

# 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](http://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
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## 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.

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### 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




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### 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](#)



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5

ForbesBrandVoice® [What is this?](#)

JAN 15, 2018 @ 05:00 AM 20,020

## 3 Essential DBA Career Priorities For 2018



**OracleVoice**

*Simplify IT, Drive Innovation* [FULL BIO](#) ✓



Jeff Erickson, Oracle

Many database administrators (DBAs) will go into 2018 wondering if “self-driving” databases will weaken their career prospects. More likely, 2018 will be a year that database technology leaps forward and these valuable data experts take on other, more important responsibilities.

“History is repeating itself,” says longtime DBA Dan Morgan, founder of [Morgan’s Library](#) and principal adviser at tech firm Meta7. Morgan has seen the DBA role evolve amid a long series of technical advances in storage, management, and performance. And each advance asked DBAs to adjust the way they work.



# Meta7 is a Division of Sirius



- Sirius acquired Forsythe Nov 1, 2017
- Combined we are a \$3.5B consultancy and VAR
- World's largest IBM integrator
- Second largest security integrator in North America
- Our focus areas
  - Silicon up through Data Integration
  - Stability
  - Security
  - Scalability



# 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 9 months
- `./runInstaller` is altered to improve Cloud compatibility
- Oracle is moving toward deprecating SYSDBA
  - We now have privileged 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 to minimize patching outages
- Expect OEM, and other tools, to manage the database through the REST API



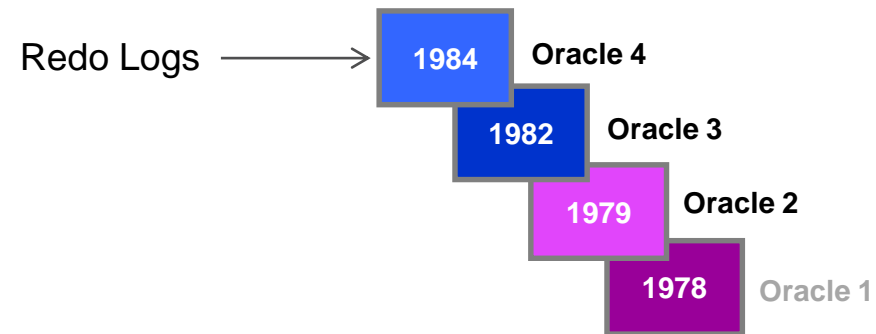




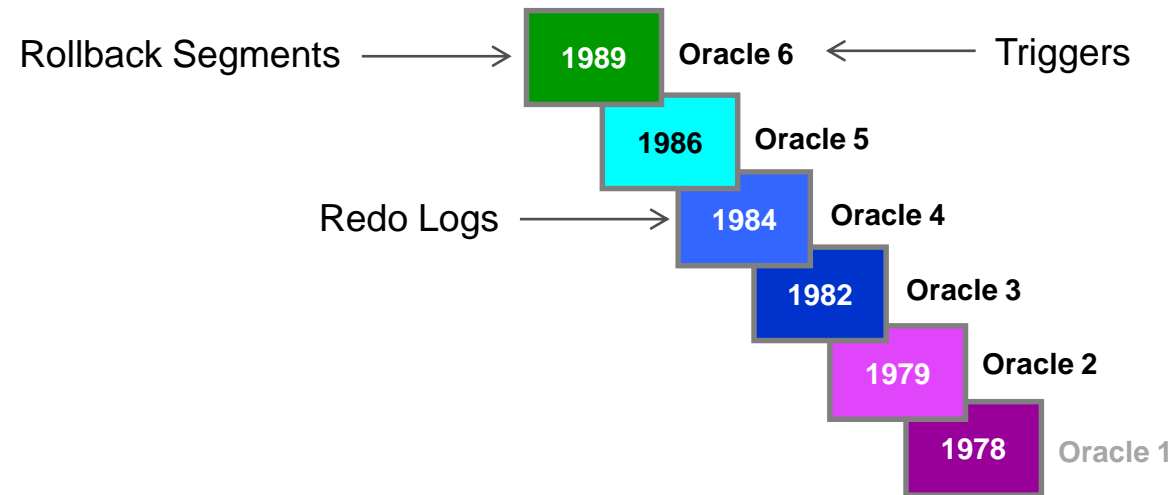
# Introduction to Database 12c



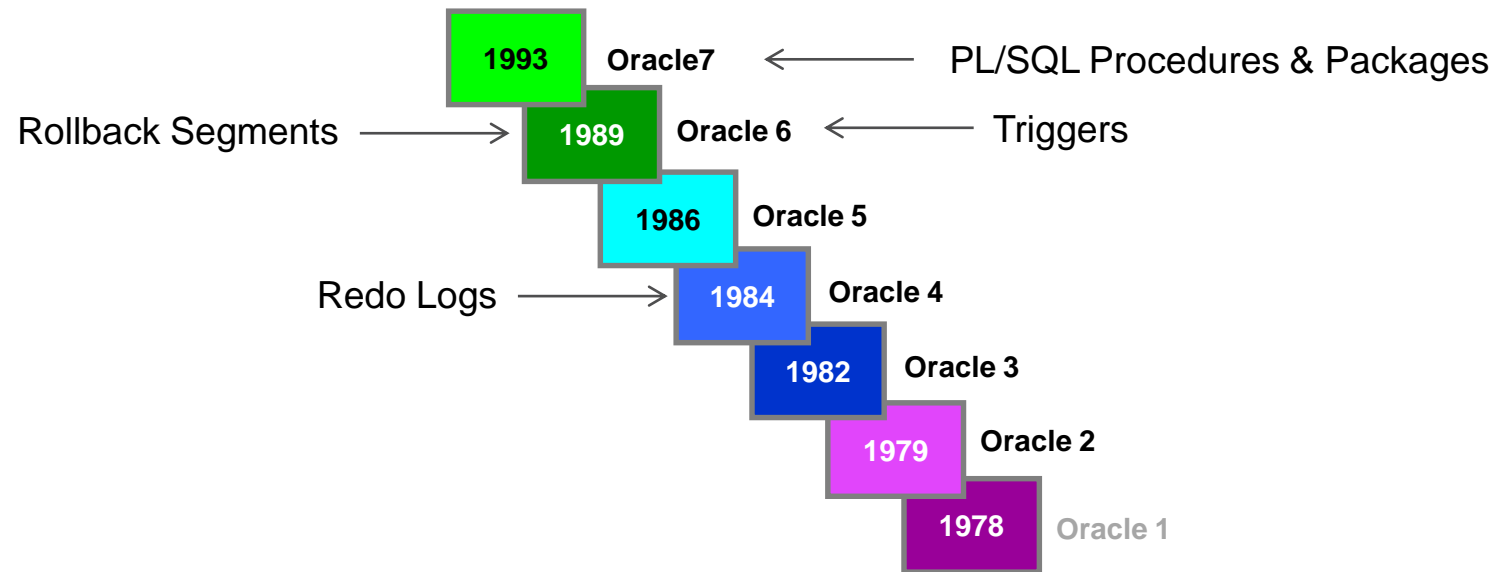
# A Brief History of the Oracle Database



