

Oracle Database 12.2 Application Containers

Unsafe Harbor

- This room is an unsafe harbor
- You can rely on the information in this presentation to help you protect your data, your databases, your organization, and your career
- No one from Oracle has previewed this presentation
- No one from Oracle knows what I'm going to say
- No one from Oracle has supplied any of my materials
- Everything I will present is existing, proven, functionality



Introduction



Daniel Morgan



- 🏆 Oracle ACE Director Alumni
 - Oracle Educator
 - 🏛️ Curriculum author and primary program instructor at University of Washington
 - 🏰 Consultant: Harvard University
 - University Guest Lecturers
 - APAC: University of Canterbury (NZ)
 - EMEA: University of Oslo (Norway)
 - Latin America: Universidad Cenfotec, Universidad Latina de Panama, Tecnológico de Costa Rica
 - IT Professional
 - First computer: IBM 360/40 in 1969: Fortran IV
 - Oracle Database since 1988-9 and Oracle Beta tester
 - The Morgan behind www.morganslibrary.org
 - Member Oracle Data Integration Solutions Partner Advisory Council
 - Vice President Twin Cities Oracle Users Group (Minneapolis-St. Paul)
 - Co-Founder International GoldenGate Oracle Users Group
 - Principal Adviser: Sirius **Meta7**



System/370-145 system console



My Websites: Morgan's Library

www.morganslibrary.org



Morgan's Library

☐ www ☐ library

International Oracle Events 2016-2017 Calendar

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

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 Database 12cR2 is now available in the Cloud. If you are not already working in a 12cR1 CDB database ... you are late to the party and you are losing your competitive edge.

Home

Resources

[Library](#)

[How Can I?](#)

[Presentations](#)

[Links](#)

[Book Reviews](#)

[Downloads](#)

[User Groups](#)

[Blog](#)

[Humor](#)

General

[Contact](#)

[About](#)

[Services](#)

[Legal Notice & Terms of Use](#)

[Privacy Statement](#)

Mad Dog Morgan



Training Events and Travels

- [OTN APAC, Sydney, Australia - Oct 31](#)
- [OTN APAC, Gold Coast, Australia - Nov 02](#)
- [OTN APAC, Beijing China - Nov 04-05](#)
- [OTN APAC, Shanghai China - Nov 06](#)
- [Sangam16, Bangalore, India - Nov 11-12](#)
- [NYOUG, New York City - Dec 07](#)

Next Event: Indiana Oracle Users Group

Oracle Events



Click on the map to find an event near you

Morgan



aboard USA-71



Library News

- [Morgan's Blog](#)
- [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](#)



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](#)

This site is maintained by Dan Morgan. Last Updated: 11/08/2016 22:25:14

This site is protected by copyright and trademark laws under U.S. and International law. ©1998-2016 Daniel A. Morgan All Rights Reserved

 OTN  Oracle Mix  Share  Twitter  Facebook  Library  Contact Us  Privacy Statement  Legal Notices & Terms of Use

www.morganslibrary.org



Just In Time IT Procurement



Consider The Following

- Oracle 18.1 has been released for Exadata and in the Oracle Cloud
 - Oracle Database 18.2 is scheduled for release in April
 - 18.3 in Q3, 18.4 in Q4
 - And 19.1 in just 10 months
- `./runInstaller` is significantly changed to be more Cloud compatible
- Oracle is moving to eliminate SYSDBA
 - We now have users named GGSYS, SYSBACKUP, SYSDG, SYSKM, SYSRAC
- The Oracle Database on Linux is moving to rpms with installation and patching fully automated from a YUM server
- The database's kernel is being rewritten so that very few patches will require an outage
- Expect OEM and other tools to manage the database through the REST API

