Oracle 12c
One Year of Hands-On Later

13 March 2014
Oracle ACE Director
Consultant to Harvard University
University of Washington Oracle Instructor, ret.
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  - Mar 20: Calgary OUG's 25th Anniversary
  - Apr 25: Azerbaijan Oracle Users Group
  - May 28: Serbia Oracle Users Group
  - Jun: Oracle Users Group Finland
12c: The Past
Disclaimer

- This room is an unsafe harbour
- 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

- This discussion is about a Beta and I am going to be very ... VERY ... careful to show you only what has been demonstrated at OpenWorld so as not to violate my NDA

- But what I am going to emphasize is precisely those things you need to know to move forward with your career
The SQL*Plus Prompt

Oracle SQL*Plus

SQL*Plus: Release 10.2.0.2.0 - Production on Sun Nov 11 15:30:58 2012
Copyright (c) 1982, 2005, Oracle. All Rights Reserved.
Enter password: ********

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.0.2 - 64bit Beta
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options

Session altered.

Session altered.

SQL>
CDB

Root (CDB$ROOT) ... RDB

- Seed PDB$SEED
- Dev 1 PDB
- Dev 2 PDB
- Test PDB

Listeners:
- Staging PDB
- Prod PDB
- Listener
Oracle has changed fundamental constructs untouched since version 6.0

What you need to pay attention to

- Container Database (CDB)
- Root Database (RDB)
- Pluggable Database (PDB)
- The DBA role ... I been warning people to stop using it?
- As things stand today you must learn the SYS_CONTEXT function ... you are going to need it to survive
- Take nothing for granted in a CDB
- Throw away tools not certified to 12c
- If you are a DBA with 20+ years experience ... you MUST read the docs: Not doing so is not an option ... unless you want a career change
The balance of this presentation will be unscripted and will not be available in any published form until after the product is released.

And I spent some time making the point that the word "database" has essentially lost all meaning.

- What does "start the database" mean?
- What does "backup the database" mean?
- What does "create a new database" mean?
- What does "the database crashed" mean?
- What does SHUTDOWN abort do?
12c: One Year Later
Should I Deploy a Container DB?

- To create a container DB: Yes or Yes?
  - Separation of duties
  - cron jobs

- To multi-tenant consolidate: Yes or No?
  - Patching requirements
  - Upgrade requirements
  - Backup and restore requirements
  - Security requirements
  - Infrastructure
Consolidation Effects

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 want to allocate space for UNDO?
What is "the" SYSAUX tablespace?

- Networks
- Backups and restores
Current Server Inventory Utilization

- Can we use our current servers?
  or more importantly "should" we use our current servers
  - Pizza Boxes (1U, 2U, 3U)
  - Blades (including UCS)
  - P Series (IBM)
  - Z Series (IBM)
  - T Series (Sun-Oracle)
  - M Series (Sun-Oracle)
  - ODA
  - Exadata
Security and Separation of Duties
Operating System Groups & Enhanced Priv. Users

- **Legacy Operating System**
  - root
  - oinstall
  - dba
  - oper

- **Database**
  - SYS
  - SYSTEM
  - DBA role
Users with Escalated Privileges

```
SQL> select username from dba_users order by 1;
USERNAME
------------------
ANONYMOUS
APEX_040200
APEX_PUBLIC_USER
APPQOSSYS
AUDSYS
CTXSYS
DBSNMP
DIP
DVF
DV_SYS
FL OWS_FILES
GSMADMIN_INTERNAL
GSMCATUSER
GSMUSER
LBACSYS
MDDATA
MDSYS
OJVM SYS
OLAPSYS
ORACLE_OCM
ORDDATA
ORDPLUGINS
ORDSYS
OUTLN
SI_INFORMTN_SCHEMA
SPATIAL_CSW_ADMIN_USR
SPATIAL_WFS_ADMIN_USR
SY C3
SYSBACKUP
SYSGOR
SYSDGC
SYSTEM
WMSYS
XDB
XS$NULL
```
### Roles Enhancing Separation of Duties

```sql
SQL> select * from dba_roles order by 1;
```

<table>
<thead>
<tr>
<th>ROLE</th>
<th>PASSWORD</th>
<th>AUTHENTICAT</th>
<th>COM</th>
<th>O</th>
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<tr>
<td>PROVISIONER</td>
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<td>XS_SESSION_ADMIN</td>
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<td>YES</td>
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</tbody>
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<table>
<thead>
<tr>
<th>PRIVILEGE</th>
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<tbody>
<tr>
<td>ALTER ANY SQL TRANSLATION PROFILE</td>
</tr>
<tr>
<td>CREATE ANY CREDENTIAL</td>
</tr>
<tr>
<td>CREATE ANY SQL TRANSLATION PROFILE</td>
</tr>
<tr>
<td>CREATE CREDENTIAL</td>
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<tr>
<td>CREATE PLUGGABLE DATABASE</td>
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<tr>
<td>CREATE SQL TRANSLATION PROFILE</td>
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<tr>
<td>DROP ANY SQL TRANSLATION PROFILE</td>
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<td>EXEMPT DDL REDACTION POLICY</td>
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<td>EXEMPT DML REDACTION POLICY</td>
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<tr>
<td>REDEFINE ANY TABLE</td>
</tr>
<tr>
<td>SET CONTAINER</td>
</tr>
<tr>
<td>USE ANY SQL TRANSLATION PROFILE</td>
</tr>
</tbody>
</table>
Auditing

