of VLANs

Startup and Shutdown ... Open and Close

Startup (1:4)

```
C:\Users\oracle>sqlplus / as sysdba
```

```
SQL*Plus: Release 12.1.0.2.0 Production on Wed Sep 16 04:14:51 2015  
Copyright (c) 1982, 2014, Oracle. All rights reserved.
```

```
Connected to:
```

```
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production  
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
```

```
SQL> shutdown immediate;
```

```
Database closed.
```

```
Database dismounted.
```

```
ORACLE instance shut down.
```

```
SQL> startup
```

```
ORACLE instance started.
```

```
Total System Global Area 2550136832 bytes
```

```
Fixed Size 3048872 bytes
```

```
Variable Size 671091288 bytes
```

```
Database Buffers 1862270976 bytes
```

```
Redo Buffers 13725696 bytes
```

```
Database mounted.
```

```
Database opened.
```

```
SQL>
```

Startup (2:4)

```
SQL> conn sys@pdbdev as sysdba
Enter password:
Connected.

SQL> conn uwclass/uwclass@pdbdev
ERROR:
ORA-01033: ORACLE initialization or shutdown in progress
Process ID: 0
Session ID: 0 Serial number: 0

SQL> conn sys@pdbdev as sysdba
Enter password:
Connected.

SQL> alter pluggable database open;

Pluggable database altered.

SQL> conn uwclass/uwclass@pdbdev
Connected.

SQL>
```

Startup (3:4)

```
SQL> conn sys@pdbdev as sysdba
```

```
Enter password:
```

```
Connected.
```

```
SQL> shutdown abort;
```

```
Pluggable Database closed.
```

```
SQL> conn / as sysdba
```

```
Connected.
```

```
SQL> select count(*) from obj$;
```

```
COUNT (*)
```

```
-----
```

```
91367
```

```
CON_NAME
```

```
-----
```

```
CDB$ROOT
```

```
SQL> SELECT COUNT(*) FROM dba_objects;
```

```
COUNT (*)
```

```
-----
```

```
91287
```

Startup (4:4)

```
SQL> ALTER PLUGGABLE DATABASE ALL OPEN;
```

```
Pluggable database altered.
```

```
SQL> SELECT COUNT(*) FROM dba_objects;
```

```
  COUNT (*)  
-----  
      91287
```

```
SQL> SELECT COUNT(*) FROM cdb_objects;
```

```
  COUNT (*)  
-----  
     275850
```

System Management

Data Dictionary

■ Container DataBase Views

- USER_ ... owned by a schema within a single container
- ALL_ ... owned by a schema or granted to a schema within a single container
- DBA_ ... everything within a single container
- CDB_ ... everything in every container
 - [Provided the container is open!](#)

```
CON_NAME
-----
CDB$ROOT

SQL> SELECT COUNT(*) FROM dba_objects;

COUNT(*)
-----
91287

SQL> SELECT COUNT(*) FROM cdb_objects;

COUNT(*)
-----
91287

SQL> ALTER PLUGGABLE DATABASE ALL OPEN;

Pluggable database altered.

SQL> SELECT COUNT(*) FROM dba_objects;

COUNT(*)
-----
91287

SQL> SELECT COUNT(*) FROM cdb_objects;

COUNT(*)
-----
275850
```

Data Dictionary: GV\$ and V\$ Views

- What is shown in the dynamic performance view depends on the container in which the query is executed

```
SQL> sho con_name
```

```
CON_NAME
```

```
-----
```

```
PDBDEV
```

```
SQL> SELECT COUNT(*) FROM v$session;
```

```
COUNT(*)
```

```
-----
```

```
38
```

```
SQL> sho con_name
```

```
CON_NAME
```

```
-----
```

```
CDB$ROOT
```

```
SQL> SELECT COUNT(*) FROM v$session;
```

```
COUNT(*)
```

```
-----
```

```
37
```

- Background sessions such as PMON, SMON, LGWR, DBWR are visible in all containers
- Foreground sessions in all containers are visible in CDB\$ROOT
- Foreground sessions in a PDB are only visible within that PDB

Data Dictionary: Object Sizes

Connected to:
Oracle Database 12c Enterprise Edition Release 11.2.0.4.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

```
SQL> desc dba_objects
```