# A Brief History of the Oracle Database

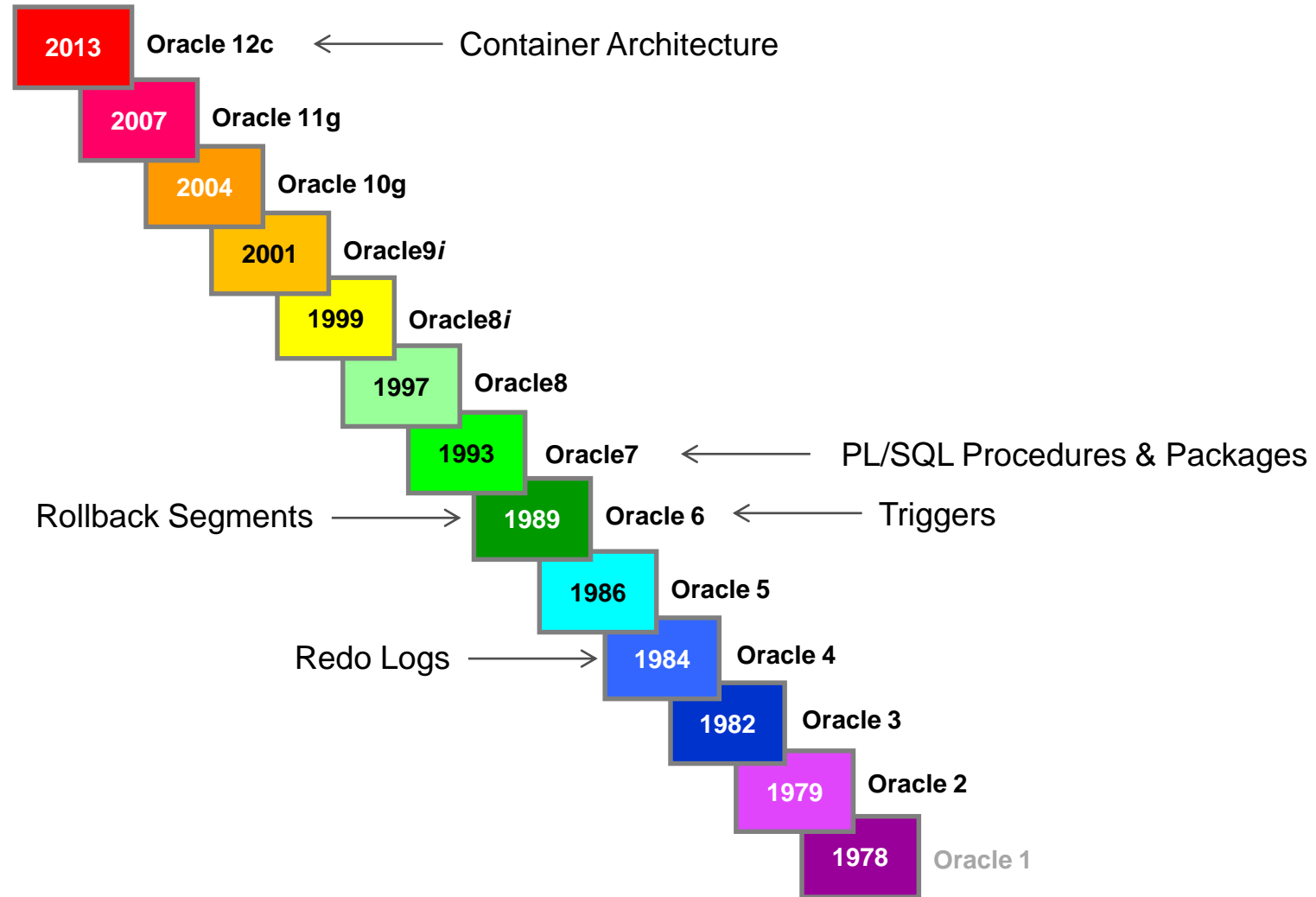


# A Brief History of the Oracle Database

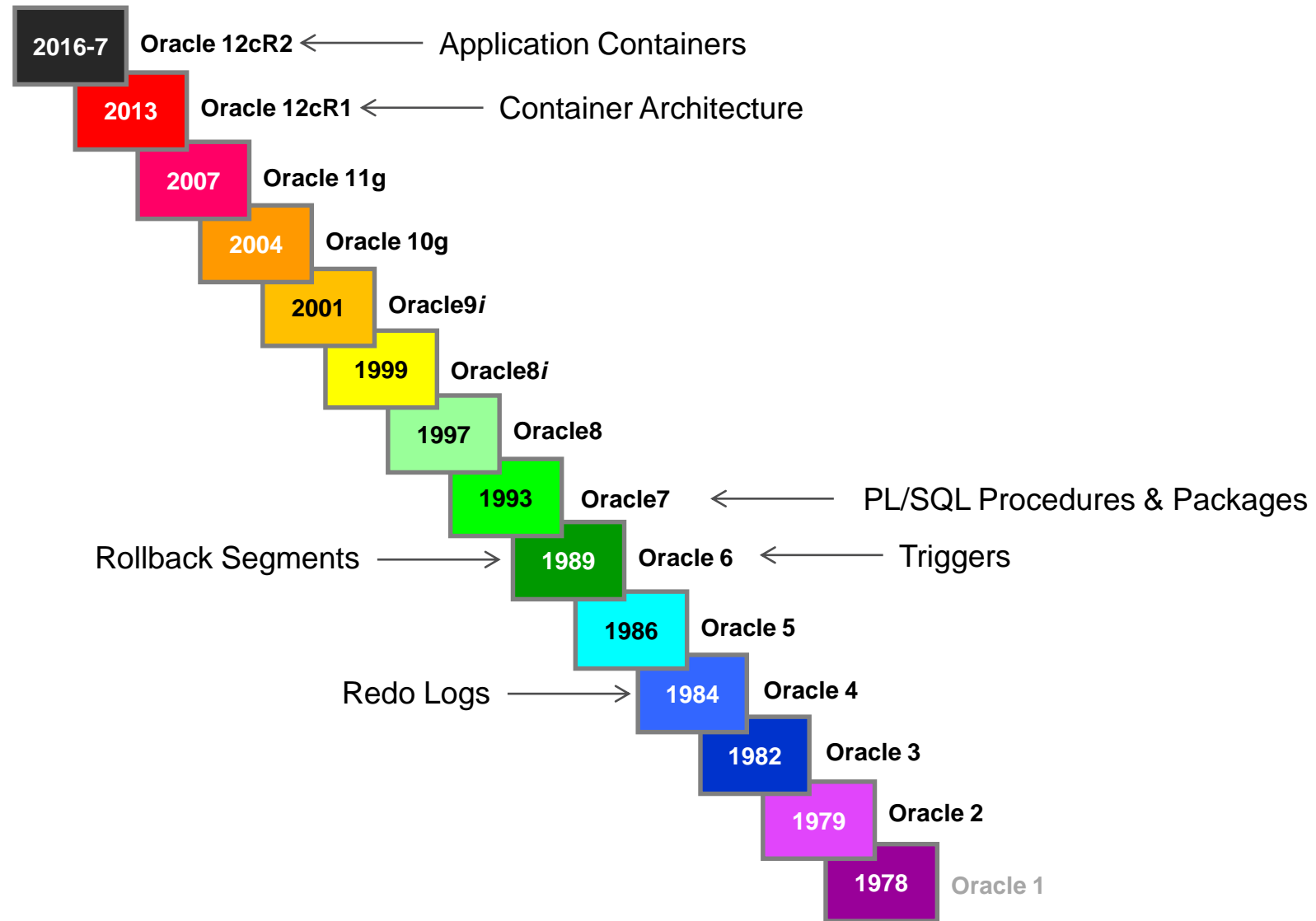