- Legacy Auditing

AUDIT CREATE PROCEDURE;
AUDIT TABLE;
AUDIT CREATE TABLE;
AUDIT CREATE TRIGGER;
AUDIT CREATE VIEW;

- Unified Audit Policies

CREATE AUDIT POLICY uw_full_clause
PRIVILEGES ALTER ANY TABLE
ACTIONS LOGOFF ROLES DBA
WHEN 'SYS_CONTEXT(''USERENV'', ''ISDBA'') = ''TRUE'''
EVALUATE PER STATEMENT
CONTAINER = ALL;
### Credentials

- **DBMS_CREDENTIAL**

  Interface for authenticating and impersonating EXTPROC callout functions, as well as external jobs, remote jobs and file watchers from the SCHEDULER.

```sql
DECLARE
  cname user_credentials.credential_name%TYPE := 'UWCRED';
  uname user_credentials.username%TYPE := 'UWCLASS';
  pwd sys.scheduler$_credential.password%TYPE := 'ZzYzX6*';
  dbrole VARCHAR2(30) := NULL;
  windom sys.scheduler$_credential.domain%TYPE := NULL;
  comment user_credentials.comments%TYPE := 'Test Cred';
  enable BOOLEAN := FALSE;
BEGIN
  dbms_credential.create_credential(cname, uname, pwd, dbrole, windom, comment, enable);
END;
/```
Network Access Control List Management

- **DBMS_NETWORK_ACL_ADMIN Enhancements**
  - APPEND_HOST_ACE
  - APPEND_HOST_ACL
  - APPEND_WALLET_ACE
  - APPEND_WALLET_ACL
  - REMOVE_HOST_ACE
  - REMOVE_WALLET_ACE
  - SET_HOST_ACL
  - SET_WALLET_ACL
Network Access Control List Management

- DBMS_NETWORK_ACL_ADMIN Deprecated Objects
  - ADD_PRIVILEGE
  - ASSIGN_ACL
  - ASSIGN_WALLET_ACL
  - CHECK_PRIVILEGE
  - CHECK_PRIVILEGE_Aclid
  - CREATE_ACL
  - DELETE_PRIVILEGE
  - DROP_ACL
  - UNASSIGN_ACL
  - UNASSIGN_WALLET_ACL
Data Dictionary and Basic Objects
Data Dictionary and Basic Objects

- Basics
  - Enhancements to the CREATE USER syntax
  - Enhancements to the CREATE TABLE syntax
  - Column Size Expansion in the Data Dictionary
  - RMAN Single Table Recovery
  - Online Drop Constraint
  - ALTER DATABASE Move Datafile
  - ALTER DATABASE Control File Management
  - ALTER DATABASE Switchover and Failover Clauses
  - New Temporal Validity Concept
Now Let's Talk About What's New

- **SQL**
  - MATCH_RECOGNIZE function for Map Reduce
  - Model Clause extended with new NEXT and PREV functions
  - USING TRUST CONSTRAINTS clause for materialized views and partitions

- **Sequences**
  - Identity Columns where sequences are created implicitly and bound to a table column
  - KEEP and NOKEEP affecting NEXTVAL during replays
  - Session and Global syntax for CREATE and ALTER sequences

- **Materialized Views**
  - New USING TRUSTED CONSTRAINTS clause
Now Let's Talk About What's New

- **Tables**
  - New ON_NULL clause for CREATE AND ALTER TABLE
  - New INVISIBLE clause

- **Indexes**
  - ALTER INDEX COALESCE includes CLEANUP syntax
  - New CASCADE clause
  - New Asynchronous Global Index maintenance clause for partitioned tables

- **PL/SQL**
  - New ACCESSIBLE BY clause
  - New FETCH FIRST clause
  - New PL/SQL Predefined Inquiry Directives
Deprecated
Deprecated Functionality

- Control Data Capture (CDC)
- Data Mining Java API (DBMS_DATA_MINING)
- DBMS_DBLINK built-in package
- Numerous startup parameters
- Resource Role no longer grants UNLIMITED TABLESPACE
- Streams
- Stored Outlines (use Baselines)
- WMSYS CONCAT function
Thank You