Name	Null?	Type
OWNER		VARCHAR2 (30)
OBJECT_NAME		VARCHAR2 (128)
SUBOBJECT_NAME		VARCHAR2 (30)
OBJECT_ID		NUMBER
DATA_OBJECT_ID		NUMBER
OBJECT_TYPE		VARCHAR2 (19)
CREATED		DATE
LAST_DDL_TIME		DATE
TIMESTAMP		VARCHAR2 (19)
STATUS		VARCHAR2 (7)
TEMPORARY		VARCHAR2 (1)
GENERATED		VARCHAR2 (1)
SECONDARY		VARCHAR2 (1)
NAMESPACE		NUMBER
EDITION_NAME		VARCHAR2 (30)

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

```
SQL> desc dba_objects
```

Name	Null?	Type
OWNER		VARCHAR2 (128)
OBJECT_NAME		VARCHAR2 (128)
SUBOBJECT_NAME		VARCHAR2 (128)
OBJECT_ID		NUMBER
DATA_OBJECT_ID		NUMBER
OBJECT_TYPE		VARCHAR2 (23)
CREATED		DATE
LAST_DDL_TIME		DATE
TIMESTAMP		VARCHAR2 (19)
STATUS		VARCHAR2 (7)
TEMPORARY		VARCHAR2 (1)
GENERATED		VARCHAR2 (1)
SECONDARY		VARCHAR2 (1)
NAMESPACE		NUMBER
EDITION_NAME		VARCHAR2 (128)
SHARING		VARCHAR2 (13)
EDITIONABLE		VARCHAR2 (1)
ORACLE_MAINTAINED		VARCHAR2 (1)

User Management

```
SQL> conn / as sysdba
Connected.
```

```
SQL> alter pluggable database all open;
```

```
Pluggable database altered.
```

```
SQL> SELECT username, COUNT(*) FROM cdb_users
2 GROUP BY username ORDER BY 1;
```

USERNAME	COUNT (*)
ANONYMOUS	3
APEX_040200	3
APEX_PUBLIC_USER	3
APPQOSSYS	3
AUDSYS	3
BI	2
CTXSYS	3
DBSNMP	3
DIP	3
DVF	3
DVSYs	3
FLows_FILES	3
GSMADMIN_INTERNAL	3
GSMCATUSER	3
GSMUSER	3
HR	2
IX	2

USERNAME	COUNT (*)
LBACSYS	3
MDDATA	3
MDSYS	3
OE	2
OJVMSYS	3
OLAPSYS	3
ORACLE_OCM	3
ORDDATA	3
ORDPLUGINS	3
ORDSYS	3
OUTLN	3
PDBADMIN	2
PM	2
SCOTT	2
SH	2
SI_INFORMTN_SCHEMA	3
SPATIAL_CSW_ADMIN_USR	3
SPATIAL_WFS_ADMIN_USR	3
SYS	3
SYSBACKUP	3
SYSDG	3
SYSKM	3
SYSTEM	3
UWCLASS	1
WM SYS	3
XDB	3
XS\$NULL	3

Common Users, Roles, and Profiles

```
SQL> SELECT username FROM dba_users ORDER BY 1;
```

USERNAME

ANONYMOUS
APEX_040200
APEX_PUBLIC_USER
APPQOSSYS
AUDSYS
CTXSYS
DBSNMP
DIP
DVF
DVSYS
FLOWS_FILES
GSMADMIN_INTERNAL
GSMCATUSER
GSMUSER
LBACSYS
MDDATA
MDSYS

USERNAME

OJVM SYS
OLAP SYS
ORACLE_OCM
ORDDATA
ORDPLUGINS
ORDSYS
OUTLN
SI_INFORMTN_SCHEMA
SPATIAL_CSW_ADMIN_USR
SPATIAL_WFS_ADMIN_USR
SYS
SYSBACKUP
SYSDG
SYSKM
SYSTEM
WM SYS
XDB
XS\$NULL

Common Users, Roles, and Profiles

```
SQL> SELECT * FROM dba_roles ORDER BY 1;
```