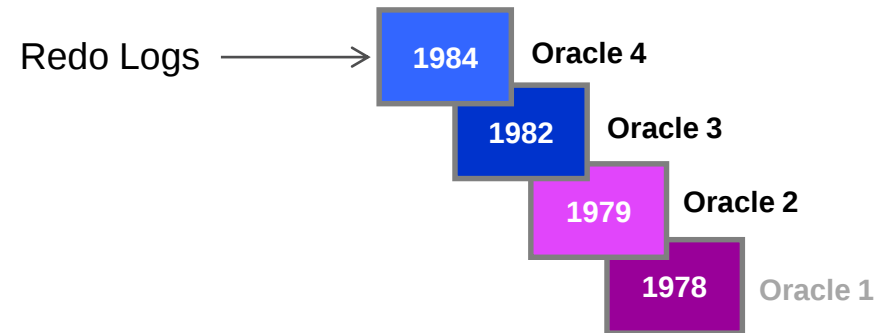




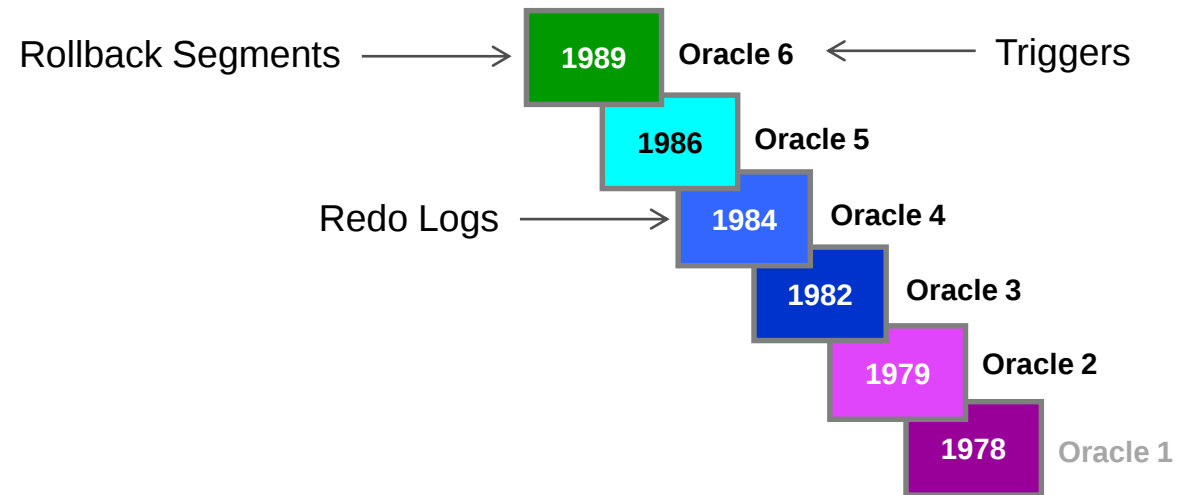
Introduction to Database 12c



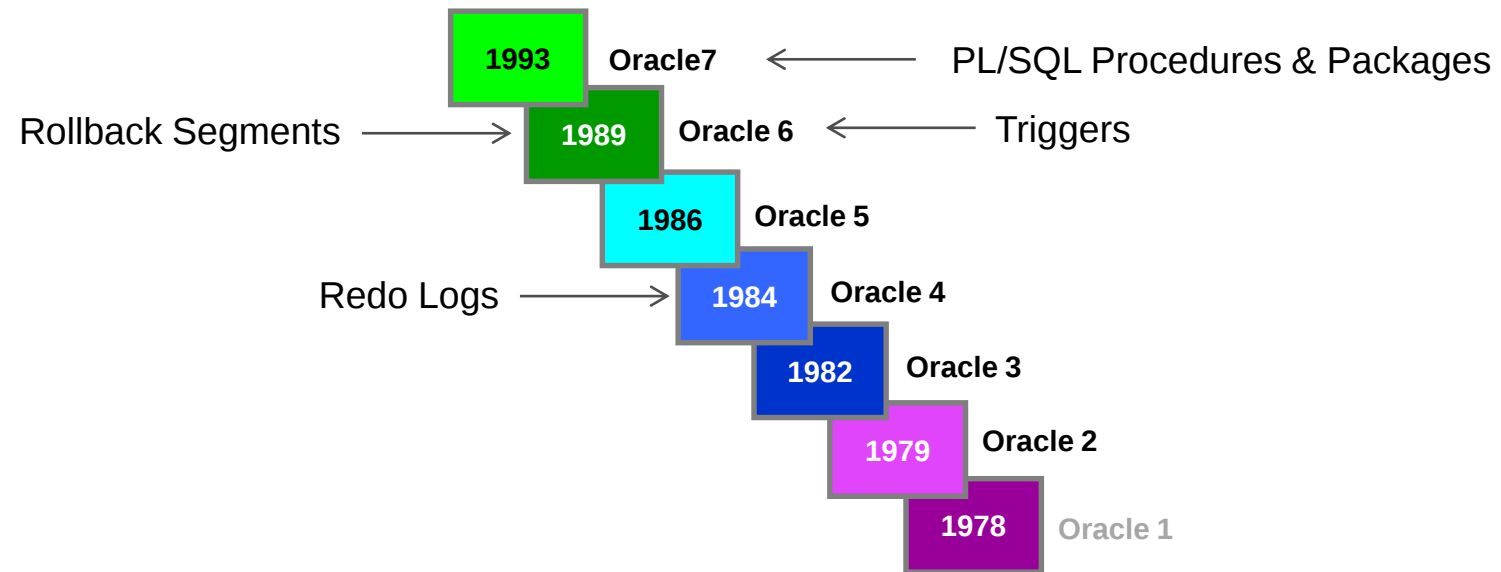
A Brief History of the Oracle Database



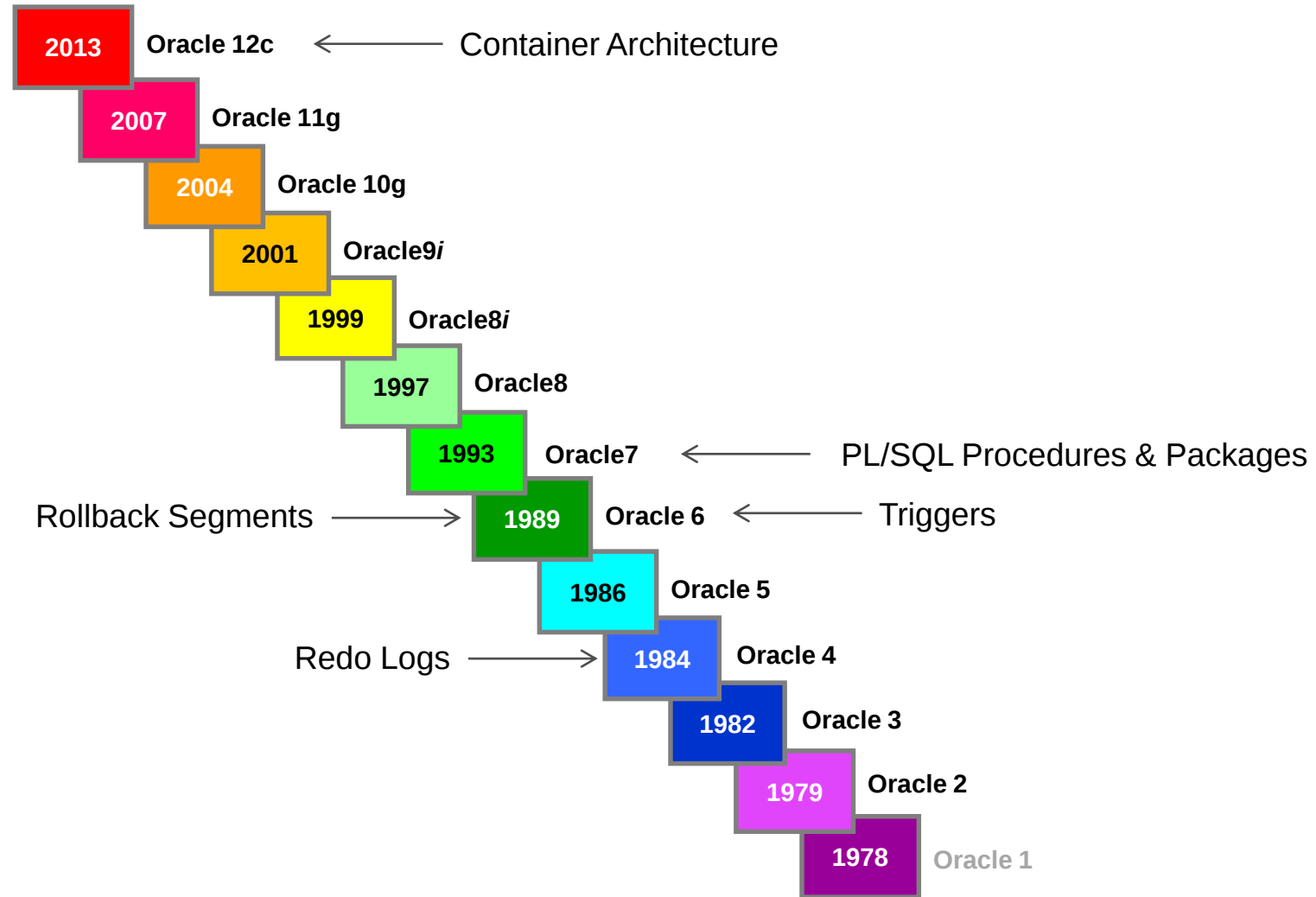
A Brief History of the Oracle Database



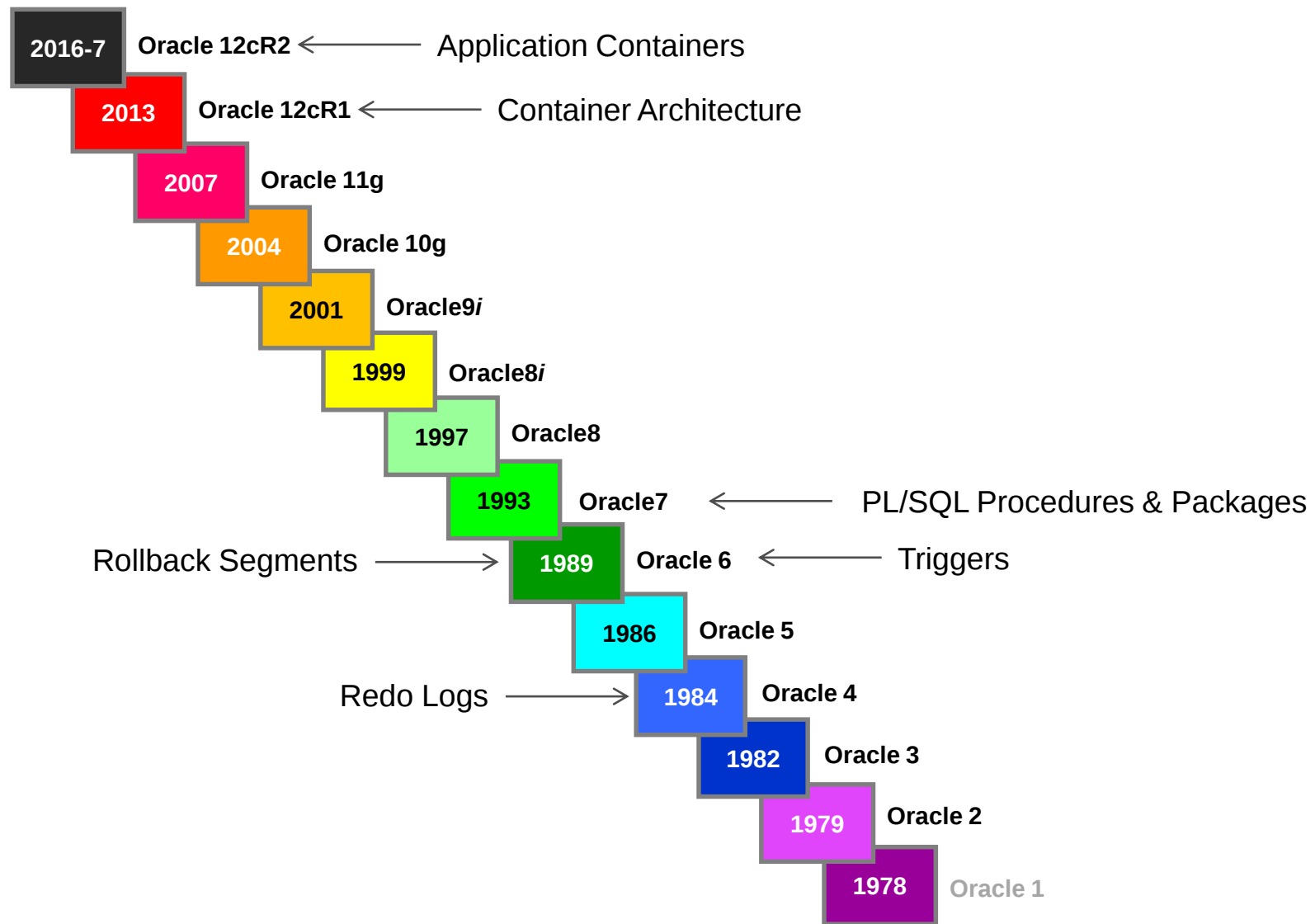
A Brief History of the Oracle Database



