

Week 8 Homework 4

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SDEV 350 – Section 7980

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Design and Justification of Design

HW4 Oracle 12c Database was created in AWS and SQL Developer was used to connect/design the database.

This is where I began my design. Inside the admin account I created tablespaces, a user profile for database users, and database users.

Admin user – SDEV350mrieser (for AWS database)

Tablespace creation – *table_audit*

Script:

```
DROP TABLESPACE table_audit INCLUDING CONTENTS;  
CREATE TABLESPACE table_audit  
DATAFILE SIZE 50M;
```

In this script I set the *SIZE* of the tablespaces above to *50M* so that users account created will have enough space inside. I also drop previously created tablespaces as to not cause an error when running the script.

Creation of Tablespaces is needed first before user profiles or users.

Temporary Tablespace creation – *TEMP_usersTable*

Script:

```
--TEMPORARY TABLESPACE CREATED  
DROP TABLESPACE TEMP_usersTable;  
CREATE TEMPORARY TABLESPACE TEMP_usersTable  
TEMPFILE SIZE 50M;
```

In this script I set the *SIZE* of the temporary tablespaces above to *50M* so that users account created within will have enough space inside. I also drop previously created tablespaces as to not cause an error when running the script. I am using temporary tablespace to help speed performance.

Creation of Temporary Tablespaces is needed first before user profiles or users.

User Profile – user_profile

```
--CREATE PROFILE  
DROP PROFILE user_profile CASCADE;  
CREATE PROFILE user_profile  
LIMIT  
    PASSWORD_REUSE_MAX      3  
    PASSWORD_REUSE_TIME    30  
    SESSIONS_PER_USER       2  
    CPU_PER_SESSION        UNLIMITED  
    CPU_PER_CALL           3000  
    CONNECT_TIME            45  
    LOGICAL_READS_PER_SESSION DEFAULT  
    LOGICAL_READS_PER_CALL   1000  
    PRIVATE_SGA              15K  
    COMPOSITE_LIMIT          500000  
    FAILED_LOGIN_ATTEMPTS    3  
    PASSWORD_LIFE_TIME      30  
    PASSWORD_LOCK_TIME      7  
    PASSWORD_GRACE_TIME     10  
    PASSWORD_VERIFY_FUNCTION ora12c_verify_function;
```

Above I am creating a user profile with least privileges to be used as a profile for database users. Creation of a user profile is a quick way to limit user privileges, as you can use a PROFILE for multiple users. Notice that *PASSWORD_VERIFY_FUNCTION* is set to *ora12c_verify_function* this is for password complexity. Also notice that *FAILED_LOGIN_ATTEMPTS* is set to 3 and *PASSWORD_LOCK_TIME* is set to 7 minutes.

Database users – DBA1 (DBA = Database Admin)

Script:

```
-- USER CREATION DBA1  
DROP USER DBA1;
```

```
CREATE USER DBA1 IDENTIFIED BY "Pa$$w0rd"
--PASSWORD EXPIRE
DEFAULT TABLESPACE "TABLE_AUDIT"
TEMPORARY TABLESPACE "TEMP_USERSTABLE"
PROFILE user_profile;
```

The creation of my database users. DBA1 is using tablespaces designed for the users side. Notice that their password is also set to expire after every login. The reason why it is commented out is because they were causing issues when trying to login into each database user. Notice that the user_profile is also being used for DBA1 and tablespace – table_audit.

Roles – Granting permission for Database users to connect, giving them Database privileges, and session privileges.

Script:

```
-- ROLES
GRANT CONNECT, "DBA" TO DBA1;
GRANT CREATE SESSION TO DBA1;
```

Design of DBA1_audit

DBA1_audit holds tables (BidRates2017, BidRates2018, Proposals2017, and Proposals2018) and audit tables (BR2017_audit, BR2018_audit, PP2017_audit, and PP2018_audit), a user profile with limiting privileges, 1 user with privileges to Select, Update, Insert and Delete tables - BidRates2017, BidRates2018, Proposals2017 and Proposals2018.

Dropping all tables – as to not cause errors like table with that name has already been created

Script:

```
--DROPPING TABLES
DROP TABLE BidRates2017;
DROP TABLE BR2017_audit;
```

DROP TRIGGER BidRates2017_audit;

DROP TABLE BidRates2018;

DROP TABLE BR2018_audit;

DROP TRIGGER BidRates2018_audit;

DROP TABLE Proposals2017;

DROP TABLE PP2017_audit;

DROP TRIGGER Proposals2017_audit;

DROP TABLE Proposals2018;

DROP TABLE PP2018_audit;

DROP TRIGGER Proposals2018_audit;

Tables – BidRates2017, BidRates2018, Proposals2017, and Proposals2018

Script:

-- CREATION OF TABLES

Create TABLE BidRates2017 (

br_id int primary key,

bid_id VARCHAR(20)

);

Create TABLE BidRates2018 (

br_id int primary key,

bid_id VARCHAR(20)

);

Create TABLE Proposals2017 (

p_id int primary key,

proposal_id VARCHAR(20)

```
);

Create TABLE Proposals2018 (
    p_id int primary key,
    proposal_id VARCHAR(20)
);
```

I went by the guide lines on tables. The parameters of each table are the only things that I designed. I gave each table an primary id and id (BidRate tables get a bid_id and Proposal tables get a proposal_id) parameters to act as it were in a real-life scenario.

Audit Tables – BR2017_audit, BR2018_audit, PP2017_audit, and PP2018_audit

Script:

```
-- CREATION OF AUDIT TABLES
```

```
CREATE TABLE BR2017_audit(
    new_id varchar (30),
    old_id varchar (30),
    user_name varchar (30),
    entry_date varchar (30),
    operation varchar (30)
);
```

```
CREATE TABLE BR2018_audit(
    new_id varchar (30),
    old_id varchar (30),
    user_name varchar (30),
    entry_date varchar (30),
    operation varchar (30)
);
```

```
CREATE TABLE PP2017_audit(
    new_id varchar (30),
    old_id varchar (30),
    user_name varchar (30),
    entry_date varchar (30),
    operation varchar (30)
);
```

```
CREATE TABLE PP2018_audit(
    new_id varchar (30),
    old_id varchar (30),
    user_name varchar (30),
    entry_date varchar (30),
    operation varchar (30)
);
```

The creation of these tables are used to hold the audit logs that are created when a user makes changes (delete, insert, update) to the tables - BidRates2017, BidRates2018, Proposals2017, and Proposals2018. The parameters of each table are used to display the change that occurred, the user that made it, the date they did it and the operation that they used.