# A Brief History of the Oracle Database

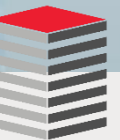


# A Brief History of the Oracle Database

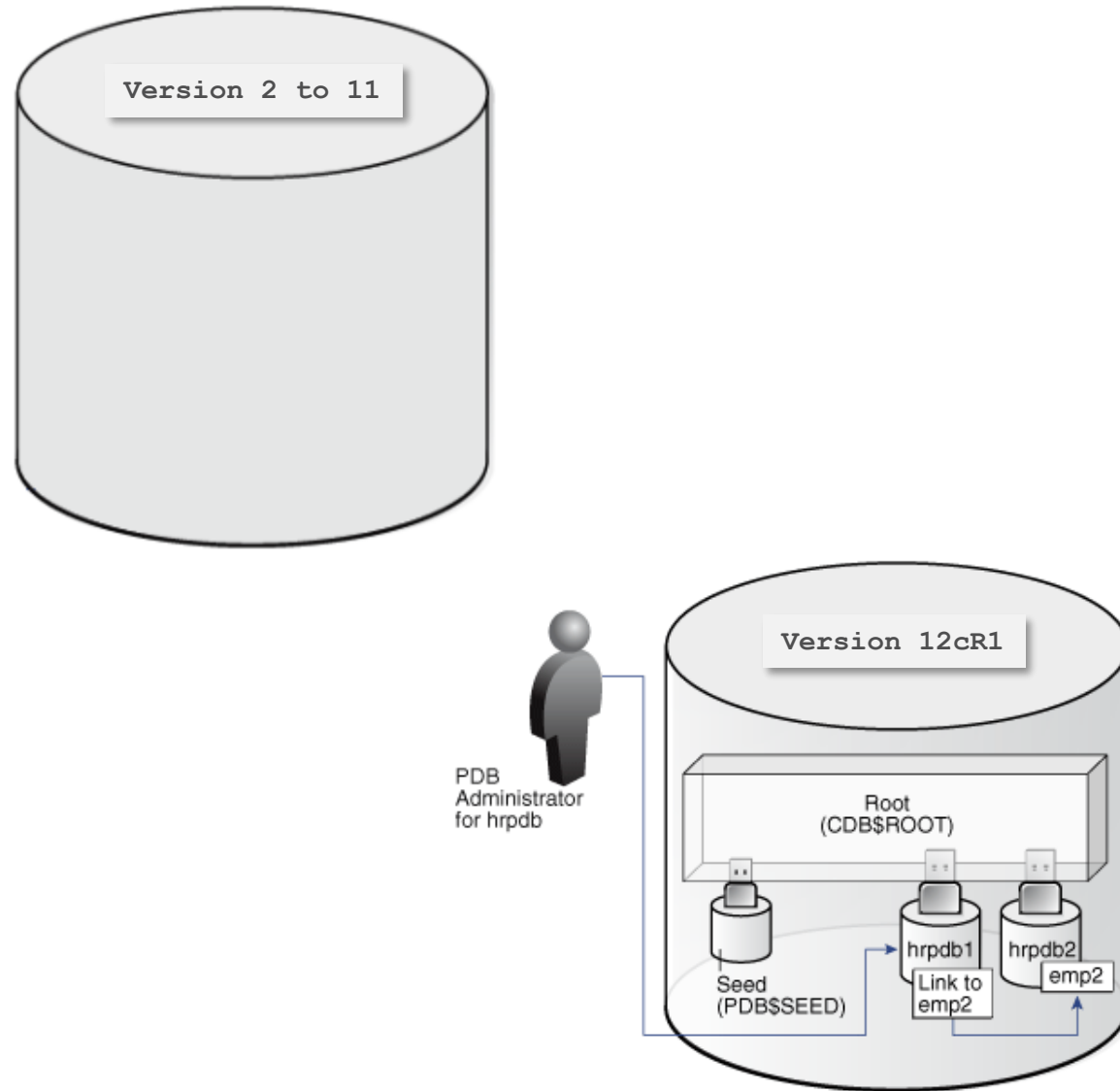




# New Physical Architecture

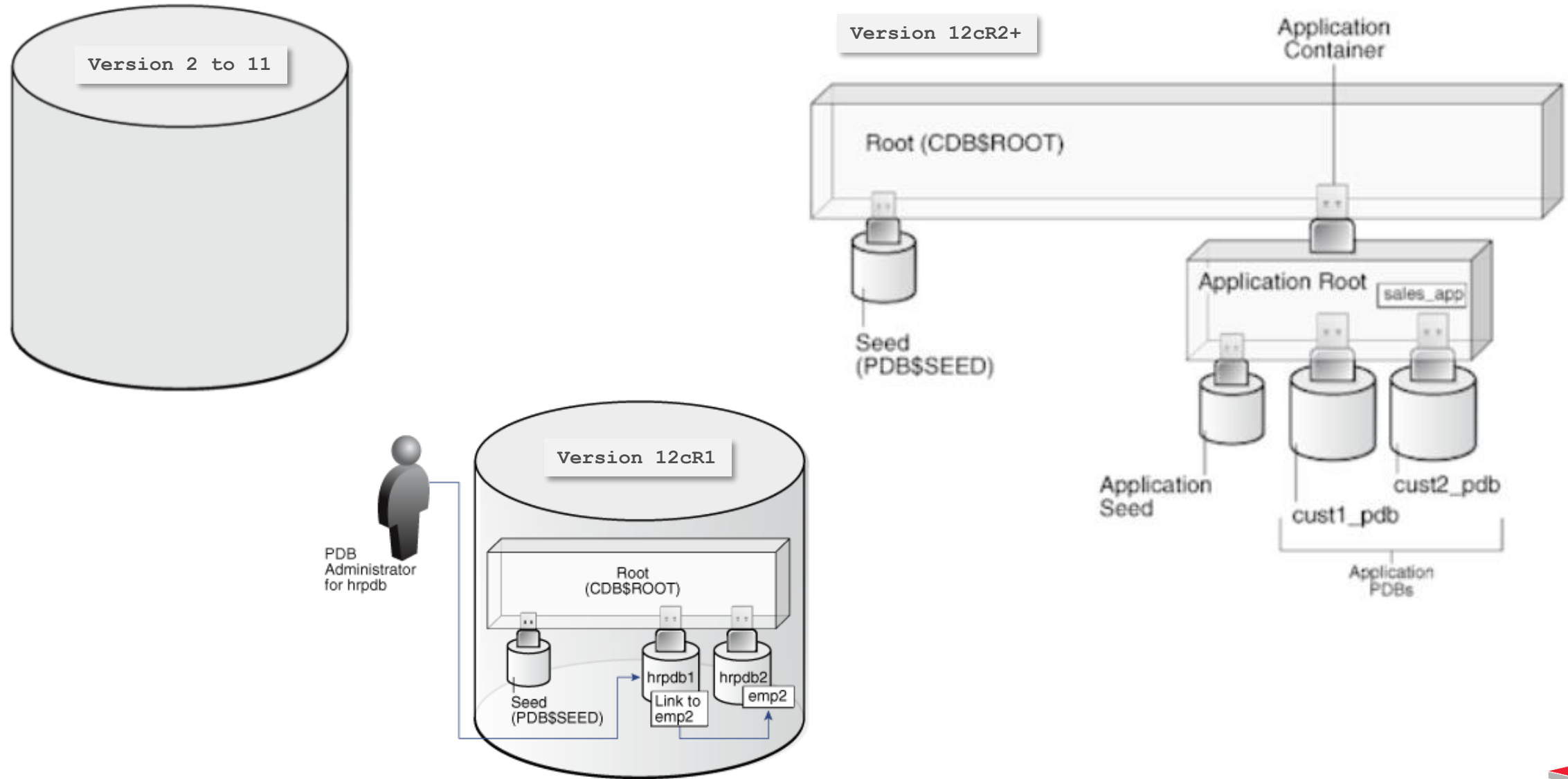