A Brief History of the Oracle Database



A Brief History of the Oracle Database

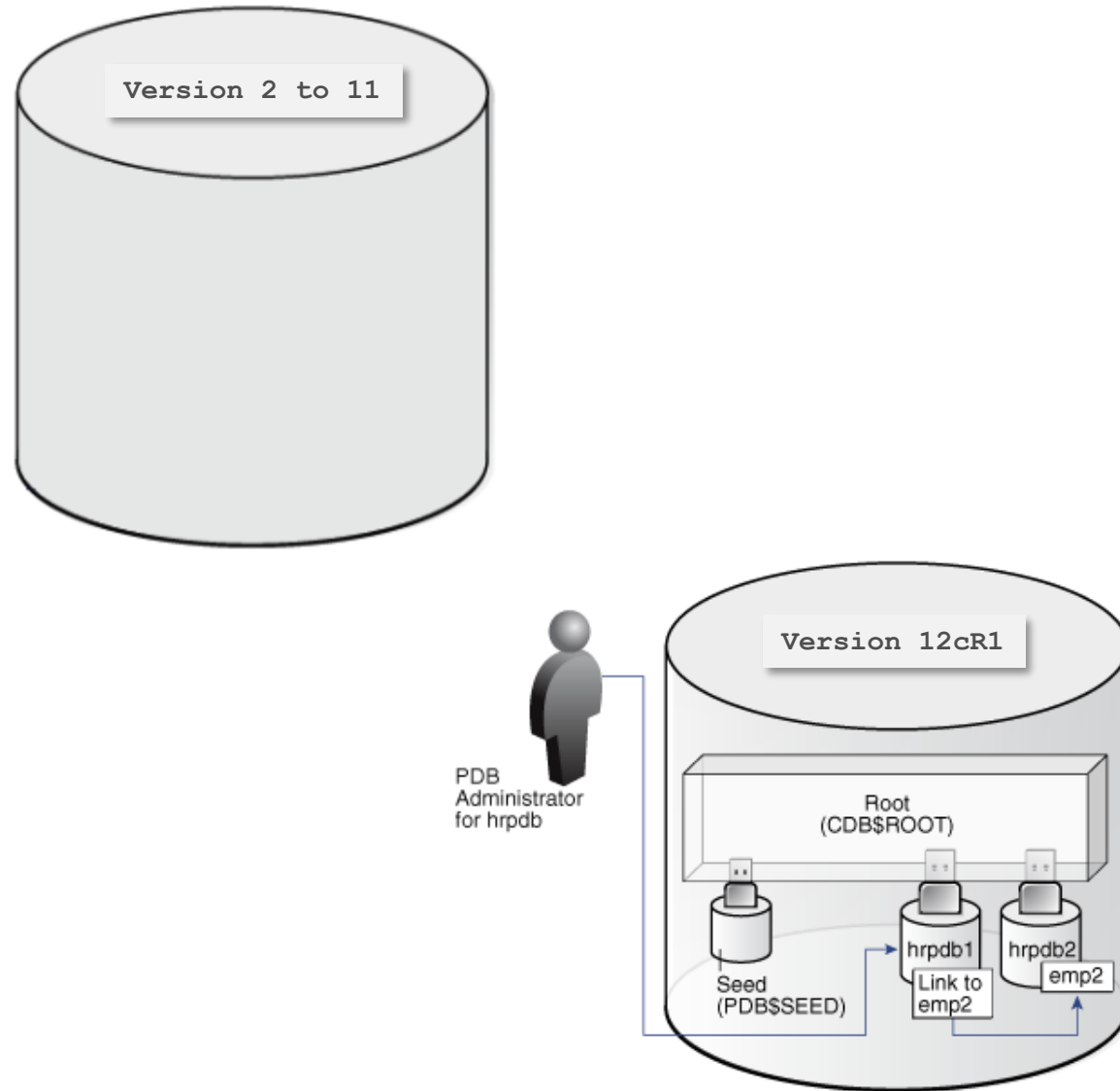




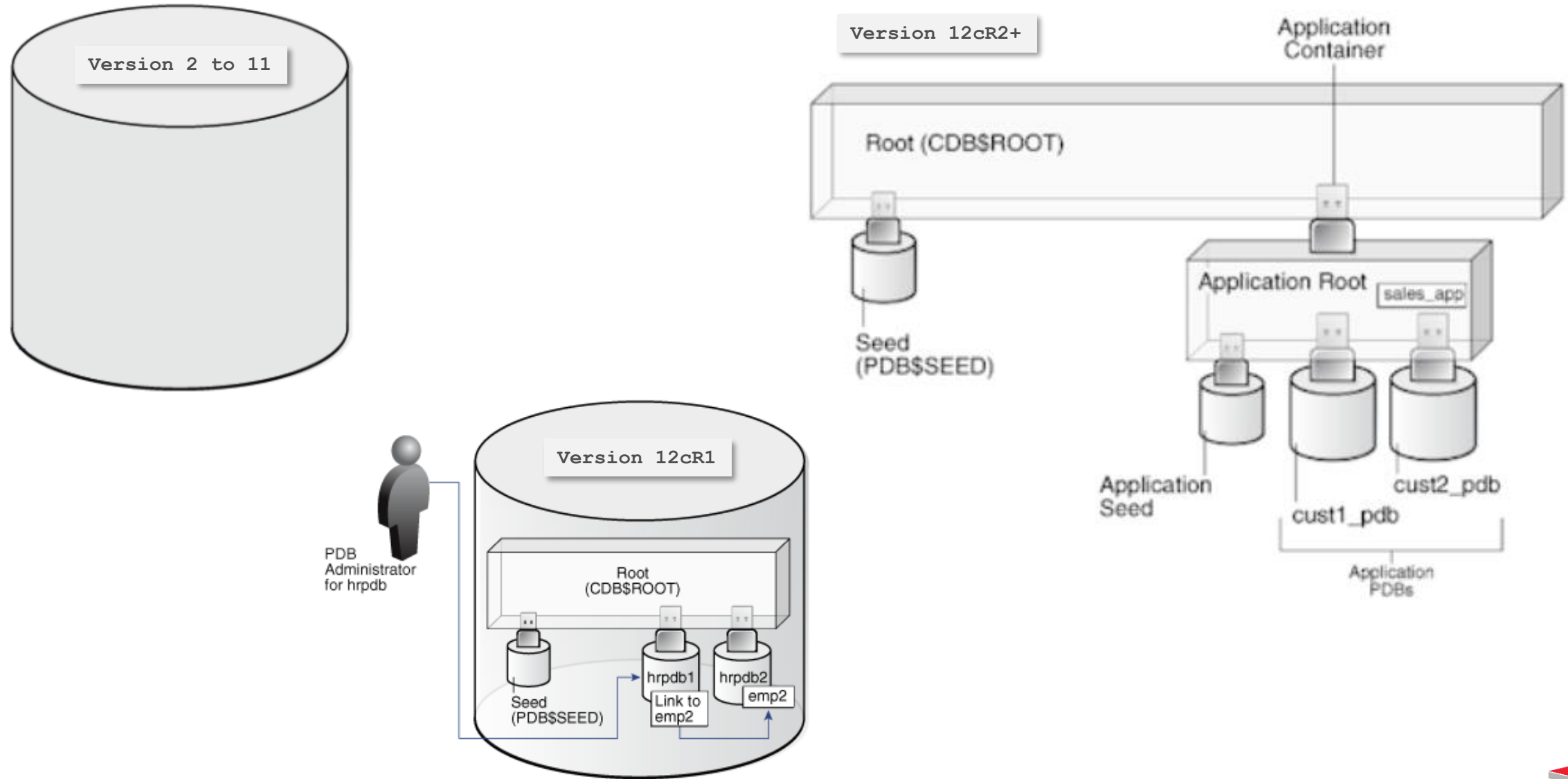
New Physical Architecture



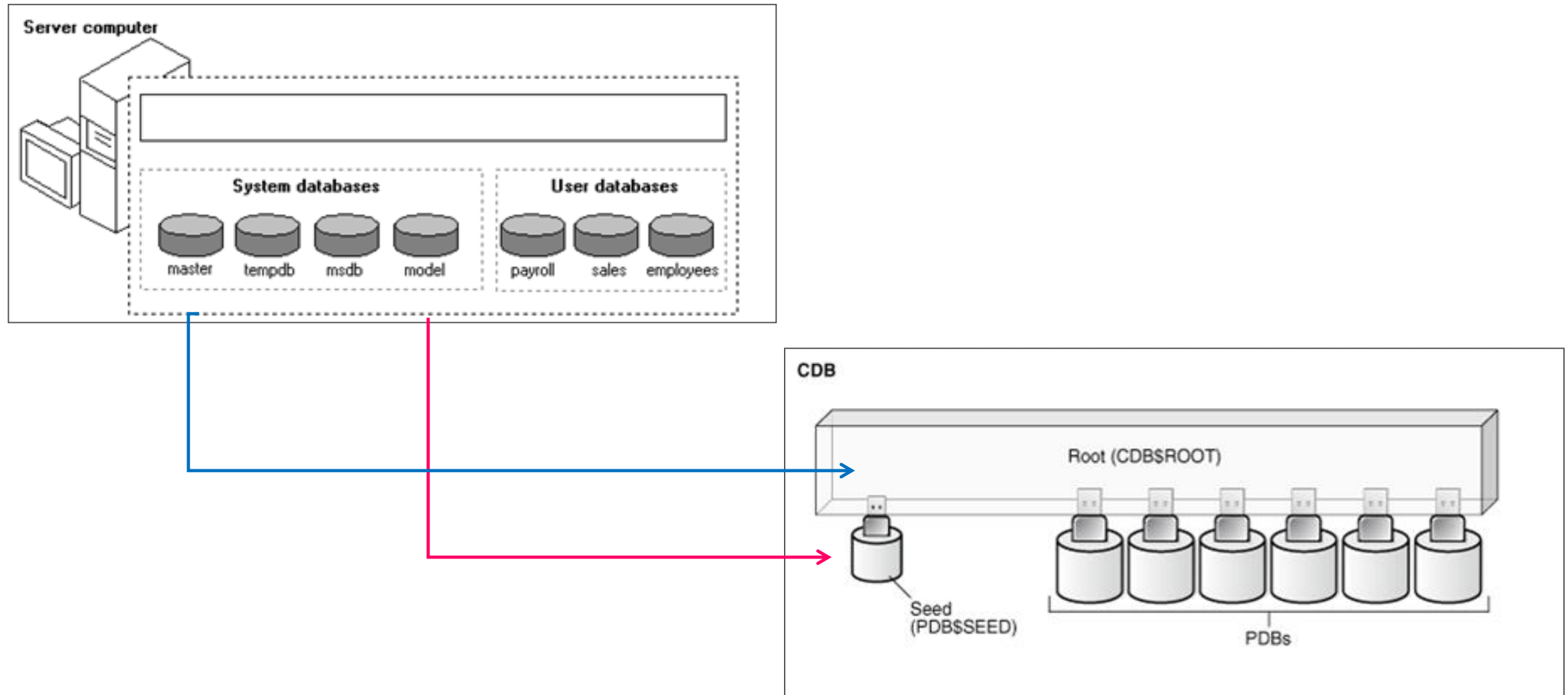
New 12cR1 Container Database Architecture



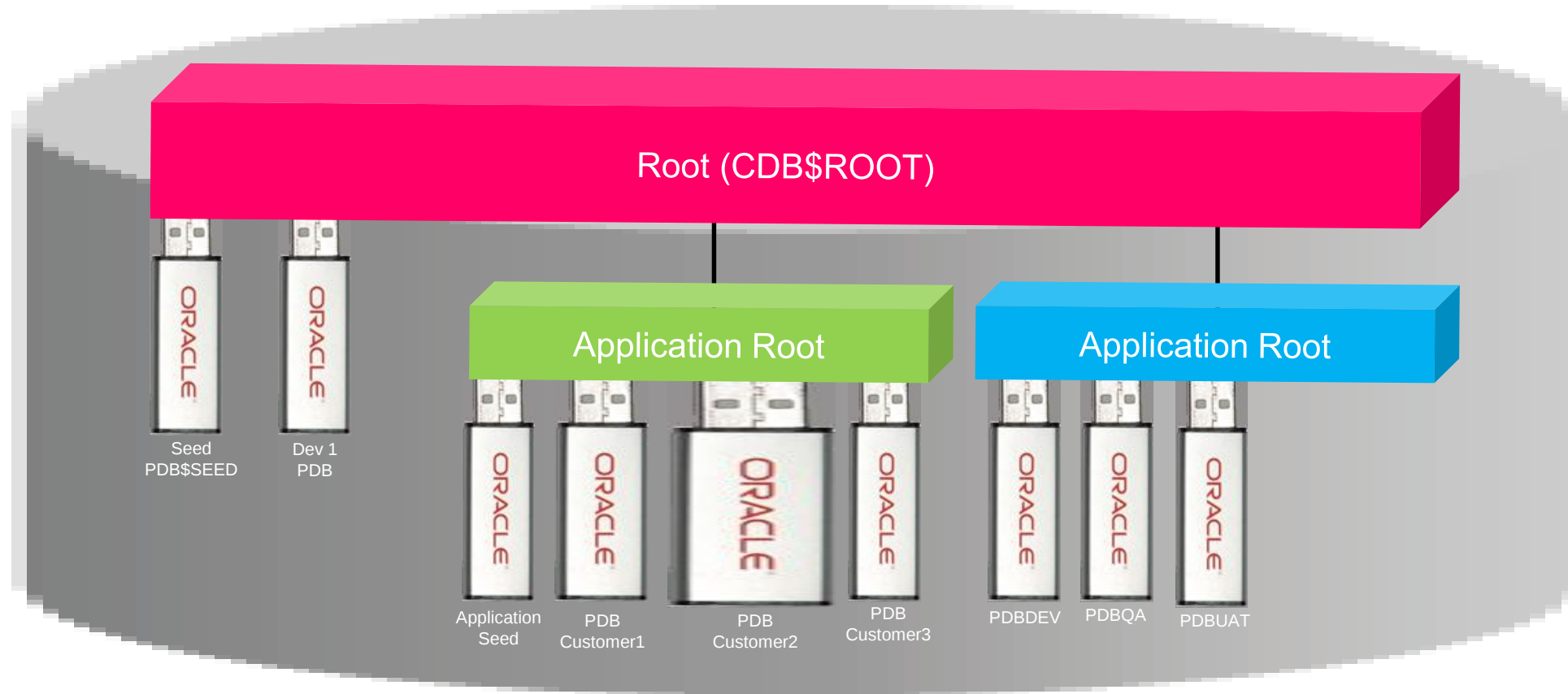
New 12cR2 Container Database Architecture