User Profile

Script:

```
--CREATE PROFILE
DROP PROFILE user_profile CASCADE;
CREATE PROFILE user_profile
LIMIT
```

```

PASSWORD_REUSE_MAX      3
PASSWORD_REUSE_TIME    30
SESSIONS_PER_USER      2
CPU_PER_SESSION         UNLIMITED
CPU_PER_CALL            3000
CONNECT_TIME             45
LOGICAL_READS_PER_SESSION DEFAULT
LOGICAL_READS_PER_CALL   1000
PRIVATE_SGA              15K
COMPOSITE_LIMIT          500000
FAILED_LOGIN_ATTEMPTS    3
PASSWORD_LIFE_TIME       30
PASSWORD_LOCK_TIME        7
PASSWORD_GRACE_TIME       10
PASSWORD_VERIFY_FUNCTION ora12c_verify_function;

```

Same user profile settings as in the sdev350mrieser account.

Creation of 1 user with privileges to Select, Update, Insert and Delete to BidRates2017, BidRates2018, Proposals2017, and Proposals2018

Script:

```

--CREATION OF AUDIT TRIGGERS FOR BidRates2017 TABLE
CREATE OR REPLACE TRIGGER BidRates2017_audit
BEFORE INSERT OR DELETE OR UPDATE ON BidRates2017
FOR EACH ROW
ENABLE
DECLARE
  v_user VARCHAR(30);

```

```

v_date VARCHAR(30);

BEGIN

SELECT USER,to_char(sysdate, 'DD/MON/YYYY HH24:MI:SS') INTO v_user, v_date from
dual;

IF INSERTING THEN

  INSERT INTO BR2017_audit(new_id,old_id, user_name, entry_date, operation)
  VALUES (:NEW.bid_id, NULL, v_user, v_date, 'INSERT');

ELSIF DELETING THEN

  INSERT INTO BR2017_audit(new_id, old_id, user_name, entry_date, operation)
  VALUES (NULL, :OLD.bid_id, v_user, v_date, 'Delete');

ELSIF UPDATING THEN

  INSERT INTO BR2017_audit(new_id, old_id, user_name, entry_date, operation)
  VALUES (:NEW.bid_id, :OLD.bid_id, v_user, v_date, 'Update');

END IF;

END;

```

```

--CREATION OF AUDIT TRIGGERS FOR BidRates2018 TABLE

CREATE OR REPLACE TRIGGER BidRates2018_audit
BEFORE INSERT OR DELETE OR UPDATE ON BidRates2018
FOR EACH ROW
ENABLE
DECLARE

  v_user VARCHAR(30);

  v_date VARCHAR(30);

BEGIN

SELECT USER,to_char(sysdate, 'DD/MON/YYYY HH24:MI:SS') INTO v_user, v_date from
dual;

IF INSERTING THEN

  INSERT INTO BR2018_audit(new_id,old_id, user_name, entry_date, operation)

```

```

VALUES (:NEW.bid_id, NULL, v_user, v_date, 'INSERT');

ELSIF DELETING THEN

  INSERT INTO BR2018_audit(new_id, old_id, user_name, entry_date, operation)
  VALUES (NULL, :OLD.bid_id, v_user, v_date, 'Delete');

ELSIF UPDATING THEN

  INSERT INTO BR2018_audit(new_id, old_id, user_name, entry_date, operation)
  VALUES (:NEW.bid_id, :OLD.bid_id, v_user, v_date, 'Update');

END IF;

END;

```

```

--CREATION OF AUDIT TRIGGERS FOR Proposals2017 TABLE

CREATE OR REPLACE TRIGGER Proposals2017_audit
BEFORE INSERT OR DELETE OR UPDATE ON Proposals2017
FOR EACH ROW
ENABLE
DECLARE
  v_user VARCHAR(30);
  v_date VARCHAR(30);

BEGIN
  SELECT USER,to_char(sysdate, 'DD/MON/YYYY HH24:MI:SS') INTO v_user, v_date from
dual;

  IF INSERTING THEN

    INSERT INTO PP2017_audit(new_id,old_id, user_name, entry_date, operation)
    VALUES (:NEW.proposal_id, NULL, v_user, v_date, 'INSERT');

  ELSIF DELETING THEN

    INSERT INTO PP2017_audit(new_id, old_id, user_name, entry_date, operation)
    VALUES (NULL, :OLD.proposal_id, v_user, v_date, 'Delete');

  ELSIF UPDATING THEN

    INSERT INTO PP2017_audit(new_id, old_id, user_name, entry_date, operation)

```

VALUES (:NEW.proposal_id, :OLD.proposal_id, v_user, v_date, 'Update');

END IF;

END;

--CREATION OF AUDIT TRIGGERS FOR Proposals2018 TABLE

CREATE OR REPLACE TRIGGER Proposals2018_audit

BEFORE INSERT OR DELETE OR UPDATE ON Proposals2018

FOR EACH ROW

ENABLE

DECLARE

v_user VARCHAR(30);

v_date VARCHAR(30);

BEGIN

SELECT USER,to_char(sysdate, 'DD/MON/YYYY HH24:MI:SS') INTO v_user, v_date from dual;

IF INSERTING THEN

INSERT INTO PP2018_audit(new_id,old_id, user_name, entry_date, operation)

VALUES (:NEW.proposal_id, NULL, v_user, v_date, 'INSERT');

ELSIF DELETING THEN

INSERT INTO PP2018_audit(new_id, old_id, user_name, entry_date, operation)

VALUES (NULL, :OLD.proposal_id, v_user, v_date, 'Delete');

ELSIF UPDATING THEN

INSERT INTO PP2018_audit(new_id, old_id, user_name, entry_date, operation)

VALUES (:NEW.proposal_id, :OLD.proposal_id, v_user, v_date, 'Update');

END IF;

END;

I created 4 audit triggers (BidRates2017_audit, BidRates2018_audit, Proposals2017_audit, Proposals2018_audit) for tables – BidRates2017, BidRates2018, Proposals2017, and Proposals2018. Each trigger is used to record actions made by a user to bidrates and proposal tables. These actions include deleting, inserting, and updating data. To view any actions a user has made, all you have to do is select from either of the audit tables - BR2017_audit, BR2018_audit, PP2017_audit, and PP2018_audit.