# New 12cR1 Container Database Architecture

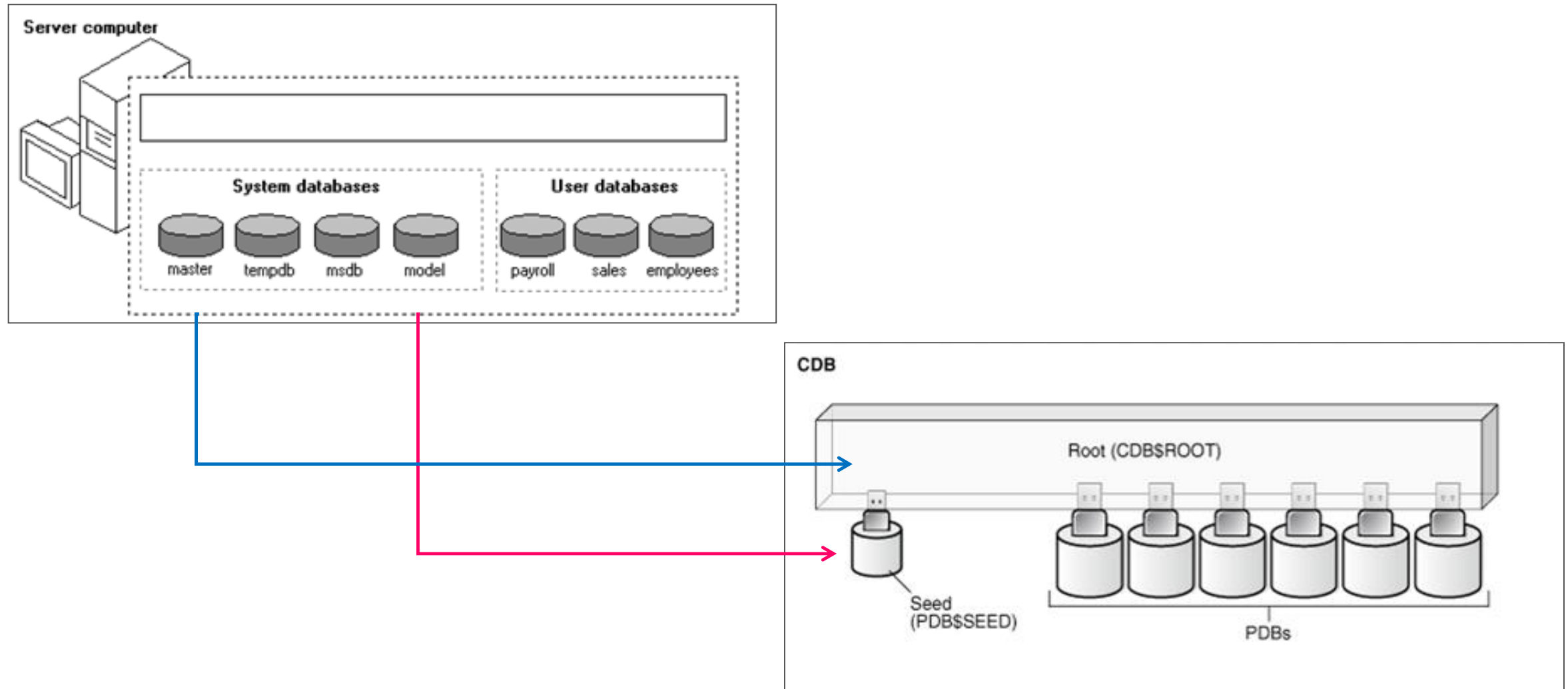




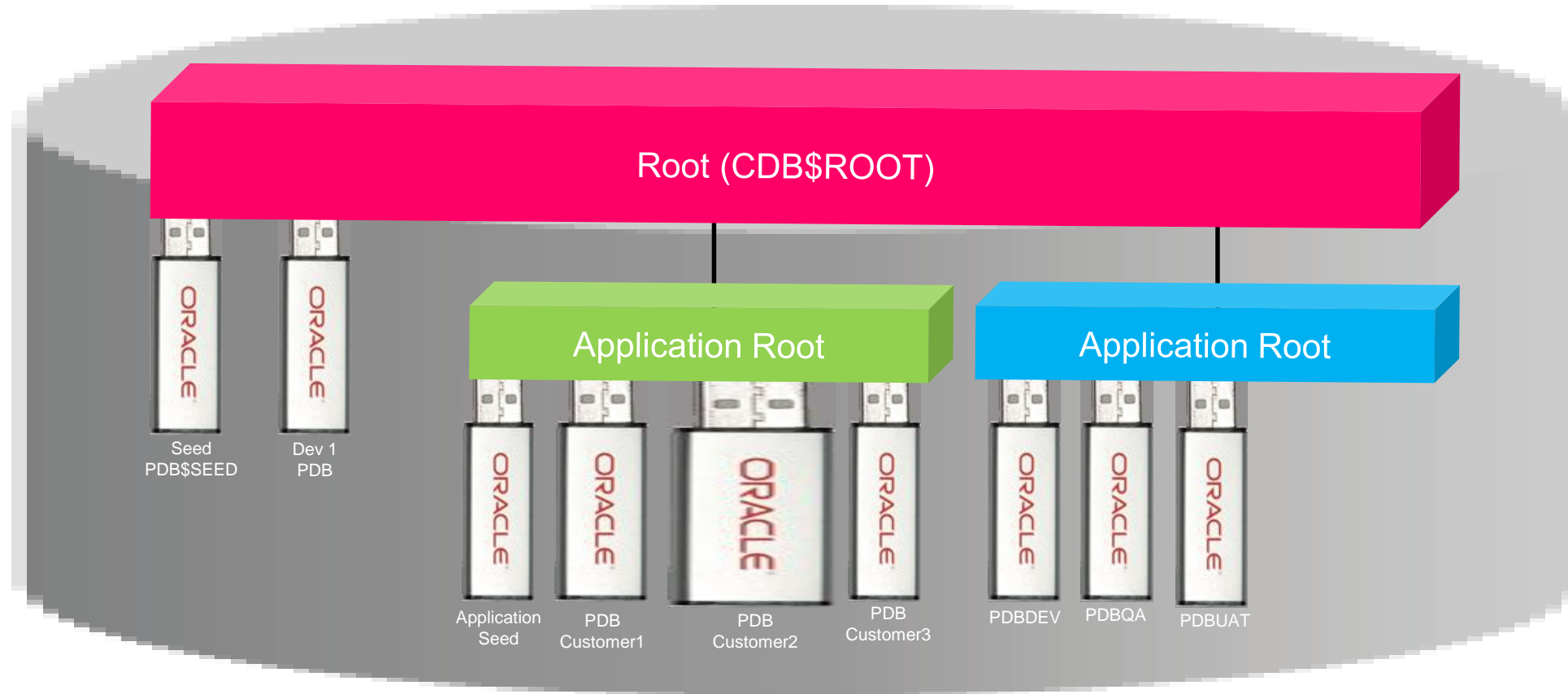
# New 12cR2 Container Database Architecture