ROLE	PASSWORD	AUTHENTICAT	COM	O
ADM_PARALLEL_EXECUTE_TASK	NO	NONE	YES	Y
APEX_ADMINISTRATOR_ROLE	NO	NONE	YES	Y
APEX_GRANTS_FOR_NEW_USERS_ROLE	NO	NONE	YES	Y
AQ_ADMINISTRATOR_ROLE	NO	NONE	YES	Y
AUDIT_ADMIN	NO	NONE	YES	Y
CDB_DBA	NO	NONE	YES	Y
DBA	NO	NONE	YES	Y
DBFS_ROLE	NO	NONE	YES	Y
GATHER_SYSTEM_STATISTICS	NO	NONE	YES	Y
GSMADMIN_ROLE	NO	NONE	YES	Y
GSMUSER_ROLE	NO	NONE	YES	Y
GSM_POOLADMIN_ROLE	NO	NONE	YES	Y
HS_ADMIN_EXECUTE_ROLE	NO	NONE	YES	Y
HS_ADMIN_ROLE	NO	NONE	YES	Y
HS_ADMIN_SELECT_ROLE	NO	NONE	YES	Y
LBAC_DBA	NO	NONE	YES	Y
LOGSTDBY_ADMINISTRATOR	NO	NONE	YES	Y
OLAP_DBA	NO	NONE	YES	Y
OLAP_XS_ADMIN	NO	NONE	YES	Y
OPTIMIZER_PROCESSING_RATE	NO	NONE	YES	Y
ORDADMIN	NO	NONE	YES	Y
PDB_DBA	NO	NONE	YES	Y
PROVISIONER	NO	NONE	YES	Y
RECOVERY_CATALOG_OWNER	NO	NONE	YES	Y
SCHEDULER_ADMIN	NO	NONE	YES	Y
SPATIAL_CSW_ADMIN	NO	NONE	YES	Y
SPATIAL_WFS_ADMIN	NO	NONE	YES	Y
WM_ADMIN_ROLE	NO	NONE	YES	Y
XDBADMIN	NO	NONE	YES	Y
XS_CACHE_ADMIN	NO	NONE	YES	Y
XS_NAMESPACE_ADMIN	NO	NONE	YES	Y
XS_SESSION_ADMIN	NO	NONE	YES	Y

Common Users, Roles, and Profiles

```
SQL> SELECT name  
2 FROM system_privilege_map  
3 ORDER BY 1;
```

NAME

```
-----  
ALTER ANY SQL TRANSLATION PROFILE  
CREATE ANY CREDENTIAL  
CREATE ANY SQL TRANSLATION PROFILE  
CREATE CREDENTIAL  
CREATE PLUGGABLE DATABASE  
CREATE SQL TRANSLATION PROFILE  
DROP ANY SQL TRANSLATION PROFILE  
EXEMPT DDL REDACTION POLICY  
EXEMPT DML REDACTION POLICY  
REDEFINE ANY TABLE  
SET CONTAINER  
USE ANY SQL TRANSLATION PROFILE
```

Feature Usage Reports (1:3)

- The following are new in 12c
 - DBMS_FEATURE_ACTIVE_DATA_GUARD (Active Data Guard)
 - DBMS_FEATURE_ADAPTIVE_PLANS (Adaptive Execution Plans)
 - DBMS_FEATURE_ADV_IDXCMP (Advanced Index Compression)
 - DBMS_FEATURE_ADV_TABCMP (Advanced Table Compression)
 - DBMS_FEATURE_AUDIT_OPTIONS (Audit Trail Type and Audit Options Chosen)
 - DBMS_FEATURE_AUTO_REOPT (Adaptive Reoptimization)
 - DBMS_FEATURE_BA_OWNER (Oracle Database Logging Recovery Appliance)
 - DBMS_FEATURE_CONCURRENT_STATS (Concurrent Stats Gathering)
 - DBMS_FEATURE_DATABASE_ODM (Oracle Data Mining)
 - DBMS_FEATURE_DATA_REDACTION (Data Masking)
 - DBMS_FEATURE_DBFS_CONTENT (Use of DBFS_CONTENT to display data stores)
 - DBMS_FEATURE_DBFS_HS (Detects Usage of Hierarchical Content Stores)
 - DBMS_FEATURE_DBFS_SFS (Content Storage Administration Sample Implementation)
 - DBMS_FEATURE_EMX (Enterprise Manager Express Usage)

Feature Usage Reports (2:3)