Creation and use of Tablespaces/Temporary Tablespaces

The screenshot shows the Oracle SQL Developer interface. In the top menu bar, the connection is set to 'sdev350mrieser'. The 'Connections' tree on the left shows 'DBA1', 'sdev350mrieser', and 'user1_SUID'. The 'Worksheet' tab is active, displaying a script named 'sdev350mrieser_audit.sql'. The script contains the following SQL code:

```
1 DROP TABLESPACE table_audit INCLUDING CONTENTS;
2 CREATE TABLESPACE table_audit
3  DATAFILE SIZE 50M;
4 .
5 --TEMPORARY TABLESPACE CREATED
6 DROP TABLESPACE TEMP_usersTable;
7 CREATE TEMPORARY TABLESPACE TEMP_usersTable
8  TEMPFILE SIZE 50M;
9 .
10 --CREATE PROFILE
11 DROP PROFILE user_profile CASCADE;
12 CREATE PROFILE user_profile
13  LIMIT
14    PASSWORD_REUSE_MAX            3
15    PASSWORD_REUSE_TIME          30
16    SESSIONS_PER_USER             2
17    CPU_PER_SESSION                UNLIMITED
18    CPU_PER_CALL                  3000
19    CONNECT_TIME                   45
20    LOGICAL_READS_PER_SESSION     DEFAULT
21    LOGICAL_READS_PER_CALL        1000
22    PRIVATE_SGA                    15K
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```

The 'Script Output' pane at the bottom shows the results of the execution:

```
TABLESPACE TABLE_AUDIT dropped.

TABLESPACE TABLE_AUDIT created.

TABLESPACE TEMP_USERSTABLE dropped.

TABLESPACE TEMP_USERSTABLE created.

Profile USER_PROFILE dropped.

Profile USER_PROFILE created.
```

Above – Tablespace Table_audit successfully dropped and created

The screenshot shows the Oracle SQL Developer interface. In the top menu bar, the connection is set to 'sdev350mrieser'. The 'Connections' tree on the left shows 'DBA1', 'sdev350mrieser', and 'user1_SUID'. The 'Worksheet' tab is active, displaying a script named 'sdev350mrieser_audit.sql'. The script contains the following SQL code:

```
1 DROP TABLESPACE table_audit INCLUDING CONTENTS;
2 CREATE TABLESPACE table_audit
3  DATAFILE SIZE 50M;
4 .
5 --TEMPORARY TABLESPACE CREATED
6 DROP TABLESPACE TEMP_usersTable;
7 CREATE TEMPORARY TABLESPACE TEMP_usersTable
8  TEMPFILE SIZE 50M;
9 .
10 --CREATE PROFILE
11 DROP PROFILE user_profile CASCADE;
12 CREATE PROFILE user_profile
13  LIMIT
14    PASSWORD_REUSE_MAX            3
15    PASSWORD_REUSE_TIME          30
16    SESSIONS_PER_USER             2
17    CPU_PER_SESSION                UNLIMITED
18    CPU_PER_CALL                  3000
19    CONNECT_TIME                   45
20    LOGICAL_READS_PER_SESSION     DEFAULT
21    LOGICAL_READS_PER_CALL        1000
22    PRIVATE_SGA                    15K
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```

The 'Script Output' pane at the bottom shows the results of the execution:

```
TABLESPACE TABLE_AUDIT created.

TABLESPACE TEMP_USERSTABLE dropped.

TABLESPACE TEMP_USERSTABLE created.

Profile USER_PROFILE dropped.

Profile USER_PROFILE created.
```

Above – Temporary Tablespace – TEMP_usersTable successfully dropped and created

Oracle SQL Developer : C:\Users\Matt_Rieser\DBA1_audit.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections x DBA1

Reports + New Connection Database Schema Se

DBA1_audit.sql

...sql user1_SUD_audit.sql

Worksheet Query Builder

```

200 --CREATION OF AUDIT TRIGGERS FOR Proposals2018 TABLE
201 CREATE OR REPLACE TRIGGER Proposals2018_audit
202 BEFORE INSERT OR DELETE OR UPDATE ON Proposals2018
203 FOR EACH ROW
204 ENABLE;
205 DECLARE
206   v_user VARCHAR(30);
207   v_date VARCHAR(30);
208 BEGIN
209   SELECT USER,to_char(sysdate, 'DD/MON/YYYY HH24:MI:SS') INTO v_user, v_date from dual;
210 IF INSERTING THEN
211   INSERT INTO P2018_audit(new_id,old_id,user_name,entry_date,operation)
212   VALUES (:NEW.proposal_id, NULL, v_user, v_date, 'INSERT');
213 END IF;

```

Script Output x Query Result x

All Rows Fetched: 12 in 0.105 seconds

OWNER	SEGMENT_NAME	PARTITION_NAME	SEGMENT_TYPE	SEGMENT_SUBTYPE	TABLESPACE_NAME	HEADER_BLOCK	BYTES	BLOCKS	EXTENTS	INITIAL_EXTENT	NEXT_EXTENT
DBA1	SYS_C005553	(null)	INDEX	ASSM	TABLE_AUDIT	8	834	65536	8	1	65536 10485
DBA1	SY5_C005552	(null)	INDEX	ASSM	TABLE_AUDIT	8	818	65536	8	1	65536 10485
DBA1	SY5_C005551	(null)	INDEX	ASSM	TABLE_AUDIT	8	802	65536	8	1	65536 10485
DBA1	SY5_C005550	(null)	INDEX	ASSM	TABLE_AUDIT	8	786	65536	8	1	65536 10485
DBA1	PP2018_AUDIT	(null)	TABLE	ASSM	TABLE_AUDIT	8	666	65536	8	1	65536 10485
DBA1	BIDRATES2017	(null)	TABLE	ASSM	TABLE_AUDIT	8	778	65536	8	1	65536 10485
DBA1	BR2018_AUDIT	(null)	TABLE	ASSM	TABLE_AUDIT	8	850	65536	8	1	65536 10485
DBA1	BR2017_AUDIT	(null)	TABLE	ASSM	TABLE_AUDIT	8	842	65536	8	1	65536 10485
DBA1	PROPOSALS2018	(null)	TABLE	ASSM	TABLE_AUDIT	8	826	65536	8	1	65536 10485
DBA1	PROPOSALS2017	(null)	TABLE	ASSM	TABLE_AUDIT	8	810	65536	8	1	65536 10485
DBA1	BIDRATES2018	(null)	TABLE	ASSM	TABLE_AUDIT	8	794	65536	8	1	65536 10485
DBA1	PP2017_AUDIT	(null)	TABLE	ASSM	TABLE_AUDIT	8	858	65536	8	1	65536 10485