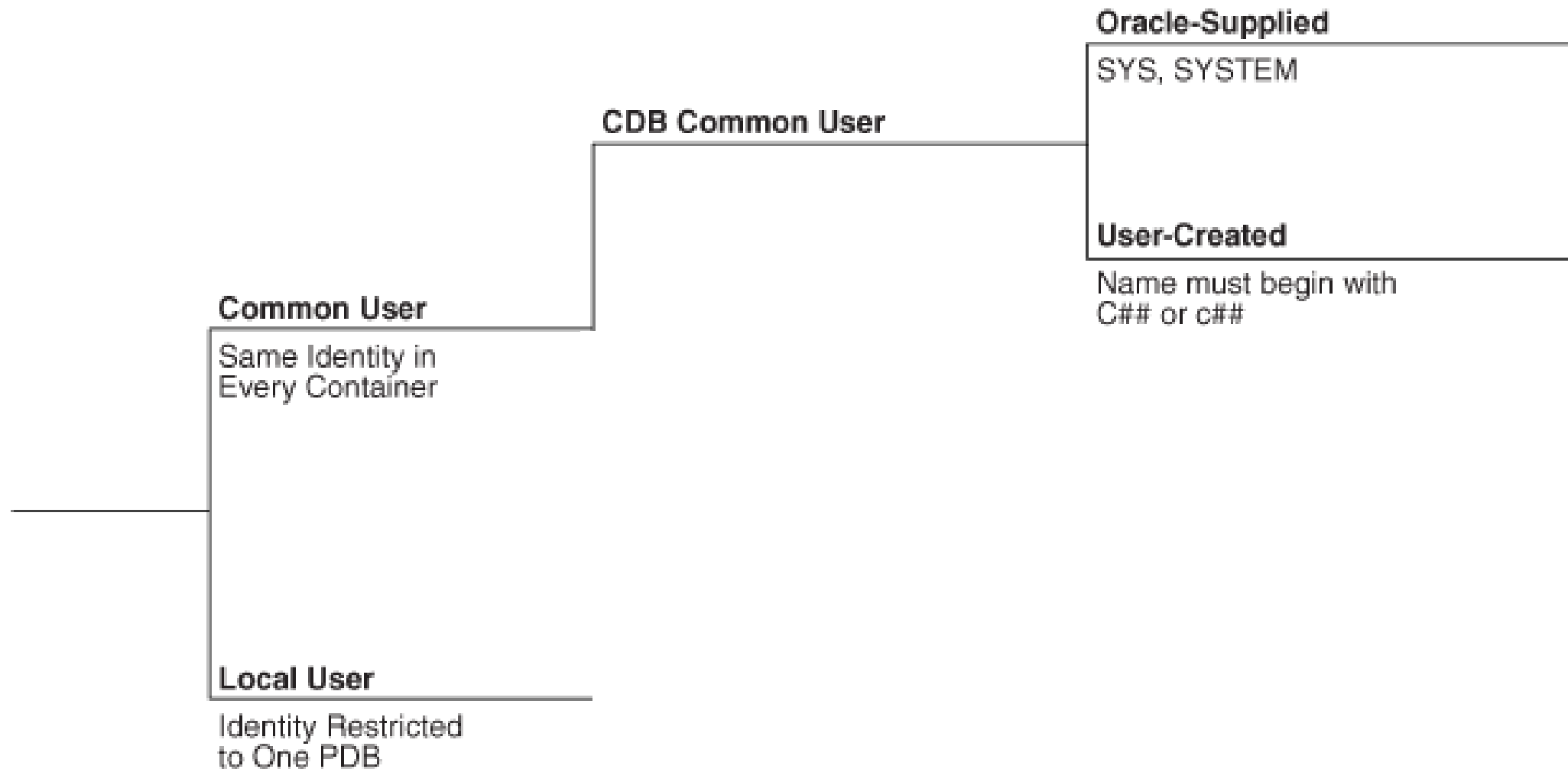
# New 12cR1 Container Database Architecture