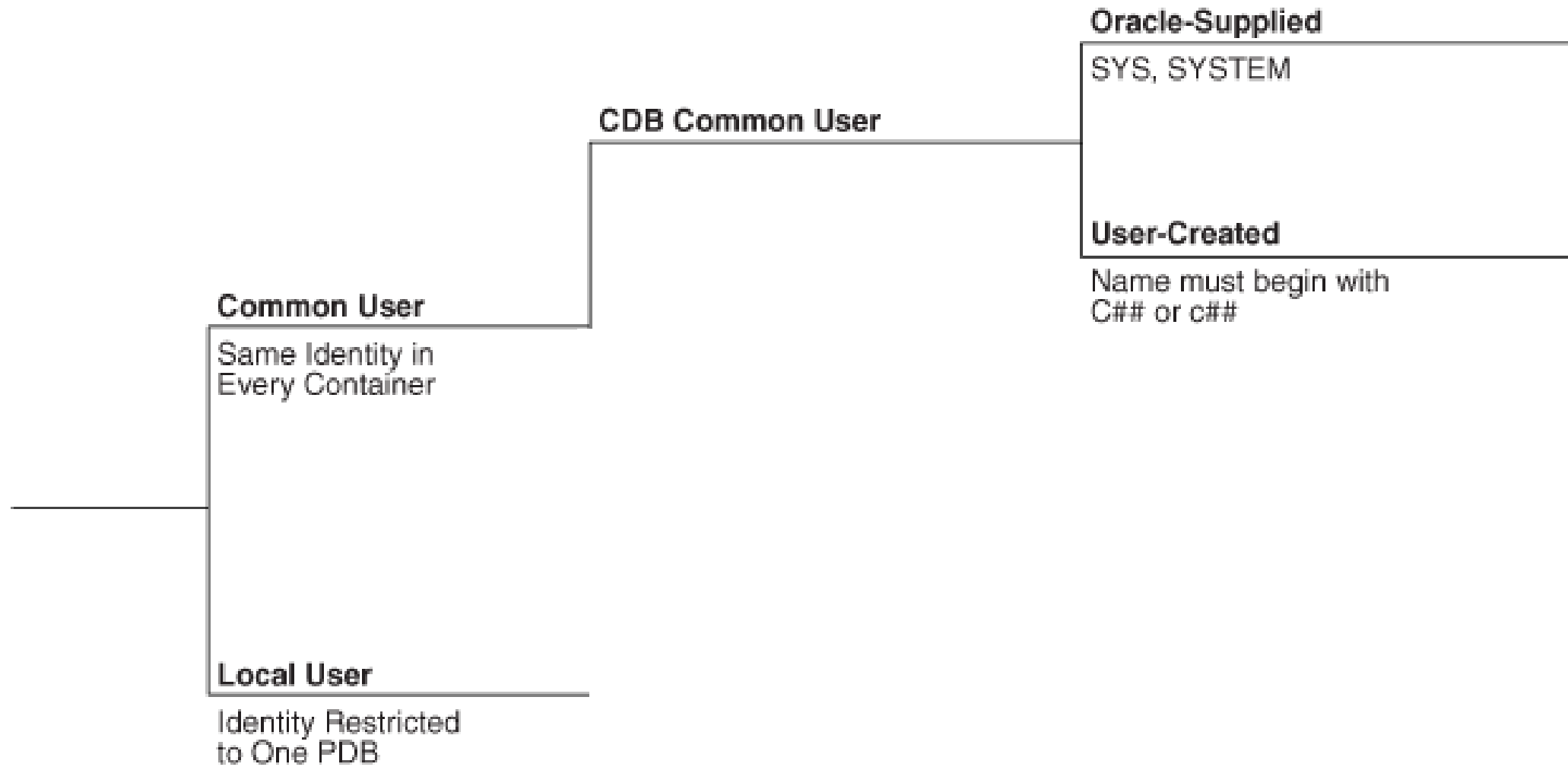
New 12cR1 Container Database Architecture



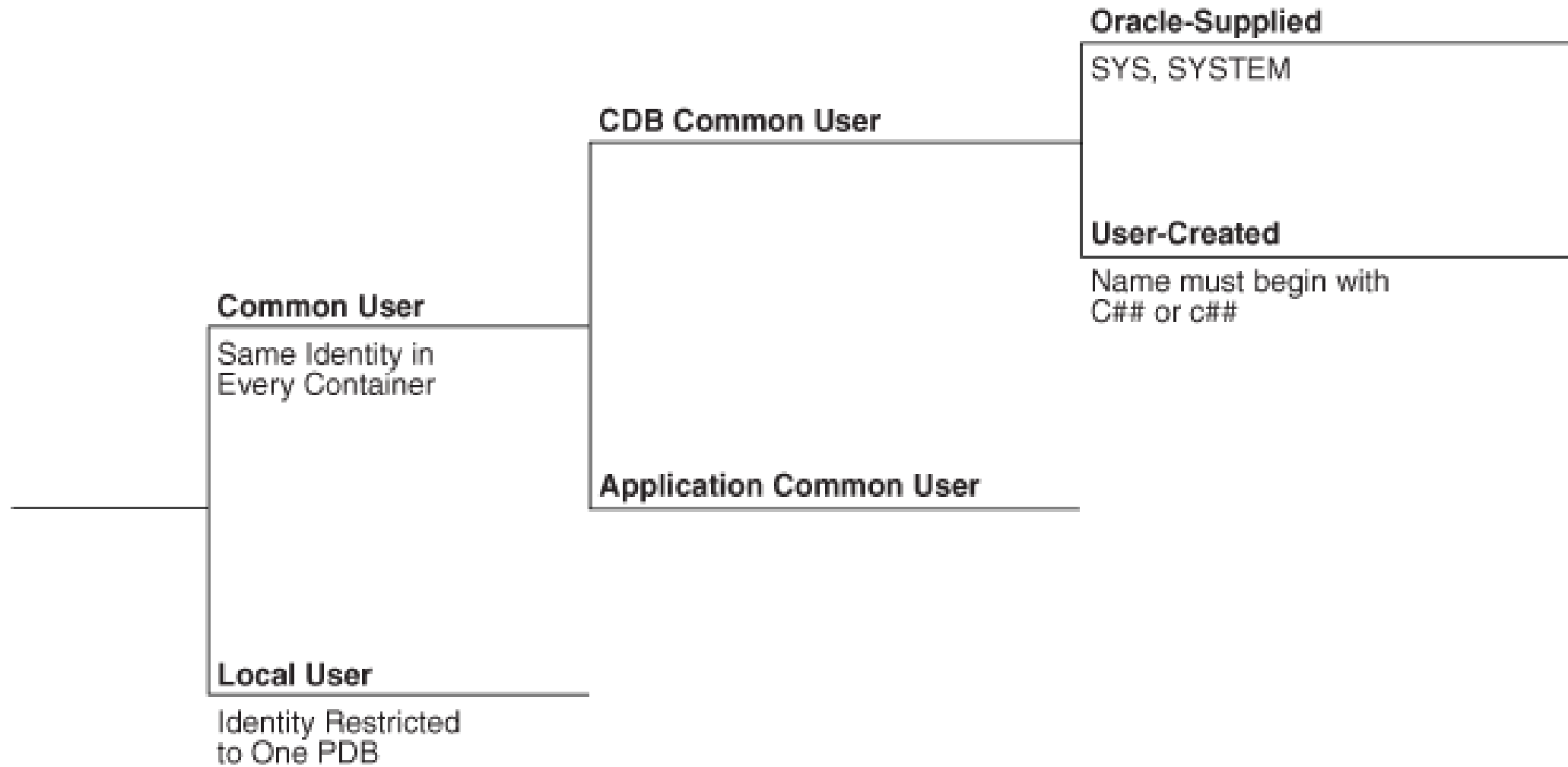
New 12cR2 Container Database Architecture



New 12cR1 Container Database User Architecture



New 12cR2 Container Database User Architecture



Users (1:2)

New: 12cR1

AUDSYS
GSMADMIN_INTERNAL
GSMCATUSER
GSMUSER
PDBADMIN
SYSBACKUP
SYSDG
SYSKM

New: 12cR2

APEX_050100
APEX_INSTANCE_ADMIN_USER
APEX_LISTENER
APEX_REST_PUBLIC_USER
DBJSON
DBSFUSER
GGSYS
HRREST
OBE
ORDS_METADATA
ORDS_PUBLIC_USER
REMOTE_SCHEDULER_AGENT
RESTFUL
SYS\$UMF
SYSRAC
XDBEXT
XDBPM
XFILES

Dropped

SPATIAL_WFS_USR



New Users With Escalated Privs

USERNAME	Usage
GGSYS	The internal account used by Oracle GoldenGate. It should not be unlocked or used for a database login.
SYSBACKUP	This privilege allows a user to perform backup and recovery operations either from Oracle Recovery Manager (RMAN) or SQL*Plus.
SYSDG	This privilege allows a user to perform Data Guard operations can use this privilege with either Data Guard Broker or the DGMGRL command-line interface.
SYSKM	This privilege allows a user to perform Transparent Data Encryption keystore operations.
SYSRAC	This privilege allows the Oracle agent of Oracle Clusterware to perform Oracle Real Application Clusters (Oracle RAC) operations. SYSRAC facilitates Oracle Real Application Clusters (Oracle RAC) operations by connecting to the database by the Clusterware agent on behalf of Oracle RAC utilities such as SRVCTL.





The Multitenant Business Case



QoS
TCO

Technical and Business Considerations

- Increased QoS
 - Enhanced security
 - New features such as Lockdown Profiles
- Lower TCO
 - Substantial consolidation
 - Fewer manual operations required to support
 - Patching
 - Replatforming
 - Migration



The Perfect Case for Applications Containers (1:2)

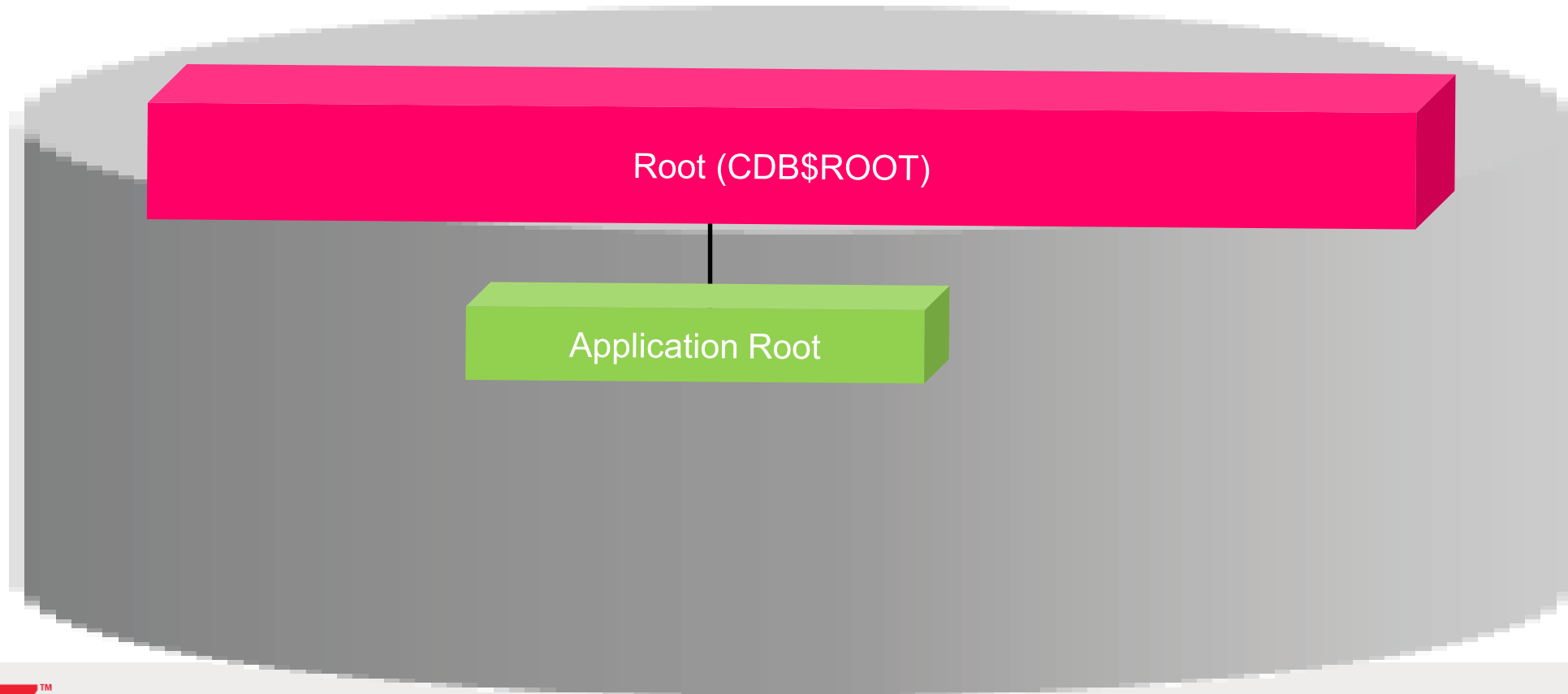
- An SaaS service provider like Salesforce.com
- Prior to application containers they have three choices