Script Output x Query Result x

Executing:SELECT * FROM DBA.SEGMENTS WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;

ORA-00942: table or view does not exist
Cause:
Action:
Error at Line: 24 Column: 15

Line 227 Column 1 | Insert | Modified | Windows | O

Above – uses the `SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT'`

`ORDER BY bytes DESC;` to display the use of TABLE_AUDIT

The screenshot shows the Oracle SQL Developer interface. The top menu bar includes File, Edit, View, Navigate, Run, Source, Team, Tools, Window, and Help. The title bar indicates the file is 'sdev350mrieser_audit.sql'. The left sidebar shows 'Connections' with entries for DBA1, sdev350mrieser, and user1_SUID. The main area has two tabs: 'sdev350mrieser_audit.sql' and 'user1_SUID_audit.sql'. The 'user1_SUID_audit.sql' tab is active, displaying a script with lines numbered 194 to 227. The script creates a user 'DBA1' with various password and profile settings, grants them DBA privileges, and creates a temporary tablespace 'TEMP_USERSTABLE'. The 'Script Output' tab at the bottom shows the results of the execution, including the creation of the 'TABLESPACE TEMP_USERSTABLE' and the creation of the 'Profile USER_PROFILE'. The status bar at the bottom right shows 'Line 36 Column 1' and other standard status indicators.

```
-- PRIVATE_PWD
22  PRIVATE_PWD          10K
23  COMPOSITE_LIMIT      500000
24  FAILED_LOGIN_ATTEMPTS 3
25  PASSWORD_LIFE_TIME    30
26  PASSWORD_LOCK_TIME   7
27  PASSWORD_GRACE_TIME  10
28  PASSWORD_VERIFY_FUNCTION ora12c_verify_function;
29
30 -- USER CREATION DBA1
31 DROP USER DBA1;
32 CREATE USER DBA1 IDENTIFIED BY "P@ssw0rd"
33 --PASSWORD EXPIRE
34 DEFAULT TABLESPACE "TABLE_AUDIT"
35 TEMPORARY TABLESPACE "TEMP_USERSTABLE"
36 PROFILE user_profile;
37
38 -- ROLES
39 GRANT CONNECT, "DBA" TO DBA1;
40 GRANT CREATE SESSION TO DBA1;
41
42 SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;
43
44
221 TABLESPACE TABLE_AUDIT created.
222
223 TABLESPACE TEMP_USERSTABLE dropped.
224
225
226 TABLESPACE TEMP_USERSTABLE created.
227
228 Profile USER_PROFILE dropped.
229
230 Profile USER_PROFILE created.
```

Above – Temporary Tablespace – TEMP_USERTABLE is being used by DBA1 and all its users

Creation and use of Profiles

The screenshot shows the Oracle SQL Developer interface with the following details:

- Connections:** DBA1, sdev350mrieser, user1_SUID.
- Worksheet:** Query Builder window containing the following SQL code:


```

10 --CREATE PROFILE
11 DROP PROFILE user_profile CASCADE;
12 CREATE PROFILE user_profile
13 LIMIT
14   PASSWORD_REUSE_MAX          3
15   PASSWORD_REUSE_TIME         30
16   SESSIONS_PER_USER           2
17   CPU_PER_SESSION              UNLIMITED
18   CPU_PER_CALL                 3000
19   CONNECT_TIME                  45
20   LOGICAL_READS_PER_SESSION    DEFAULT
21   LOGICAL_READS_PER_CALL       1000
22   PRIVATE_SGA                   15K
23   COMPOSITE_LIMIT                500000
24   FAILED_LOGIN_ATTEMPTS        3
25   PASSWORD_LIFE_TIME            30
26   PASSWORD_LOCK_TIME             7
27   PASSWORD_GRACE_TIME           10
28   PASSWORD_VERIFY_FUNCTION      ora12c_verify_function;
29
30 -- USER CREATION DBA1
31 DROP USER DBA1;
32 CREATE USER DBA1 IDENTIFIED BY "Padgword"
33 --PASSWORD EXPIRE
34 DEFAULT TABLESPACE "TABLE_AUDIT"
35 TEMPORARY TABLESPACE "TEMP_USERSTABLE"
36 PROFILE user_profile;
37
38   ROLES
39 GRANT CONNECT, "DBA" TO DBA1;
40 GRANT CREATE SESSION TO DBA1;
41
42 SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;
43 SELECT USERNAME,PROFILE,ACCOUNT_STATUS FROM DBA_USERS ORDER BY PROFILE DESC;
      
```
- Script Output:** Shows the execution results:
 - TABLESPACE TEMP_USERSTABLE created.
 - Profile USER_PROFILE dropped.
 - Profile USER_PROFILE created.
 - User DBA1 dropped.
 - User DBA1 created.
- Status Bar:** Task completed in 3.553 seconds.

Above – shows the creation of user_profile

The screenshot shows the Oracle SQL Developer interface with the following details:

- Connections:** DBA1, sdev350mrieser, user1_SUID.
- Worksheet:** Query Builder window containing the following SQL code:


```

10 --CREATE PROFILE
11 DROP PROFILE user_profile CASCADE;
12 CREATE PROFILE user_profile
13 LIMIT
14   PASSWORD_REUSE_MAX          3
15   PASSWORD_REUSE_TIME         30
16   SESSIONS_PER_USER           2
17   CPU_PER_SESSION              UNLIMITED
18   CPU_PER_CALL                 3000
19   CONNECT_TIME                  45
20   LOGICAL_READS_PER_SESSION    DEFAULT
21   LOGICAL_READS_PER_CALL       1000
22   PRIVATE_SGA                   15K
23   COMPOSITE_LIMIT                500000
24   FAILED_LOGIN_ATTEMPTS        3
25   PASSWORD_LIFE_TIME            30
26   PASSWORD_LOCK_TIME             7
27   PASSWORD_GRACE_TIME           10
28   PASSWORD_VERIFY_FUNCTION      ora12c_verify_function;
29
30 -- USER CREATION DBA1
31 DROP USER DBA1;
32 CREATE USER DBA1 IDENTIFIED BY "Padgword"
33 --PASSWORD EXPIRE
34 DEFAULT TABLESPACE "TABLE_AUDIT"
35 TEMPORARY TABLESPACE "TEMP_USERSTABLE"
36 PROFILE user_profile;
37
38   ROLES
39 GRANT CONNECT, "DBA" TO DBA1;
40 GRANT CREATE SESSION TO DBA1;
41
42 SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;
43 SELECT USERNAME,PROFILE,ACCOUNT_STATUS FROM DBA_USERS ORDER BY PROFILE DESC;
      
```
- Script Output:** Shows the execution results:
 - All Rows Fetched: 21 in 0.028 seconds
 - Table output showing users and their profiles:

USERNAME	PROFILE	ACCOUNT_STATUS
USER1_SUID	USER_PROFILE	OPEN
DBA1	USER_PROFILE	OPEN
3 SYS	ROADMIN	OPEN
4 SYSTEM	ROADMIN	OPEN
5 ROADMIN	ROADMIN	OPEN
6 DBSNMP	ROADMIN	EXPIRED & LOCKED
7 ANONYMOUS	DEFAULT	EXPIRED & LOCKED
8 XDB	DEFAULT	EXPIRED & LOCKED
9 APPQOSSYS	DEFAULT	EXPIRED & LOCKED
10 GNSADMIN_INTERNAL	DEFAULT	EXPIRED & LOCKED
11 SYSPBACKUP	DEFAULT	EXPIRED & LOCKED
12 OUTLN	DEFAULT	EXPIRED & LOCKED
13 SYNS	DEFAULT	EXPIRED & LOCKED
- Status Bar:** Click on an identifier with the Control key down to perform "Go to Declaration".

Above – shows the use of user_profile as DBA1 and user1_SUID

Creation and use of Roles

Oracle SQL Developer : C:\Users\Matt.Rieser\sdev350rieser_audit.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections sdev350rieser_audit.sql DBA_1_audit.sql user1_SUID_audit.sql

Worksheet Query Builder

```
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44
```

```
COMPOSITE_LIMIT      500000
FAILED_LOGIN_ATTEMPTS 3
PASSWORD_LIFE_TIME 30
PASSWORD_LOCK_TIME 7
PASSWORD_GRACE_TIME 10
PASSWORD_VERIFY_FUNCTION orai2c_verify_function;

-- USER CREATION DBA1
DROP USER DBA1;
CREATE USER DBA1 IDENTIFIED BY "PasswOrd"
--PASSWORD EXPIRE
DEFAULT TABLESPACE "TABLE_AUDIT"
TEMPORARY TABLESPACE "TEMP_USERSTABLE"
PROFILE user_profile;
-- ROLES
GRANT CONNECT, "DBA" TO DBA1;
GRANT CREATE SESSION TO DBA1;

SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;
SELECT USERNAME,PROFILE, ACCOUNT_STATUS FROM DBA_USERS ORDER BY PROFILE DESC;
```

Script Output X Query Result X Task completed in 0.308 seconds

Profile USER_PROFILE created.

User DBA1 dropped.

User DBA1 created.

Grant succeeded.

Grant succeeded.

Click on an identifier with the Control key down to perform "Go to Declaration".

Line 40 Column 30 | Insert | Modified | Windows |

Above – Roles granted to DBA1, connection and ‘DBA’ access and session creation

Oracle SQL Developer : C:\Users\Matt_Rieser\DBA1_audit.sql

File Edit View Navigate Run Source Team Tools Window Help

Connections : sdev35mrieser_audit.sql DBA1_audit.sql user1_SUID_audit.sql | 0.054 seconds

Reports

+ [+] Queues 1

+ Triggers

+ Crossrefs

+ Types

+ Sequence

+ Materialized Views

+ Materialized Views Synonyms

+ Public Synonyms

+ Database

+ PL/SQL Obj. (1)

+ Directories

+ Editions

+ Java

+ XML Schemas

+ XML DB Ru

+ Scheduler

+ RDF Schema

+ Recycle Bin

+ Other User

- + ANON
- + APPQ
- + AUDS
- + CTAS
- + DBA1
- + DSN
- + DIP
- + DSM4
- + GMNC
- + GSMU
- + OUTU
- + ROSA
- + SYS
- + SYSB
- + SYSDI
- + SYSIO
- + SYSTE
- + USER
- + XDR
- + XSINI

+ user1_SUID

+ Oracle NoSQL Connection

+ Database Schema

Worksheet Query Builder

97 --PASSWORD_EXPIRE
98 PROFILE user_profile;
99
100 -- CREATION OF USER BOLES
101 DROP ROLE users_SUID;
102 CREATE ROLE users_SUID;
103 GRANT SELECT ON bidrates2017 TO users_SUID;
104 GRANT DELETE ON bidrates2017 TO users_SUID;
105 GRANT INSERT ON bidrates2017 TO users_SUID;
106 GRANT UPDATE ON bidrates2017 TO users_SUID;
107
108 GRANT SELECT ON bidrates2018 TO users_SUID;
109 GRANT DELETE ON bidrates2018 TO users_SUID;
110 GRANT INSERT ON bidrates2018 TO users_SUID;
111 GRANT UPDATE ON bidrates2018 TO users_SUID;
112
113 GRANT SELECT ON Proposals2018 TO users_SUID;
114 GRANT DELETE ON Proposals2018 TO users_SUID;

Script Output x | Query Result x

redo

Task completed in 0.368 seconds

Role USERS_SUID dropped.

Role USERS_SUID created.

Grant succeeded.