# New 12cR2 Container Database Architecture

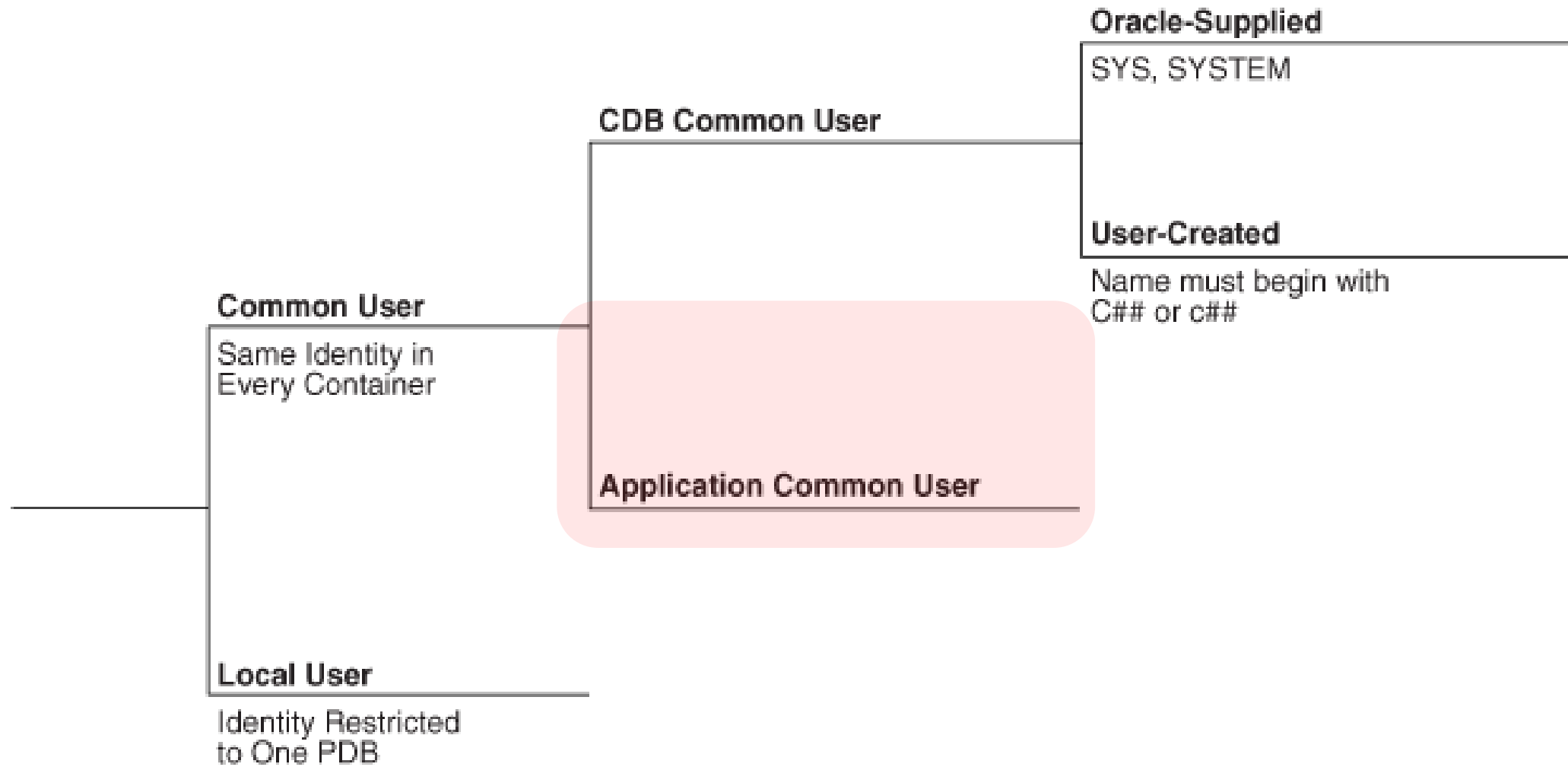


# New 12cR1 Container Database User Architecture





# 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  
DBSFWUSER  
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	<p>This privilege allows the Oracle agent of Oracle Clusterware to perform Oracle Real Application Clusters (Oracle RAC) operations.</p> <p>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.</p>





# 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

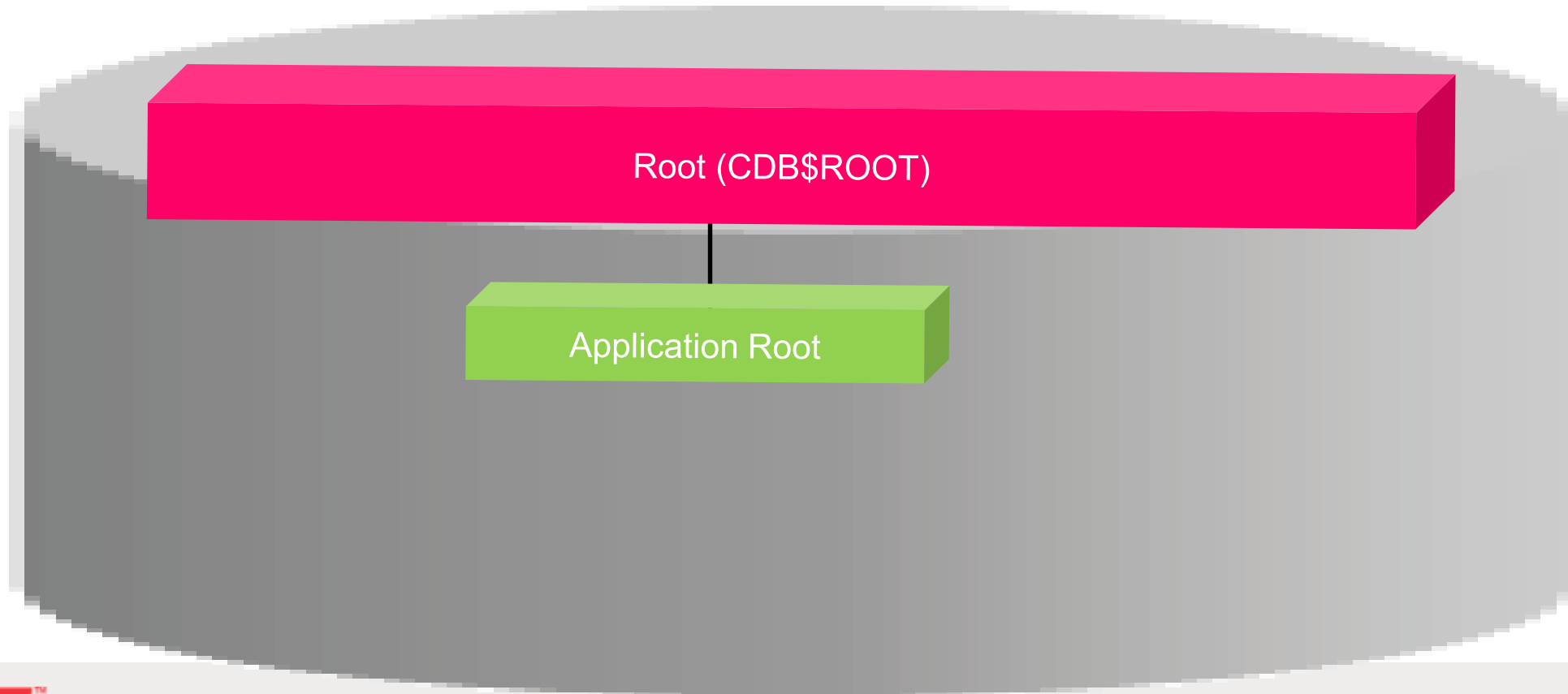
- And each of these solutions requires that
  - Security is provided by application code
  - You abandon any hope of separation of duties
  - You ignore GDPR
  - You perform application patching and maintenance once per customer