Architecture	Issue
Put every customers data into shared tables	Security is provided by application code No physical separation of customer's data A breach compromises everyone's data
Put each customer into a separate schema	Each new customer requires creation of a new user Each new customer requires creation of new tablespaces
Put every customer into a separate database	If each database requires 4GB of memory ... do the math

- And each of these solutions requires that
 - Security is provided by application code
 - You abandon any hope of separation of duties
 - You ignore GDPR
 - You perform application patching and maintenance once per customer

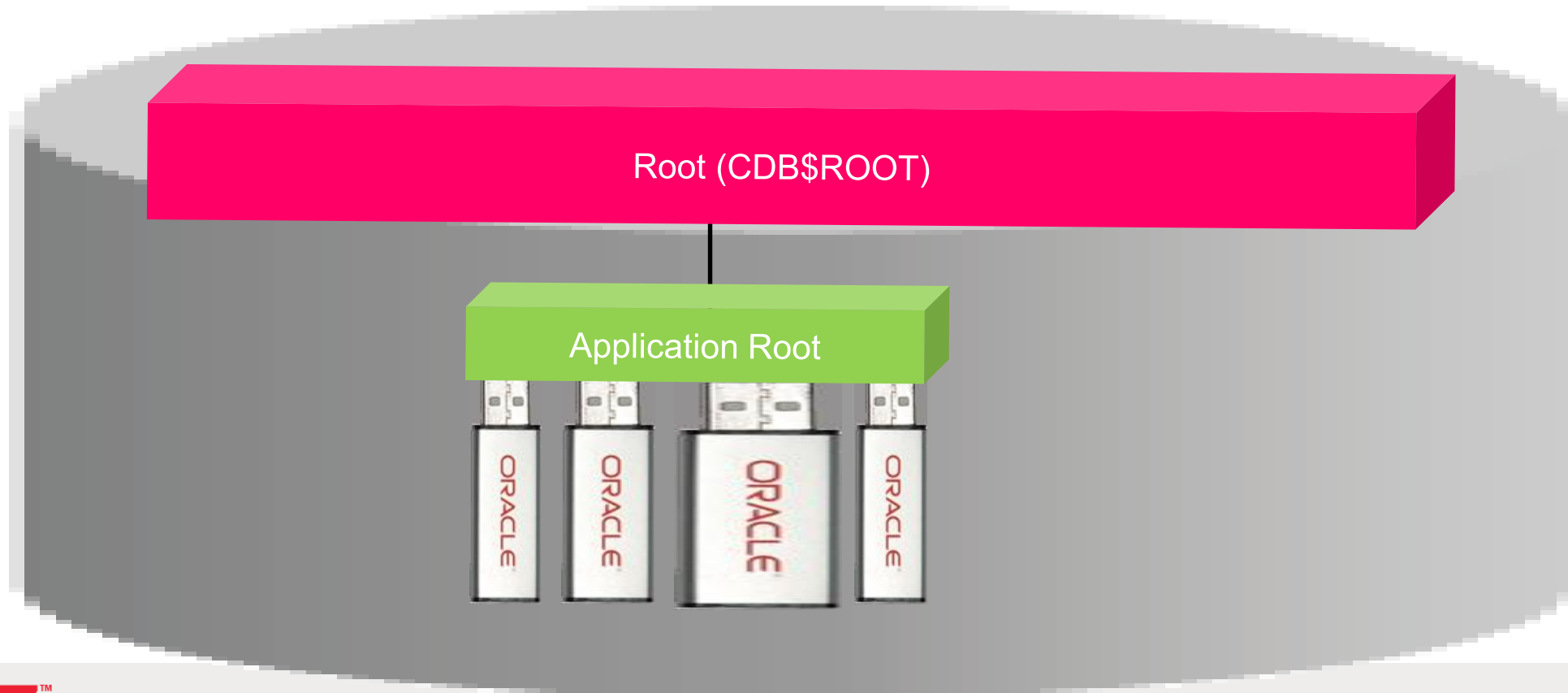
The Perfect Case for Applications Containers (2:2)

- With application containers the application exists in only one place ... where it is logically and physically isolated inheriting the data dictionary from ROOT
 - Install once for all customers
 - Patch once for all customers
 - Maintain once for all customers



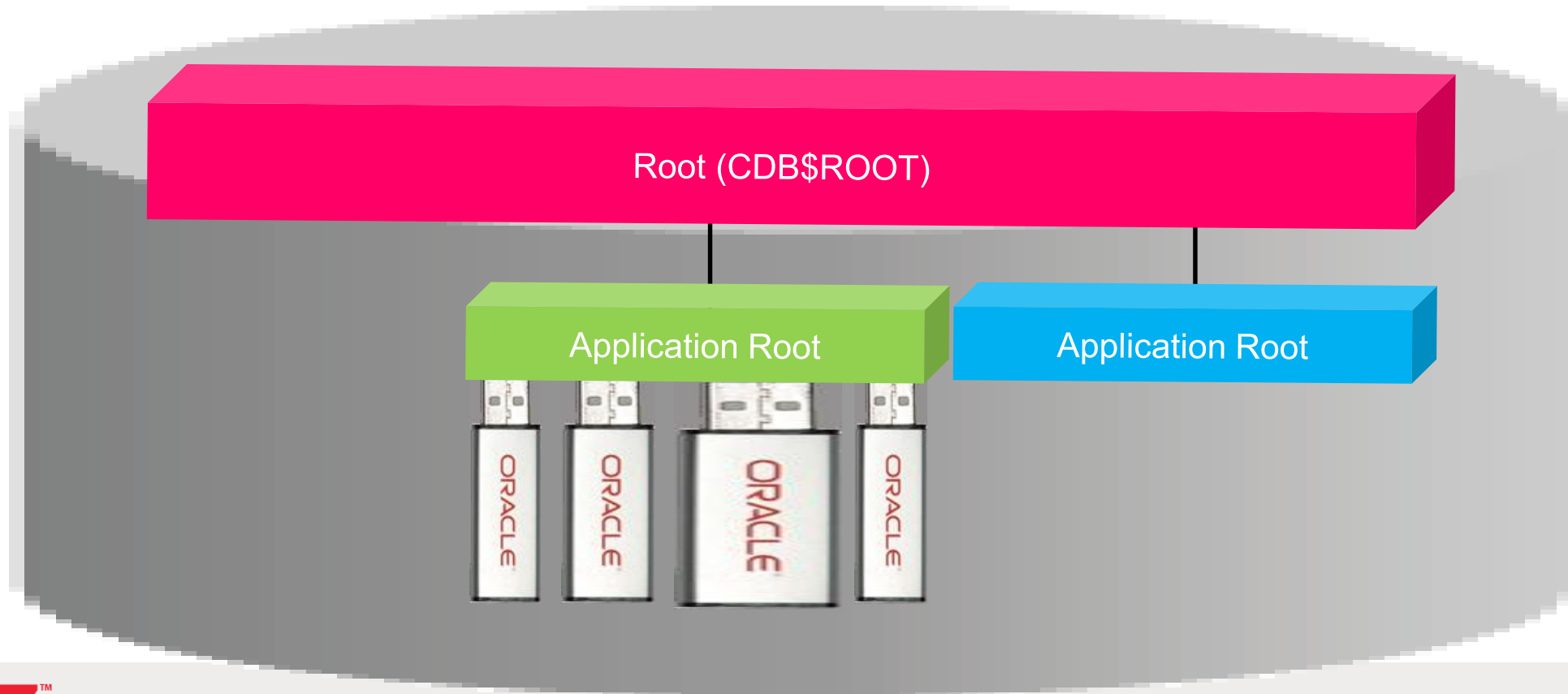
The Perfect Case for Applications Containers (2:2)

- Each customer, isolated in their own PDB, inherits the application by pointer from the **Application Root**
 - Metadata Sharing (DDL)
 - Data Sharing (DDL + data)



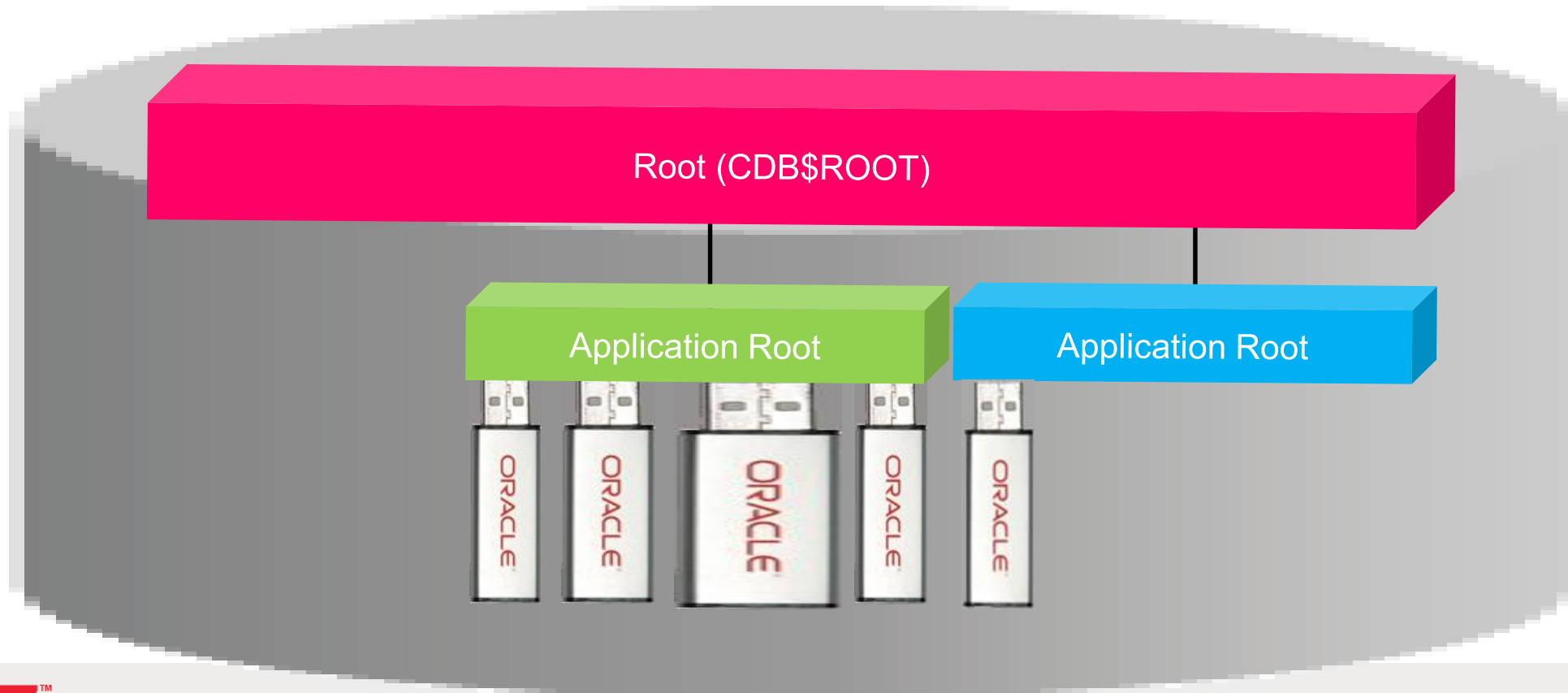
The Perfect Case for Applications Containers (2:2)