Click on an identifier with the Control key down to perform "Go to Declaration".

| Line 116 Column 28 | Insert | Windows |

Above – Role - users SUID in DBA1 was created and granted to user1 SUID

The screenshot shows the Oracle SQL Developer interface with the following details:

- Connections:** A connection named "DBA1" is selected.
- Toolbars:** File, Edit, View, Navigate, Run, Source, Team, Tools, Window, Help.
- Left Sidebar:** Shows the schema structure for "DBA1", including Tables, Triggers, Crosschecks, Types, Sequence, Materialized Views, Synonyms, Public Synonyms, Database, PL/SQL, Java, XML Schema, XML DB, Scheduler, RDF Semantic, Recycle Bin, and Other User roles.
- Central Area:**
 - Worksheet:** Displays the audit configuration script "user1_SUID_audit.sql".

```
1 --> INSERT INTO PP2018_AUDIT(new_id, old_id, user_name, entry_date, operation)
2   VALUES (:NEW:proposal_id, NULL, v_user, v_date, 'INSERT');
3
4  ELSIF DELETING THEN
5    INSERT INTO PP2018_audit(new_id, old_id, user_name, entry_date, operation)
6      VALUES (NULL, :OLD:proposal_id, v_user, v_date, 'Delete');
7
8  ELSIF UPDATING THEN
9    INSERT INTO PP2018_audit(new_id, old_id, user_name, entry_date, operation)
10   VALUES (:NEW:proposal_id, :OLD:proposal_id, v_user, v_date, 'Update');
11
12 END IF;
13
14
15 SELECT * FROM BR2017_AUDIT;
16 select parameter_value from v$option where parameter='Unified Auditing';
17 show parameter audit
18
19 SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE AUDIT' ORDER BY bytes DESC;
20
21 SELECT * FROM DBA_ROLE_PRIVS ORDER BY GRANTEE DESC;
22
```
 - Script Output:** Shows the results of the "SELECT * FROM DBA_ROLE_PRIVS ORDER BY GRANTEE DESC;" query.

GRANTEE	GRANTED_ROLE	ADMIN_OPTION	DELEGATE_OPTION	DEFAULT_ROLE	COMMON
13 ADMIN	XDBADMIN	YES	NO	YES	NO
14 RDSADMIN	XDBADMIN	YES	NO	YES	NO
15 SYS	XDBADMIN	YES	NO	YES	YES
16 ADMIN	USER_SUID_USERS	YES	NO	YES	NO
17 ADMIN	USER_SUID_APPS	YES	NO	YES	NO
18 ADMIN	USER_SUID	YES	NO	YES	NO
19 DBA1	USERS_SUID	YES	NO	YES	NO
20 USER1_SUID	USERS_SUID	NO	NO	YES	NO
21 SYS	SODA_APP	YES	NO	YES	YES
22 RESOURCE	SODA_APP	NO	NO	YES	YES
23 RDSADMIN	SODA_APP	YES	NO	YES	NO
24 ADMIN	SODA_APP	YES	NO	YES	NO
25 XDB	SODA_APP	YES	NO	YES	YES
26 ADMIN	SELECT_CATALOG_ROLE	YES	NO	YES	NO
27 SYS	SELECT_CATALOG_ROLE	YES	NO	YES	YES
28 RDSADMIN	SELECT_CATALOG_ROLE	YES	NO	YES	NO
29 EM_EXPRESS	SELECT_CATALOG_ROLE	NO	NO	YES	YES

Bottom status bar: Click on an identifier with the Control key down to perform "Go to Declaration". Line 228 Column 1 | Insert | Modified | Windows | Close

Above – we see the DBA1 and user1_SUID with their granted roles

Creation and use of Users

The screenshot shows the Oracle SQL Developer interface with the connection set to 'sdev350mrieser'. The 'DBA1_audit.sql' script is open in the Worksheet window. The code creates a user 'DBA1' with a profile 'USER_PROFILE' and grants various privileges. The output pane shows the execution results.

```
--> 21:  CREATE PROFILE "USER_PROFILE" LIMIT PRIVATE_MEMORY 10M  
22:    COMPOSITE_LIMIT 500000  
23:    FAILED_LOGIN_ATTEMPTS 3  
24:    PASSWORD_LIFE_TIME 30  
25:    PASSWORD_LOCK_TIME 7  
26:    PASSWORD_GRACE_TIME 10  
27:    PASSWORD_VERIFY_FUNCTION ora12c_verify_function;  
28:  
29: --> 30:  -- USER CREATION DBA1  
31:  DROP USER DBA1;  
32:  CREATE USER DBA1 IDENTIFIED BY "Pa$$w0rd";  
33:  --PASSWORD EXPIRE  
34:  DEFAULT TABLESPACE "TABLE_AUDIT"  
35:  TEMPORARY TABLESPACE "TEMP_USERSTABLE"  
36:  PROFILE user_profile;  
37:  
38:  -- ROLES  
39:  GRANT CONNECT, "DBA" TO DBA1;  
40:  GRANT CREATE SESSION TO DBA1;  
41:  
42:  SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;  
43:  SELECT USERNAME,PROFILE,ACCOUNT_STATUS FROM DBA_USERS ORDER BY PROFILE DESC;  
44:  
Profile USER_PROFILE created.  
User DBA1 dropped.  
User DBA1 created.  
Grant succeeded.  
Grant succeeded.  
Grant succeeded.
```

Above – successful creation of DBA user - DBA1

The screenshot shows the Oracle SQL Developer interface with the connection set to 'DBA1'. The 'DBA1_audit.sql' script is open in the Worksheet window. The code creates a user 'USER1_UID' with a profile 'USER_PROFILE' and grants audit permissions on tables like BR2017_AUDIT and BR2018_AUDIT. The output pane shows the execution results.

```
--> 21:  INSERT INTO PP2018_audit(new_id,old_id,user_name,entry_date,operation)  
22:  VALUES (:NEW.proposal_id,NULL,v_user,v_date,'INSERT');  
23:  ELSIF DELETING THEN  
24:  INSERT INTO PP2018_audit(new_id,old_id,user_name,entry_date,operation)  
25:  VALUES (NULL,:OLD.proposal_id,v_user,v_date,'Delete');  
26:  ELSIF UPDATING THEN  
27:  INSERT INTO PP2018_audit(new_id,old_id,user_name,entry_date,operation)  
28:  VALUES (:NEW.proposal_id,:OLD.proposal_id,v_user,v_date,'Update');  
29:  
30: END IF;  
31:  
32:  
33: SELECT * FROM BR2017_AUDIT;  
34: select parameter,value from v$option where parameter='Unified Auditing';  
35: show parameter audit  
36: SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;  
37: SELECT * FROM DBA_ROLE_PRIVS ORDER BY GRANTEE DESC;  
38:  
Profile USER_PROFILE dropped.  
User USER1_UID created.  
Role USERS_UID dropped.  
Role USERS_UID created.  
Grant succeeded.
```

Above - Successful creation of 1 user with select, update, insert, and delete permissions for

tables – BidRates2017, BidRates2018, Proposals2017, and Proposals2018 within DBA1