- DBMS_FEATURE_FGA_AUDIT (Fine Grained Auditing)
- DBMS_FEATURE_GATEWAYS (Oracle Database Gateways)
- DBMS_FEATURE_GOLDENGATE (Oracle GoldenGate)
- DBMS_FEATURE_HCCRLL (Hybrid Columnar Compress Row Level Locking)
- DBMS_FEATURE_HEATMAP (ADO, ILM)
- DBMS_FEATURE_IDH (In-Database Hadoop)
- DBMS_FEATURE_ILM (Information Lifecycle Management)
- DBMS_FEATURE_IMA (In-Memory Aggregation)
- DBMS_FEATURE_IMC (In-Memory Column Store)
- DBMS_FEATURE_IOT (Index Organized Table Usage)
- DBMS_FEATURE_JSON (Java Script Object Notation)
- DBMS_FEATURE_LABEL_SECURITY (Advanced Security Option)
- DBMS_FEATURE_MOVE_DATAFILE (Online Move Datafile)
- DBMS_FEATURE_ONLINE_REDEF (DBMS_REDEFINITION Package)
- DBMS_FEATURE_PILLAR_EHCC (Pillar Hybrid Columnar Compression)

Feature Usage Reports (3:3)

- DBMS_FEATURE_PILLAR_STORAGE (Pillar Axiom SAN)
- DBMS_FEATURE_PRIV_CAPTURE (DBMS_PRIVILEGE_CAPTURE)
- DBMS_FEATURE_RAS (Real Application Security)
- DBMS_FEATURE_ROND (RAC One-Node)
- DBMS_FEATURE_SEG_MAIN_ONL_COMP (Partition Maintenance Segment Compression)
- DBMS_FEATURE_SPD (Statistical Incremental Maintenance)
- DBMS_FEATURE_STREAMS (Streams)
- DBMS_FEATURE_TSDP (Transparent Sensitive Data Protection Policy)
- DBMS_FEATURE_UNIFIED_AUDIT (Unified Audit Policies)
- DBMS_FEATURE_XSTREAM_IN (XStreams Input)
- DBMS_FEATURE_XSTREAM_OUT (XStreams Output)
- DBMS_FEATURE_XSTREAM_STREAMS (XStreams Usage)
- DBMS_FEATURE_ZFS_EHCC (ZFS Hybrid Columnar Compression)
- DBMS_FEATURE_ZFS_STORAGE (ZFS File System Usage)
- DBMS_FEATURE_ZMAP (Zone Maps)

DBMS_PREUP

DBMS_PREUP (1:2)

- A new undocumented PL/SQL package owned by SYS and used by the Database Upgrade Assistant
- Constants and subprograms listed here are only those that are publicly accessible. Additional constants and subprograms are private to the package body.
A list of all CHECK_NAME values can be found in the INIT_PREUPCHECKS procedure local to the package body (see source code)
- Do not run this yourself ... but read the information about it on the Morgan's Library website to learn what can and cannot be upgraded successfully
- Contains 206 separate objects and overloads

http://www.morganslibrary.org/reference/pkgs/dbms_preup.html

DBMS_PREUP (2:2)

```
DECLARE
  OutVal VARCHAR2(1024);
  RetVal NUMBER;
BEGIN
  RetVal := dbms_preup.audit_viewer_check(OutVal);
  dbms_output.put_line(OutVal);
  dbms_output.put_line(TO_CHAR(RetVal));
END;
/
ERROR: --> A user or role with the name "AUDIT_VIEWER" found in the database. This is an Oracle defined role.
You must drop this role or user prior to upgrading.
0
```

- OLAP Catalog(AMD) exists in database Starting with Oracle Database 12c, OLAP is desupported
- "APPQOSSYS" user found in database. This is an internal account used by Oracle Application Quality of Service Management. Please drop this user prior to upgrading.
- A user or role with the name "AUDIT_VIEWER" found in the database. This is an Oracle defined role. You must drop this role or user prior to upgrading.
- A user or role with the name "AUDSYS" found in the database. This is an internal account used by Oracle Database Auditing. You must drop this user or role prior to upgrading.
- Inactive DBIDs found in AWR AWR contains inactive DBIDs which may need additional updating
- A user or role with the name "CAPTURE_ADMIN" found in the database. This is an Oracle defined role. You must drop this user or role prior to upgrading.
- Compatible set too low "compatible" currently set at and must be set to at least 11.0.0 prior to upgrading the database. Update your init.ora or spfile to make this change.
- Database contains schemas with objects dependent on DBMS_LDAP package.
- Database Vault is enabled in this database. Starting with release 12.1, it is REQUIRED that Database Vault be disabled prior to database upgrade.
- Enterprise Manager Database Control repository found in the database. In Oracle Database 12c, Database Control is removed during the upgrade.