- Create **version two** of the application in a new **Application Root**



The Perfect Case for Applications Containers (2:2)

- Migrate your customers one-at-a-time to the new version in seconds with no outage or impact to any other customer





Create Application Root Container



Application Containers Demo 1: Create Application Root (1:4)

```
CREATE PLUGGABLE DATABASE <pdb_name> AS <APPLICATION CONTAINER | SEED>  
ADMIN USER <admin_user_name> IDENTIFIED BY <password>  
[ROLES = (<comma_delimited_list_of_roles>)]  
[PARALLEL <integer>]  
[DEFAULT TABLESPACE <tablespace_name>]  
[<pdb_storage_clause>]  
[<file_name_convert_clause>]  
[<service_name_convert_clause>]  
[<path_prefix_clause>]  
[TEMPFILE REUSE]  
[<user_tablespace_clause>]  
[<standby_database_clause>]  
[<LOGGING | NOLOGGING | FILESYSTEM_LIKE_LOGGING>]  
[<create_file_dest_clause>]  
[HOST = '<host_name>']  
[PORT = <port_number>;
```

Application Containers Demo 1: Create Application Root (2:4)

```
conn sys@orabase as sysdba
Enter password:
Connected.

sho con_id

CON_ID
-----
1

show con_name

CON_NAME
-----
CDB$ROOT

SELECT name, open_mode, application_root,
application_pdb, application_seed, pdb_count
FROM v$containers
ORDER BY con_id;
```

NAME	OPEN_MODE	APP	APP	APP	PDB_COUNT
CDB\$ROOT	READ WRITE	NO	NO	NO	2
PDB\$SEED	READ ONLY	NO	NO	NO	0
PDBDEV	READ WRITE	NO	NO	NO	0

```
-- as desirable as it would be to do so you cannot use
special characters in a PDB name
CREATE PLUGGABLE DATABASE uwapp_root
AS APPLICATION CONTAINER
ADMIN USER uwAdmin IDENTIFIED BY uwAdmin
ROLES = (CDB_DBA)
DEFAULT TABLESPACE uwapp_tbs
FILE_NAME_CONVERT = ('/pdbseed/', '/uwapp/')
USER_TABLESPACES = NONE
LOGGING;

Pluggable database created.

SELECT name, open_mode, application_root,
application_pdb, application_seed, pdb_count
FROM v$containers
ORDER BY con_id;
```

NAME	OPEN_MODE	APP	APP	APP	PDB_COUNT
CDB\$ROOT	READ WRITE	NO	NO	NO	3
PDB\$SEED	READ ONLY	NO	NO	NO	0
PDBDEV	READ WRITE	NO	NO	NO	0
UWAPP_ROOT	MOUNTED	YES	NO	NO	0

```
ALTER PLUGGABLE DATABASE uwapp_root OPEN;

Pluggable database altered.
```



Application Containers Demo 1: Create Application Root (3:4)

```
SELECT name, creation_date, clb_goal, pdb
FROM v$services
ORDER BY 1;
```

NAME	CREATION_DATE	CLB_G	PDB
SYS\$BACKGROUND	26-JAN-2017 13:54:44	SHORT	CDB\$ROOT
SYS\$USERS	26-JAN-2017 13:54:44	SHORT	CDB\$ROOT
uwapp_root	26-MAR-2017 17:09:28	LONG	UWAPP\$ROOT
pdbdev	02-MAR-2017 07:57:37	LONG	PDBDEV
orabase	02-MAR-2017 07:52:46	LONG	CDB\$ROOT
orabaseXDB	02-MAR-2017 07:52:46	LONG	CDB\$ROOT

```
ALTER SESSION SET CONTAINER=uwapp_root;
```

Session altered.

```
sho con_id
```

```
CON_ID
```

```
-----
```

```
4
```

```
show con_name
```

```
CON_NAME
```

```
-----
```

```
UWAPP$ROOT
```



Application Containers Demo 1: Create Application Root (4:4)

```
SELECT tablespace_name TBS_NAME, file_name
FROM dba_data_files
UNION
SELECT tablespace_name, file_name
FROM dba_temp_files
ORDER BY 1;
```

```
TBS_NAME  FILE_NAME
```

```
-----
SYSAUX    /u01/app/oracle/oradata/orabase/uwapp/sysaux01.dbf
SYSTEM    /u01/app/oracle/oradata/orabase/uwapp/system01.dbf
TEMP       /u01/app/oracle/oradata/orabase/uwapp/temp012017-03-02_07-53-20-031-AM.dbf
UNDOTBS1   /u01/app/oracle/oradata/orabase/uwapp/undotbs01.dbf
```



Application Installation



```
ALTER PLUGGABLE DATABASE APPLICATION
{ { app_name
{ BEGIN INSTALL 'app_version' [ COMMENT 'comment' ]
| END INSTALL [ 'app_version' ]
| BEGIN PATCH number [ MINIMUM VERSION 'app_version' ] [ COMMENT
'comment' ]
| END PATCH [ number ]
| BEGIN UPGRADE 'start_app_version' TO 'end_app_version' [ COMMENT
'comment' ]
| END UPGRADE [ TO 'end_app_version' ]
| BEGIN UNINSTALL
| END UNINSTALL
| SET PATCH number
| SET VERSION 'app_version'
| SET COMPATIBILITY VERSION { 'app_version' | CURRENT }
| SYNC }
|
{ ALL SYNC }
}
```

Application Containers Demo 2: Application Installation (2:5)

```
ALTER PLUGGABLE DATABASE APPLICATION uw_app BEGIN INSTALL '1.0';
```

Pluggable database altered.

```
CREATE TABLESPACE uwapp_tbs  
DATAFILE '/u01/app/oracle/oradata/orcl12c/uwapp/uwapp_tbs'  
SIZE 25M AUTOEXTEND ON NEXT 25M;
```

Tablespace created.

```
-- create user  
CREATE USER uwapp_user IDENTIFIED BY uwapp_user  
DEFAULT TABLESPACE uwapp_tbs  
TEMPORARY TABLESPACE temp  
QUOTA UNLIMITED ON uwapp_tbs;
```

User created.

```
GRANT create session TO uwapp_owner;  
GRANT create procedure TO uwapp_owner  
GRANT create table TO uwapp_owner;  
GRANT create view TO uwapp_owner;
```

Grant succeeded.

```
CREATE OR REPLACE PROCEDURE uwapp_owner.who_am_i AUTHID DEFINER
IS
BEGIN
    dbms_output.put_line('I do not know');
END who_am_i;
/

CREATE TABLE uwapp_owner.t1 (
    tid          NUMBER(10),
    last_name    VARCHAR2(20));

ALTER TABLE uwapp_owner.t1
ADD PRIMARY KEY (tid);

CREATE TABLE uwapp_owner.t2(
    tid NUMBER(10),
    last_name VARCHAR2(20));

ALTER TABLE uwapp_owner.t2
ADD PRIMARY KEY (tid);

CREATE VIEW uwapp_owner.t1t2_view AS
SELECT t1.tid, t2.last_name
FROM uwapp_user.t1, uwapp_user.t2
WHERE t1.tid = t2.tid;
```

```
INSERT INTO uwapp_owner.t1 VALUES (1, 'MORGAN');
INSERT INTO uwapp_owner.t1 VALUES (2, 'KYTE');
INSERT INTO uwapp_owner.t1 VALUES (3, 'LEWIS');
INSERT INTO uwapp_owner.t2 VALUES (1, 'TOWNSEND');
INSERT INTO uwapp_owner.t2 VALUES (2, 'KURIAN');
COMMIT;

SELECT * FROM uwapp_user.t1t2_view;

SQL> SELECT * FROM uwapp_user.t1t2_view;

TID          LAST_NAME
-----
          1 TOWNSEND
          2 KURIAN

ALTER PLUGGABLE DATABASE APPLICATION uw_app END INSTALL;

Pluggable database altered.
```

```
col app_name format a10
col app_version format a12

SELECT app_name, app_version, app_status, app_implicit
FROM dba_applications
WHERE app_name = 'UW_APP';
```

APP_NAME	APP_VERSION	APP_STATUS	A
UW_APP	1.0	NORMAL	N

```
-- if there are application PDBs, under the application root
-- container, exit and synchronize them with their root with
-- ALTER APPLICATION PDB
```

Application Containers Demo 3: Sharable Objects (1:3)

```
SQL> CREATE TABLE servers (  
 2  srvr_id NUMBER(10),  
 3  network_id NUMBER(10),  
 4  status VARCHAR2(1),  
 5  latitude FLOAT(20),  
 6  longitude FLOAT(20),  
 7  netaddress VARCHAR2(15));
```

Table created.

```
SQL> CREATE TABLE serv_inst  
 2  SHARING=METADATA (  
 3  siid NUMBER(10),  
 4  si_status VARCHAR2(15),  
 5  type VARCHAR2(5),  
 6  installstatus VARCHAR2(1),  
 7  location_code NUMBER(10),  
 8  custacct_id VARCHAR2(10),  
 9  srvr_id NUMBER(10),  
10* ws_id NUMBER(10));
```

SHARING=METADATA

*

ERROR at line 9:

ORA-00922: missing or invalid option

```
SQL> show parameter default_sharing
```

NAME	TYPE	VALUE
default_sharing	string	METADATA



Application Containers Demo 3: Sharable Objects (2:3)

```
SQL> ALTER PLUGGABLE DATABASE APPLICATION uw_app BEGIN INSTALL '1.0';
ALTER PLUGGABLE DATABASE APPLICATION uw_app BEGIN INSTALL '1.0'
*
ERROR at line 1:
ORA-65221: application UW_APP exists already

SQL> ALTER PLUGGABLE DATABASE APPLICATION uw_app
  2 BEGIN UPGRADE '1.0' TO '2.0'
  3 COMMENT 'Adding New Table With Sharing';

SQL> CREATE TABLE serv_inst
  2 SHARING=METADATA (
  3   siid NUMBER(10),
  4   si_status VARCHAR2(15),
  5   type VARCHAR2(5),
  6   installstatus VARCHAR2(1),
  7   location_code NUMBER(10),
  8   custacct_id VARCHAR2(10),
  9   srvr_id NUMBER(10),
10*  ws_id NUMBER(10));

Table created.
```