Testing DBA1 user functionality

The screenshot shows the Oracle SQL Developer interface. The 'Connections' sidebar lists 'DBA1' and 'user1_SUID'. The 'Worksheet' tab contains a script named 'user1_SUID' with the following content:

```
1 insert into DBA1.students VALUES(1, 'noname', 'bob', '123 fake street', 'maryland');
2 insert into DBA1.students VALUES(2, 'noname', 'matt', '123 fake street', 'texas');
3
4 insert into DBA1.employees VALUES (1, 'noname', 'susan', '123 fake street', 'new york');
5
6 select * from DBA1.EMPLOYEES;
7
8 insert into DBA1.finances VALUES(1);
9
10 select * from DBA1.FINANCES;
11
12 select * from DBA1.STUDENTS;
13
14 update DBA1.students set FIRSTNAME = 'tim' where student_id = 2;
15
16 select * from DBA1.students;
17
18 delete from DBA1.students where student_id = 1;
19
```

The 'Script Output' tab shows the results of the execution:

```
1 row inserted.

1 row inserted.

1 row inserted.

EMPLOYEE_ID LASTNAME      FIRSTNAME     ADDRESS        CITY
-----  -----
1 noname          susan    123 fake street   new york

1 row inserted.

FINANCE_ID
```

At the bottom, the status bar indicates 'Saved: C:\Users\Matt_Rieser\DBA2.sql'.

Above – shows the successful completion of script as user1_SUID. This script -

- inserts into DBA1.BIDRATES2017, DBA1. BIDRATES2018, DBA1.PROPOSALS2017, and PROPOSALS2018 tables
- selects from DBA1.BIDRATES2017, DBA1. BIDRATES2018, DBA1.PROPOSALS2017, and PROPOSALS2018 tables
- updates record's from DBA1.BIDRATES2017, DBA1.BIDRATES2018, DBA1.PROPOSALS2017, and PROPOSALS2018 tables
- deletes a record from DBA1.BIDRATES2107
- shows that permission for table creation is not allowed

Output:

1 row inserted.

1 row inserted.

1 row inserted.

1 row inserted.

BR_ID BID_ID

1 bob

BR_ID BID_ID

1 matt

P_ID PROPOSAL_ID

1 sue

P_ID PROPOSAL_ID

1 lucy

1 row updated.

1 row updated.

1 row updated.

1 row updated.

BR_ID BID_ID

1 MATT

BR_ID BID_ID

1 MARK

P_ID PROPOSAL_ID

1 DIANA

P_ID PROPOSAL_ID

1 REBECCA

1 row deleted.

no rows selected

The screenshot shows the Oracle SQL Developer interface. The left sidebar displays a tree view of database objects under 'DBA1'. The main workspace contains a 'Worksheet' tab with the following SQL code:

```

7 select * from DBAI.BIDRATES2018;
8 select * from DBAI.PROPOSALS2017;
9 select * from DBAI.PROPOSALS2018;
10
11 UPDATE DBAI.BIDRATES2017 SET BID_ID = 'MATT' WHERE BR_ID = 1;
12 UPDATE DBAI.BIDRATES2018 SET BID_ID = 'MARK' WHERE BR_ID = 1;
13 UPDATE DBAI.PROPOSALS2017 SET proposal_ID = 'DIANA' WHERE P_ID = 1;
14 UPDATE DBAI.PROPOSALS2018 SET proposal_ID = 'REBECCA' WHERE P_ID = 1;
15
16 select * from DBAI.BIDRATES2017;
17 select * from DBAI.BIDRATES2018;
18 select * from DBAI.PROPOSALS2017;
19 select * from DBAI.PROPOSALS2018;
20
21 DELETE from DBAI.BIDRATES2017 WHERE BR_ID = 1;
22
23 select * from DBAI.BIDRATES2017;
24
25 CREATE TABLE muffin (
26   muffin_id int primary KEY
27 );
28
29

```

The 'Script Output' tab at the bottom shows the results of the execution:

```

no rows selected

Error starting at line : 25 in command -
CREATE TABLE muffin (
  muffin_id int primary KEY
)
Error report -
ORA-01031: insufficient privileges
01031. 00000 -  "insufficient privileges"
*Cause:  An attempt was made to perform a database operation without
          the necessary privileges.
*Action: Ask your database administrator or designated security
          administrator to grant you the necessary privileges

```

Above - tests to see if the creation of table muffin is possible, which this account doesn't have permissions for, so it outputs a permission error (good error)

Creation and use of Tables

The screenshot shows the Oracle SQL Developer interface. The 'Connections' sidebar lists several connections, including 'DBA1', 'user1_SUID', and 'sdev350rieser'. The 'Reports' sidebar shows various report types. The 'Worksheet' tab displays a script named 'user1_SUID.sql' containing SQL code to alter session and create tables for students, employees, and finances. The 'Script Output' tab shows the execution results, indicating the session was altered, tables were dropped and created, and new tables were created.

```

1 Alter session set current_schema = DBA1;
2 --Creating Tables
3 DROP TABLE students;
4 Create TABLE students (
5     student_id int primary key,
6     lastname VARCHAR(20),
7     firstname VARCHAR(20),
8     address VARCHAR(20),
9     city VARCHAR(20)
10 );
11
12 DROP TABLE employees;
13 Create TABLE employees (
14     employee_id int PRIMARY KEY,
15     lastname VARCHAR(20),
16     firstname VARCHAR(20),
17 );

```

Above – shows the creations of students, employees, and finances tables within DBA1