TNSNAMES.ORA

TNSNAMES Configuration

- Every time you add a new PDB ... you must also make a manual entry to TNSNAMES.ORA

```
# tnsnames.ora Network Configuration File:
C:\app\oracle\product\12.1.0\dbhome_1\network\admin\tnsnames.ora
# Generated by Oracle configuration tools.

PDBDEV =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP) (HOST = 127.0.0.1) (PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = pdbdev)
    )
  )

PDBTEST =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = 127.0.0.1) (PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = pdbtest)
    )
  )

ORACLRC_CONNECTION_DATA =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = IPC) (KEY = EXTPROC1521))
    )
    (CONNECT_DATA =
      (SID = CLRExtProc)
      (PRESENTATION = RO)
    )
  )
```

```
PDBPROD =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = 127.0.0.1) (PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = pdbprod)
    )
  )

ORABASE =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP) (HOST = 127.0.0.1) (PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = orabase)
    )
  )
```

Miscellaneous

Tools

- Verify that any tools you are using are capable of understanding the container architecture
 - PLSQL Developer
 - SolarWind
 - TOAD
- As of today some of them, even the latest versions, do not
- And older versions will definitely not do so

Cron Jobs (1:2)

- Not all shell scripts are going to survive unedited the change to a CDB
- If a script uses slash "/" to connect it is going to see CDB\$ROOT
- If a script needs to connect to a PDB it is going to have to run in a carefully constructed environment or be modified to include the PDB name
- If PDBs are truly used as intended, and are portable, and can be unplugged from one place and plugged into another
 - How does the shell script or cron job know about it?
 - How does TNSNAMES.ORA know about it?

```
#!/bin/bash rman target / <<EOF
shutdown immediate;
startup mount;
backup spfile;
backup database;
alter database open;
delete noprompt obsolete;
quit;
EOF
```

```
#!/bin/bash
cd
. ~/.profile
sqlplus -s / @/home/oracle/psql/gather_sysstat.sql
sqlplus -s / @/home/oracle/psql/gather_latch.sql
sqlplus -s / @/home/oracle/psql/gather_rlimit.sql
sqlplus -s / @/home/oracle/psql/gather_system_event.sql
sqlplus -s / @/home/oracle/psql/gather_waitstat.sql
```

Cron Jobs (2:2)

```
C:\Users\oracle>sqlplus / as sysdba
```

```
SQL*Plus: Release 12.1.0.2.0 Production on Wed Sep 16 20:45:38 2015
```

```
Copyright (c) 1982, 2014, Oracle. All rights reserved.
```

```
Connected to:
```

```
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
```

```
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
```

```
SQL> show con_name
```

```
CON_NAME
```

```
-----
```

```
CDB$ROOT
```

```
SQL> exit
```

```
Disconnected from Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
```

```
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
```

```
C:\Users\oracle>set ORACLE_SID=PDBDEV
```

```
C:\Users\oracle>sqlplus / as sysdba
```

```
SQL*Plus: Release 12.1.0.2.0 Production on Wed Sep 16 20:46:01 2015
```

```
Copyright (c) 1982, 2014, Oracle. All rights reserved.
```

```
ERROR:
```

```
ORA-12560: TNS:protocol adapter error
```

DBMS_SCHEDULER

```
BEGIN
  dbms_scheduler.create_job(
    job_name    => 'EXT_LOAD',
    job_type    => 'EXECUTABLE',
    job_action  => 'c:\oracle\product\11.2.0\db_1\bin\sqlldr.exe',
    number_of_arguments => 1,
    start_date  => SYSTIMESTAMP,
    enabled     => FALSE,
    comments    => 'SQL*Loader Job Demo');
END;
/

BEGIN
  dbms_scheduler.set_job_argument_value('EXT_LOAD',
                                         1,
                                         argument_value=>'userid=uwclass/uwclass@pdbdev
control=c:\temp\sqlldr02.ctl
log=c:\temp\sqlldr02.log');
END;
/

exec dbms_scheduler.enable('EXT_LOAD');
```

Wrap Up

Conclusion

- Oracle Database 12c is different
- And in essentially every respect it is better
- But the cost to you in moving to the new container architecture is that you must do something you haven't had to do in 20+ years ... learn new architecture
- Database 12.2 is in Beta
 - And I cannot talk about what I know
 - But the non-container architecture is very likely a thing of the past
 - So your planning cycle should include deep hands-on experience or bringing in a consultant to help your organization understand the challenges and help you meet them successfully

*

ERROR at line 1:

ORA-00028: your session has been killed

Thank You

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