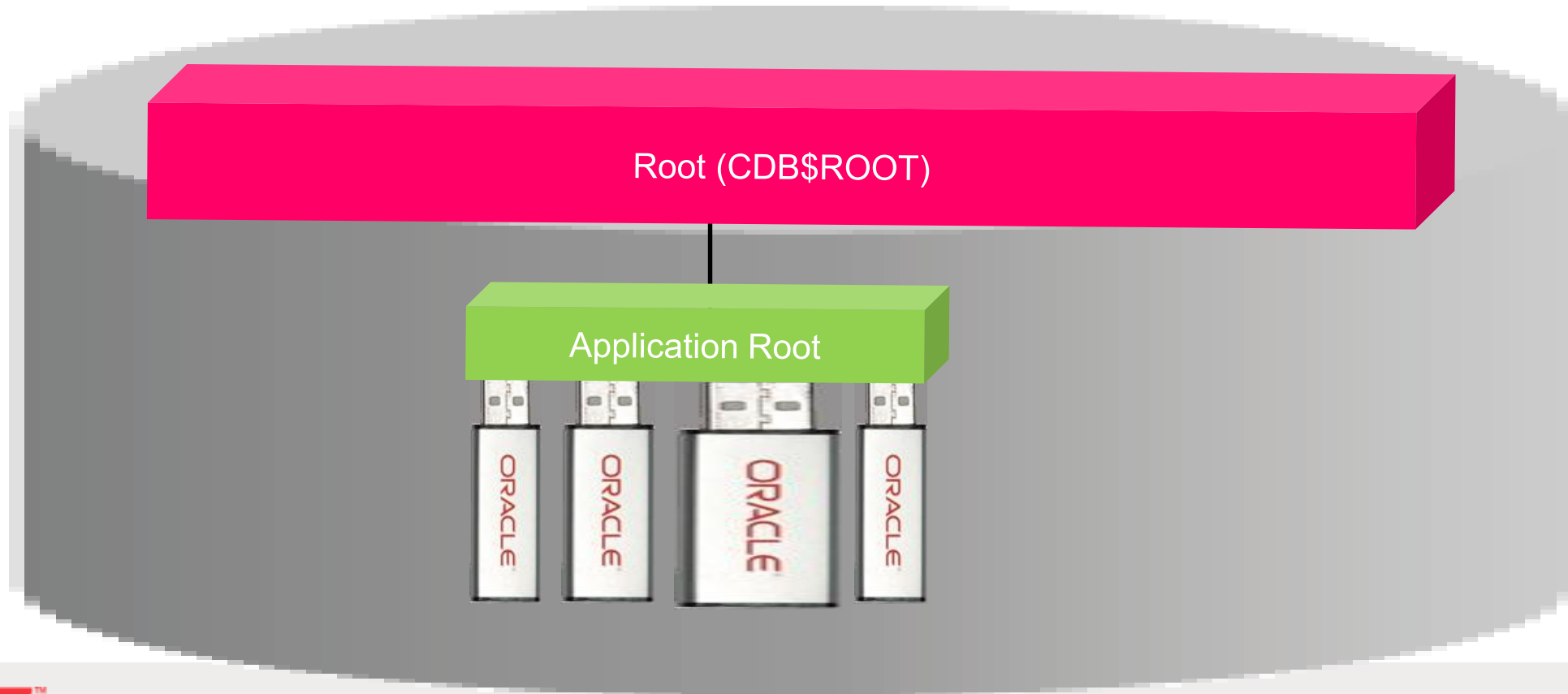
# The Perfect Case for Applications Containers (2:2)

- 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



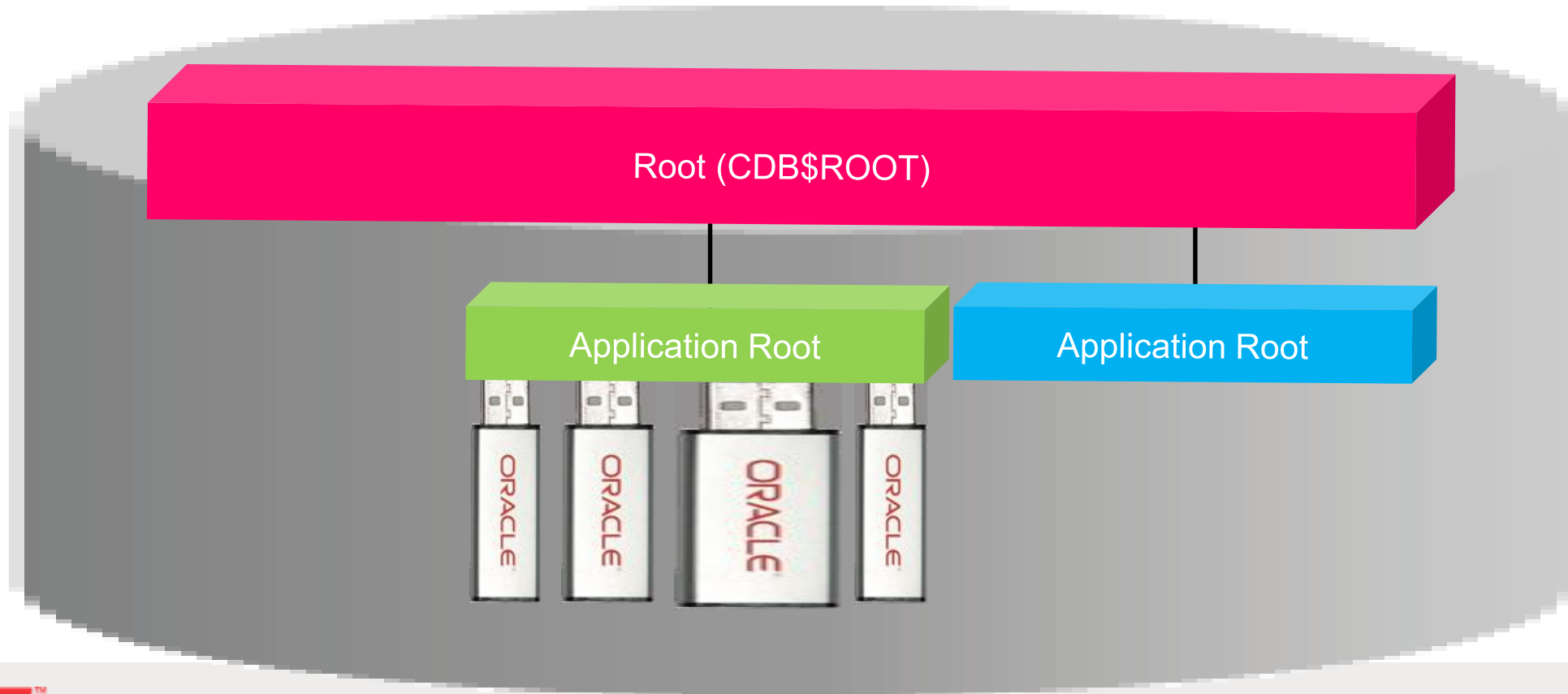
# The Perfect Case for Applications Containers (2:2)

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



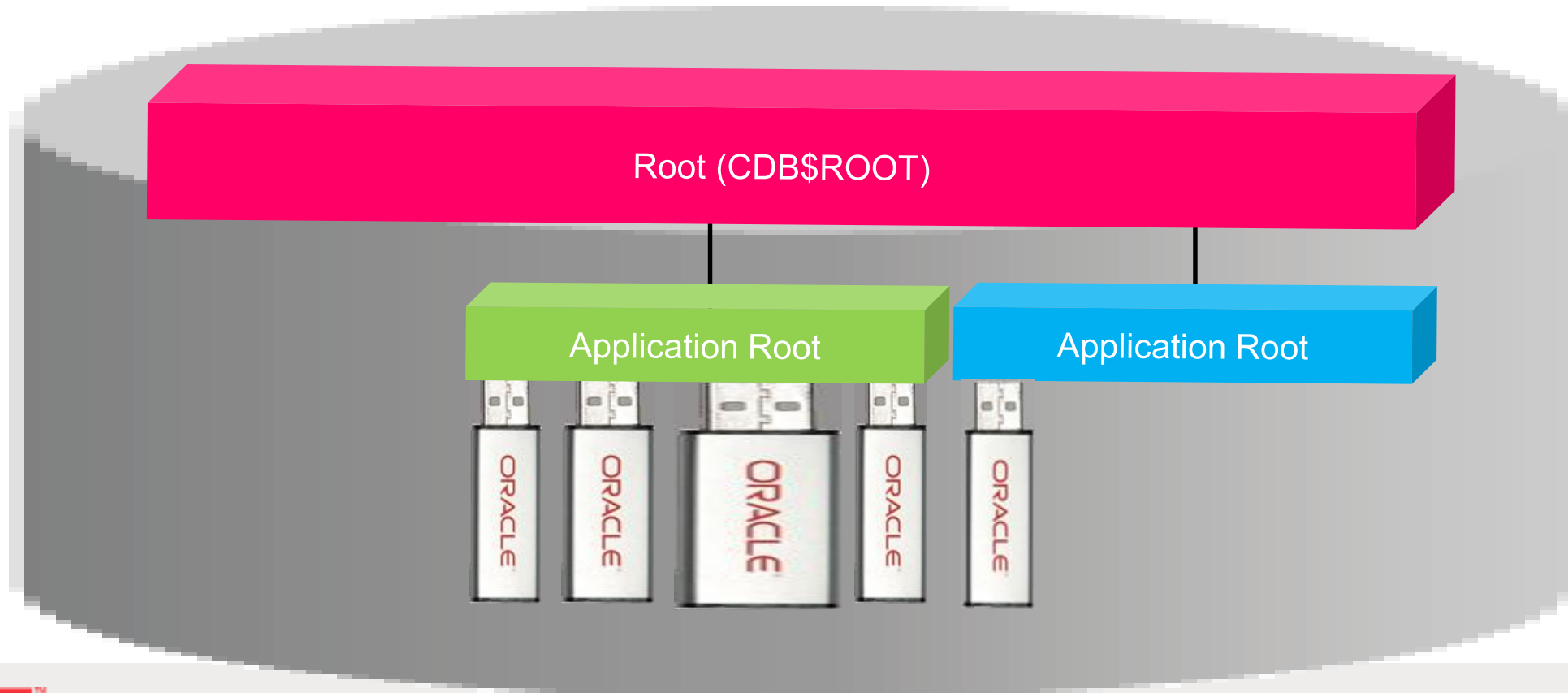
# The Perfect Case for Applications Containers (2:2)