Application Containers Demo 3: Sharable Objects (3:3)

```
SQL> ALTER PLUGGABLE DATABASE APPLICATION uw_app END UPGRADE;
```

```
SQL> desc dba_applications
```

Name	Null?	Type
APP_NAME		VARCHAR2(128)
APP_ID		NUMBER
APP_VERSION		VARCHAR2(30)
APP_STATUS		VARCHAR2(12)
APP_IMPLICIT		VARCHAR2(1)
APP_CAPTURE_SERVICE		VARCHAR2(64)
APP_CAPTURE_MODULE		VARCHAR2(64)

```
col app_name format a37
```

```
SQL> SELECT app_name, app_id, app_version, app_status, app_implicit  
2 FROM dba_applications;
```

APP_NAME	APP_ID	APP_VERSION	APP_STATUS	A
APP\$4BAF1A01C5964D55E0530100007F821B	2	1.0	NORMAL	Y
UW_APP	21	2.0	NORMAL	N



Application Seed Creation



Application Containers Demo 4: Create Seed (1:5)

```
CREATE PLUGGABLE DATABASE AS SEED FROM uwapp_root
ADMIN USER uwappAdmin IDENTIFIED BY uwappAdmin
FILE_NAME_CONVERT = ('/uwapp/', '/uwappseed/')
LOGGING;
```

```
SQL> SELECT con_id, name, open_mode, application_root, application_pdb,
2      application_seed
3      FROM v$containers
4      ORDER BY con_id;
```

CON_ID	NAME	OPEN_MODE	APP	APP	APP
4	UWAPP_ROOT	READ WRITE	YES	NO	NO
6	UWAPP_ROOT\$SEED	MOUNTED	NO	YES	YES

```
SQL> ALTER PLUGGABLE DATABASE uwapp_root$seed OPEN;
```

Warning: PDB altered with errors.

```
SQL> ALTER PLUGGABLE DATABASE uwapp_root$seed OPEN READ ONLY;
```

Warning: PDB altered with errors.

Application Containers Demo 4: Create Seed (2:5)

```
SQL> host
[oracle@vbgeneric ~]$ cd $ORACLE_BASE/diag/orabase/orabase/trace
[oracle@vbgeneric trace]$ tail alert_orabase.log
UWAPP_ROOT$SEED(6):Opatch validation is skipped for PDB UWAPP_ROOT$SEED (con_id=0)
UWAPP_ROOT$SEED(6):*****
UWAPP_ROOT$SEED(6):WARNING: Pluggable Database UWAPP_ROOT$SEED with pdb id - 6 is
UWAPP_ROOT$SEED(6): altered with errors or warnings. Please look into
UWAPP_ROOT$SEED(6): PDB_PLUG_IN_VIOLATIONS view for more details.
UWAPP_ROOT$SEED(6):*****
2017-04-19T18:45:58.662039-04:00
UWAPP_ROOT$SEED(6):Opening pdb with no Resource Manager plan active
Pluggable database UWAPP_ROOT$SEED opened read only
UWAPP_ROOT(4):Completed: ALTER PLUGGABLE DATABASE uwapp_root$seed OPEN READ ONLY
```

```
[oracle@vbgeneric ~]$exit
SQL> col time format a29
SQL> col name format a16
SQL> col type format a6
SQL> col cause format a30
SQL> col action format a22
```

```
SQL> SELECT time, name, cause, status, action
2* FROM pdb_plug_in_violations;
```

TIME	NAME	CAUSE	STATUS	ACTION
19-APR-17 06.45.57.958082 PM	UWAPP_ROOT\$SEED	Non-Application PDB to Application PDB	PENDING	Run pdb_to_apppdb.sql .



Application Containers Demo 4: Create Seed (3:5)

```
SQL> @@/rdbms/admin/pdb_to_apppdb.sql
SQL> SET FEEDBACK 1
SQL> SET NUMWIDTH 10
SQL> SET LINESIZE 80
SQL> SET TRIMSPOOL ON
SQL> SET TAB OFF
SQL> SET PAGESIZE 100
SQL>
SQL> WHENEVER SQLERROR EXIT;
SQL>
SQL> VARIABLE cdbname VARCHAR2(128)
SQL> VARIABLE pdbname VARCHAR2(128)
SQL> VARIABLE appname VARCHAR2(128)
SQL> BEGIN
2 -- Disallow script in non-CDB
3 SELECT sys_context('USERENV', 'CDB_NAME')
4 INTO :cdbname
5 FROM dual
6 WHERE sys_context('USERENV', 'CDB_NAME') is not null;
7 -- Disallow script in CDB Root
8 -- Disallow script in PDB$SEED (Bug 22550952)
9 SELECT sys_context('USERENV', 'CON_NAME')
10 INTO :pdbname
11 FROM dual
12 WHERE sys_context('USERENV', 'CON_NAME') <> 'CDB$ROOT'
13 AND sys_context('USERENV', 'CON_NAME') <> 'PDB$SEED';
14 -- Disallow script outside of Application Container
15 SELECT sys_context('USERENV', 'APPLICATION_NAME')
16 INTO :appname
17 FROM dual
18 WHERE sys_context('USERENV', 'APPLICATION_NAME') is not null;
19 -- Disallow script in Proxy PDB (Bug 22550952). This query works
20 -- because remote mapping in Proxy PDB has been disabled using
21 -- the underscore parameter.
22 SELECT /*+ OPT_PARAM('_ENABLE_VIEW_PDB', 'FALSE') */ name
23 INTO :pdbname
24 FROM v$pdb
25 WHERE proxy_pdb='NO';
26 END;
27 /
BEGIN
*
ERROR at line 1:
ORA-01422: exact fetch returns more than requested number of rows
ORA-06512: at line 22

Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
[oracle@vbgeneric ~]$
```



Application Containers Demo 4: Create Seed (4:5)

- On dissecting the pdb_to_apppdb.sql script the following was identified as the root cause of the error

```
SQL> SELECT /*+ OPT_PARAM('_ENABLE_VIEW_PDB', 'FALSE') */ name
  2   FROM v$pdb
  3  WHERE proxy_pdb='NO';

NAME
-----
UWAPP_ROOT
UWAPP_ROOT$SEED
```

- Further examination of the script(s) found numerous examples of this

```
select TO_NUMBER('NOT_IN_APPLICATION_PDB') from v$pdb
where con_id=sys_context('USERENV', 'CON_ID') and application_pdb<>'YES';
```

- Clearly the script has no choice but to fail
- More news on this in our Slack group as it becomes available

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)
    )
  )

ORACLR_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)
    )
  )
```

Conclusion

- Read the docs
 - Download it
 - Install it
 - Learn it
-
- For demos that work in SQL*Plus
www.morganslibrary.org/library.html



Oracle Help Center - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Oracle Help Center Downloads

docs.oracle.com/en/

Search

Welcome Daniel Sign out

How can we help?

Welcome to the Oracle Help Center. Whether you are new to Oracle or an advanced user, you can find useful information about our products and services, ranging from getting started guides to advanced features.

Search Find a product

All Products Search products



Cloud
A broad selection of enterprise solutions for cloud computing



Applications
Choice & flexibility with a vast, secure portfolio of products



Middleware
Premier business innovation platform for enterprise & cloud



Database
Oracle databases lead the world delivering innovative solutions

The screenshot shows the Oracle Database Documentation page in a Mozilla Firefox browser. The browser's address bar displays `docs.oracle.com/en/database/`. The page header includes the Oracle logo and the text "Welcome Daniel Sign Out". The left sidebar contains a search bar and a navigation menu with the following items: "Help Center Home", "Oracle Database" (highlighted), "Related Products", "Other Databases", "NoSQL", "MySQL", "TimesTen In-Memory Database", "Database Mobile Server", "Berkeley DB", "Database Express Edition", "Java DB", "Rdb", and "Essbase". The main content area features a large green circular icon with a white database symbol. Below this, the "Database Documentation" section provides an overview of Oracle's database solutions. The "Oracle Database" section includes a dropdown menu for "Oracle Database 12c Release 2 (12.2)", which is highlighted by a blue arrow. Below this, the "Learn About Oracle Database" section lists links for "Get Started", "What's New", and "Oracle Live SQL". The "Common Tasks" section lists links for "Install and Upgrade", "Administration", and "Development". A small purple circle with the number "1" is visible in the bottom right corner of the page.

ORACLE[®] Help Center

Sign In

Search for...

Q

Help Center Home

Oracle Database

Related Products

Other Databases

NoSQL

MySQL

TimesTen In-Memory Database

Database Mobile Server

Berkeley DB

Database Express Edition

Java DB

Rdb

Essbase

Home / Database / Oracle / Oracle Database

Oracle Database Documentation

Oracle provides a range of industry-leading on-premise and cloud-based solutions to meet the data management requirements from small and medium sized businesses to large global enterprises. These include the latest generation of the world's most popular database, Oracle Database 18c.

Oracle Database

Oracle Database 18c

Learn About Oracle Database

Get Started

What's New

Tutorials

Oracle Live SQL

Topics

Install and Upgrade

Administration

Development

Security

Performance

Clustering

High Availability

Data Warehousing

Spatial and Graph

Distributed Data

META7TM



55

Oracle Technology Network - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Oracle Technology Network X +

www.oracle.com/technetwork/index.html

Search

DuckDuckGo Google meta7 humor news oracle scitech Headlines

ORACLE

Sign In/Register Help Country Communities I am a... I want to...

Search

Products Solutions Downloads Store Support Training Partners About OTN

Popular Downloads

Java for Developers
Java for Your Computer
Java SE
Solaris
MySQL
Oracle Fusion
Middleware 11g
Oracle Database
Prebuilt Developer VMs

Database

Oracle Database
Oracle Database 11g Express
Edition
MySQL
Oracle Berkeley DB
Oracle Instant Client
Oracle Application Express
See All...

Middleware

Oracle Fusion Middleware
(including Oracle WebLogic Server)
Oracle JRockit
Oracle SOA Suite
See All...

Enterprise Management

Oracle Enterpris
Oracle Applicati
See All...

Server and St

Solaris
Linux and Oracle
Firmware
See All...

Developer Tools

Applications

Overview Downloads Documentation Learn More Community

Oracle Database Software Downloads

You must accept the [OTN License Agreement](#) to download this software.
☐ Accept License Agreement | ☐ Decline License Agreement

Oracle Database 12c Release 2

(12.2.0.1.0) - Standard Edition 2 and Enterprise Edition

Microsoft Windows x64 (64-bit)

File 1 (2.8 GB) See All

Linux x86-64

File 1 (3.2 GB) See All

Oracle Solaris (SPARC systems, 64-bit)

File 1 (3.1 GB) See All

Oracle Solaris (x86 systems, 64-bit)

File 1 (2.8 GB) See All



Download from edelivery (1:3)

ORACLE CLOUD

FAQ damorgan12c@gmail.com English [Sign Out](#)

Oracle Software Delivery Cloud

New to the site? Take a [tour](#)

Need Help? [Contact Software Delivery Customer Service](#)
New! "Provide Feedback"

To add items to your Selected Software cart, choose a Category by which you would like to search. Then, type in the term and either pick the software title from the drop down results or click the Search button to pick from expanded results. Alternately, you may select one of our most Popular Downloads, available below.

Once you begin searching, additional filters will appear to refine your search. In most cases, your search results will return both Releases (**REL** - a specific set of functionality) and Download Packages (**DLP** - a collection of related Releases).

After you have made your selection, the software title will immediately be placed into your Selected Software cart where you can assign a platform.

All Categories

database enterprise edition

Oracle Database Enterprise Edition

Oracle NoSQL Database Enterprise Edition

Oracle Database 12c Enterprise Edition

Enterprise Manager for MySQL Database

JD Edwards EnterpriseOne Database

MySQL Enterprise Edition

MySQL Enterprise Edition Subscription (1-4 socket server) - Oracle 1-Click Or

MySQL Enterprise Edition Subscription (5+ socket server) - Oracle 1-Click Or

MySQL Enterprise Edition Subscription - Oracle 1-Click Ordering

Oracle Argus Enterprise Edition

Oracle Argus Safety Japan (Enterprise Edition)

Oracle Business Intelligence Enterprise Edition

Oracle Business Intelligence Enterprise Edition Documentation Media Library

Search

Clear

Popular Downloads

<https://edelivery.oracle.com>

Downloads from edelivery (2:3)

ORACLE[®] CLOUD

FAQ damorgan12c@gmail.com English Sign Out

Oracle Software Delivery Cloud

New to the site? Take a [tour](#)

Need Help? Contact Software Delivery Customer Service
New! **"Provide Feedback"**

To add items to your Selected Software cart, choose a Category by which you would like to search. Then, type in the term and either pick the software title from the drop down results or click the Search button to pick from expanded results. Alternately, you may select one of our most Popular Downloads, available below.

Once you begin searching, additional filters will appear to refine your search. In most cases, your search results will return both Releases (**REL** - a specific set of functionality) and Download Packages (**DLP** - a collection of related Releases).

After you have made your selection, the software title will immediately be placed into your Selected Software cart where you can assign a platform.

All Categories

Oracle Database Enterprise Edition

Search

Clear

Popular Downloads

All

Commercial

Linux/VM

1-Click

Courseware

Documentation

DLP: Oracle Database Enterprise Edition 18.0.0.0.0 (Oracle Database Enterprise Edition)

DLP: Oracle Database 12c Enterprise Edition 12.2.0.1.0 (Oracle Database Enterprise Edition)

DLP: Oracle Database 12c Enterprise Edition 12.1.0.2.0 (Oracle Database Enterprise Edition)

DLP: Oracle Database 12c Enterprise Edition 12.1.0.1.0 (Oracle Database Enterprise Edition)

DLP: Oracle NoSQL Database Enterprise Edition 12.2.4.5.0

DLP: Oracle NoSQL Database Enterprise Edition 12.1.4.4.0

DLP: Oracle NoSQL Database Enterprise Edition 12.1.4.3.0

DLP: Oracle NoSQL Database Enterprise Edition 12.1.4.2.0

DLP: Oracle NoSQL Database Enterprise Edition 12.1.3.5.2

DLP: Oracle NoSQL Database Enterprise Edition 12.1.3.4.7

DLP: MySQL Enterprise Edition Subscription - Oracle 1-Click Ordering 0.0.0.0.0

DLP: Oracle Argus Enterprise Edition 8.1.0.0.0

DLP: Oracle Argus Enterprise Edition 8.0.0.0.0

DLP: Oracle Argus Enterprise Edition 7.0.2.0.0

DLP: Oracle Business Intelligence Suite Enterprise Edition for Oracle Applications 11.1.1.9.0

DLP: Oracle Database 11g Personal Edition 11.2.0.1.0

DLP: Oracle Database 11g Standard Edition One 11.2.0.2.0

DLP: Oracle Database 11g Standard Edition One 11.2.0.1.0

DLP: Oracle Database 11g Standard Edition One 11.2.0.1.0

DLP: Oracle Database 12c Personal Edition

https://edelivery.oracle.com



Downloads from edelivery (3:3)

ORACLE[®]CLOUD

FAQ damorgan12c@gmail.com English Sign Out

Oracle Software Delivery Cloud

New to the site? Take a [tour](#)

Need Help? Contact Software Delivery Customer Service
New! ***Provide Feedback***

To continue, select the Platform/Language for each individual Release. To remove an item from the Selected Software Cart, please uncheck the box next to the title. Language Supplement Releases are optional; to include it where applicable, check the box next to the Release title and select your desired Language.

Back

Remove All

Continue

☒ Selected Software	Terms and Restrictions	Platforms / Languages	Size
☒ Oracle Database Enterprise Edition 18.0.0.0.0 	Oracle Standard Terms and Restrictions		
☒ Oracle Database Global Service Manager (Exadata Only) 18.0.0.0.0		Linux x86-64 ▼	932.0 MB
☒ Oracle Database Client (Exadata Only) 18.0.0.0.0		Linux x86-64 ▼	1.3 GB
☒ Oracle Database (Exadata Only) 18.0.0.0.0		Linux x86-64 ▼	3.5 GB
☒ Oracle Database Grid Infrastructure (Exadata Only) 18.0.0.0.0		Linux x86-64 ▼	3.3 GB

Back

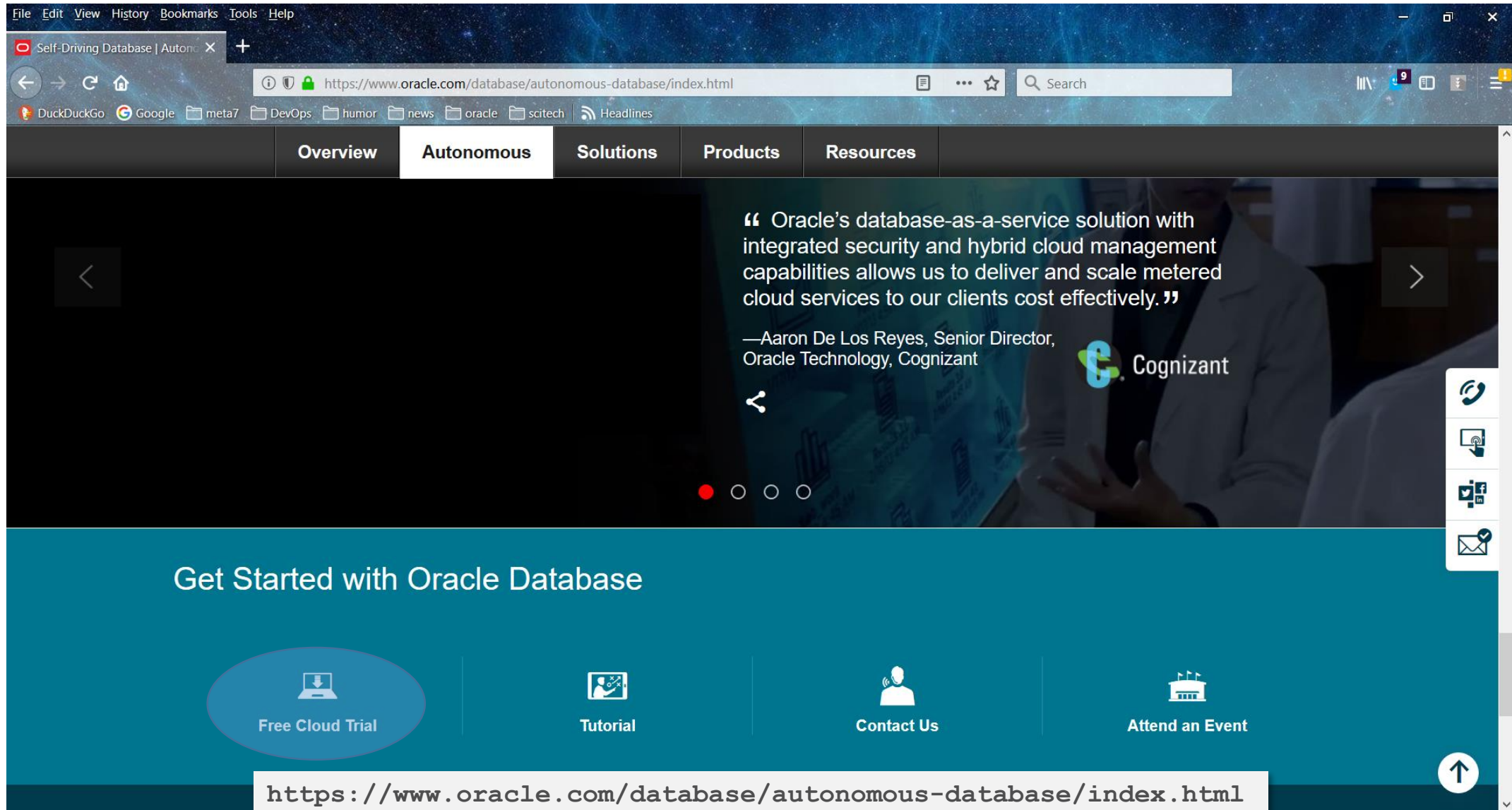
Remove All

Continue

<https://edelivery.oracle.com>



Deploy in the Cloud



The screenshot shows a web browser window displaying the Oracle Autonomous Database website. The browser's address bar shows the URL `https://www.oracle.com/database/autonomous-database/index.html`. The website has a dark header with navigation links: Overview, Autonomous (selected), Solutions, Products, and Resources. Below the header is a large hero section with a background image of a person in a white lab coat. The hero section contains a quote: "Oracle's database-as-a-service solution with integrated security and hybrid cloud management capabilities allows us to deliver and scale metered cloud services to our clients cost effectively." attributed to Aaron De Los Reyes, Senior Director, Oracle Technology, Cognizant. Below the quote is a Cognizant logo. At the bottom of the hero section is a teal bar with the text "Get Started with Oracle Database" and four buttons: "Free Cloud Trial" (circled in red), "Tutorial", "Contact Us", and "Attend an Event". A URL bar at the bottom of the screenshot shows the same URL as the browser's address bar.

File Edit View History Bookmarks Tools Help

Self-Driving Database | Autonom

https://www.oracle.com/database/autonomous-database/index.html

Overview Autonomous Solutions Products Resources

“ Oracle’s database-as-a-service solution with integrated security and hybrid cloud management capabilities allows us to deliver and scale metered cloud services to our clients cost effectively. ”

—Aaron De Los Reyes, Senior Director, Oracle Technology, Cognizant

Cognizant

Get Started with Oracle Database

Free Cloud Trial Tutorial Contact Us Attend an Event

`https://www.oracle.com/database/autonomous-database/index.html`

*

ERROR at line 1:

ORA-00028: your session has been killed

Thank You