- 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 = (APP_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



# Application Containers Demo 2: Application Installation (1:5)

```
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.



# Application Containers Demo 2: Application Installation (3:5)

```
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;
```



# Application Containers Demo 2: Application Installation (4:5)

```
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.
```





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

```
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 <a href="#">pdb_to_apppdb.sql</a> .





# 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.

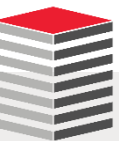
PDBDEV =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = TCP) (HOST = 127.0.0.1) (PORT = 1521))
    )
    (CONNECT_DATA =
      (SERVICE_NAME = pdbdev)
    )
  )

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](http://www.morganslibrary.org/library.html)



The screenshot shows the Oracle Help Center website in a Mozilla Firefox browser window. The address bar displays [docs.oracle.com/en/](https://docs.oracle.com/en/). The page header includes the Oracle logo and the text "Help Center", along with a user greeting "Welcome Daniel" and a "Sign out" link. The main content area features a large heading "How can we help?" followed by a welcome message. To the right, there are tabs for "Search" and "Find a product", with a search input field and a "Search products" button. Below this, four categories are displayed in a grid: Cloud (purple circle with a cloud icon), Applications (blue circle with a mobile device icon), Middleware (red circle with a network icon), and Database (green circle with a server rack icon). Each category has a brief description of the solutions offered.

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A blue arrow pointing from the 'Oracle Database' section header down to the 'Oracle Database 18c' dropdown menu.

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A 3D icon of a stack of books or documents, with a red top and grey sides.

56



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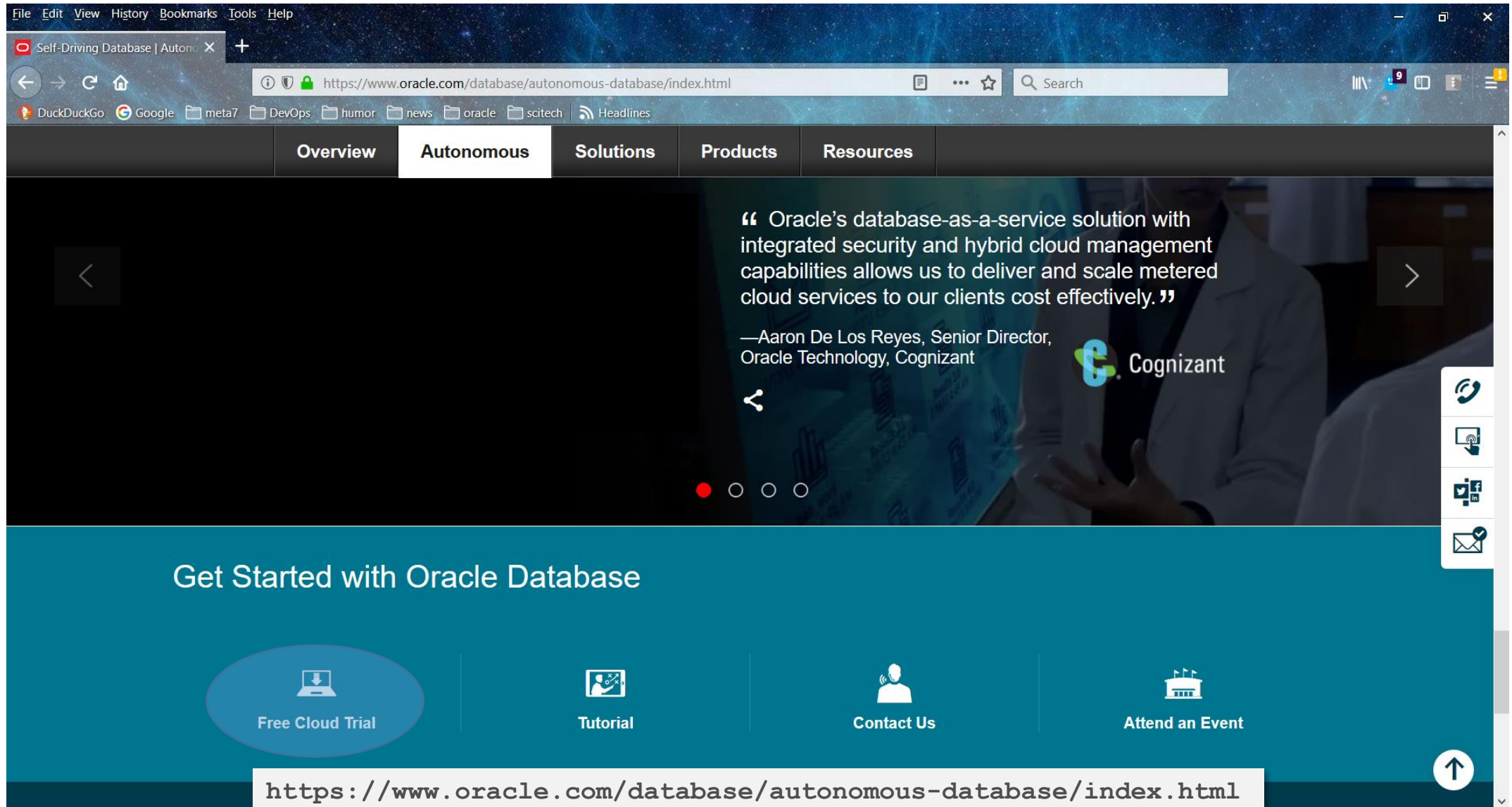
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# Deploy in the Cloud



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\*

ERROR at line 1:

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# Thank You