The screenshot shows the Oracle SQL Developer interface. The 'Connections' sidebar lists 'DBA1_audit' and 'user1_SUID_audit'. The 'Reports' sidebar shows various audit reports. The 'Worksheet' tab displays a script named 'user1_SUID_audit.sql' containing audit-related queries. The 'Script Output' tab shows the execution results, displaying the structure of tables such as Bid_ID, BID_ID, and P_ID, PROPOSAL_ID.

```

223 --SELECT parameter,value FROM v$option WHERE parameter='UNIFIED AUDITING';
224 show parameter audit
225 SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;
226 SELECT * FROM DBA_ROLE_PRIVS ORDER BY GRANTEE DESC;
227
228 SELECT * FROM BDRATES2018;
229 SELECT * FROM BDRATES2018;
230 SELECT * FROM PROPOSALS2017;
231 SELECT * FROM PROPOSALS2018;
232
233
234 SELECT * FROM BR2017_AUDIT;
235 SELECT * FROM BR2018_AUDIT;
236 SELECT * FROM PP2017_AUDIT;
237 SELECT * FROM PP2018_AUDIT;
238
239

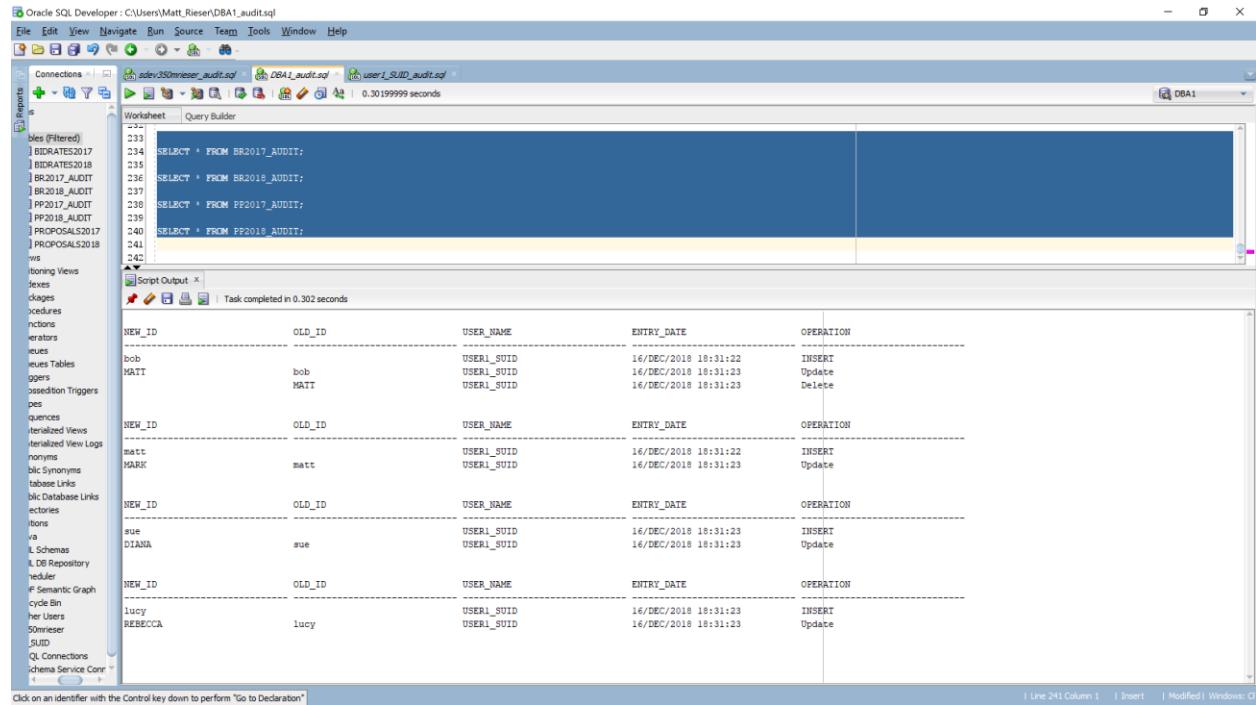
```

Above – successful testing with select statements of the tables (BidRates2017, BidRates2018,

Proposals2017, and Proposals2018) in DBA1 that were propagated by user1_SUID's account, previously used.

Looking at the auditing tables

After using the user1_SUID for inserting, selecting, updating, and deleting. There should be records in my auditing tables at this point (set triggers earlier to record changes within tables), showing the changes.



The screenshot shows the Oracle SQL Developer interface with three tabs open: 'adv350muser_audit.sql', 'DBA1_audit.sql', and 'user1_SUID_audit.sql'. The 'user1_SUID_audit.sql' tab is active, displaying the following SQL code:

```
231
232
233 SELECT * FROM BR2017_AUDIT;
234
235 SELECT * FROM BR2018_AUDIT;
236
237 SELECT * FROM PP2017_AUDIT;
238
239 SELECT * FROM PP2018_AUDIT;
240
241
242
```

Below the code, the 'Script Output' window shows the results of the audit queries. There are four tables displayed, each representing a different audit trail:

Table	New_ID	Old_ID	User_Name	Entry_Date	Operation
BR2017_AUDIT	bob		USER1_SUID	16/DEC/2018 18:31:22	INSERT
	MATT	bob	USER1_SUID	16/DEC/2018 18:31:23	Update
		MATT	USER1_SUID	16/DEC/2018 18:31:23	Delete
BR2018_AUDIT	matt		USER1_SUID	16/DEC/2018 18:31:22	INSERT
	MARK	matt	USER1_SUID	16/DEC/2018 18:31:23	Update
PP2017_AUDIT	sue		USER1_SUID	16/DEC/2018 18:31:23	INSERT
	DIANA	sue	USER1_SUID	16/DEC/2018 18:31:23	Update
PP2018_AUDIT	lucy		USER1_SUID	16/DEC/2018 18:31:23	INSERT
	REBECCA	lucy	USER1_SUID	16/DEC/2018 18:31:23	Update

Above – successfully recorded the changes that occurred within BidRates2017, BidRates2018, Proposals2017, and Proposals2018. The tables display the new_id, old_id, username, entry_date, and operation.

Modifying the AWS Instance to Enable Audits and Auditing

The screenshot shows the AWS RDS Modify DB Instance page. In the 'Monitoring' section, the 'Enable enhanced monitoring' option is selected. In the 'Log exports' section, the 'Alert log' and 'Audit log' options are checked.

Above – clicked the enable enhanced monitoring option under Monitoring and checked boxed alert log and audit log options under Log exports.

The screenshot shows the 'Summary of modifications' section with the following table:

Attribute	Current value	New value
Enable Enhanced Monitoring	Yes	Yes
Granularity	0	60
Monitoring Role		Default (arn:aws:iam::775610908556:role/rds-monitoring-role)
Enable publish to cloudWatch logs		Alert log, Audit log

Above – clicked the modify DB instance button at the bottom of the page

sdev350mrieser

Summary

DB Name sdev350mrieser	CPU 2.17%	Info Available	Class db.t2.micro
Role Instance	Current activity 3 Connections	Engine Oracle Standard Edition Two	Region & AZ us-east-2c

Connectivity

Endpoint & port	Networking	Security
Endpoint sdev350mrieser.ckguqlaftai.us-east-2.rds.amazonaws.com	Availability zone us-east-2c	VPC security groups rds-launch-wizard-1 (sg-0a7c67a3ef61e667b) (active)
Port 1521	VPC vpc-c53705ad	Public accessibility Yes
	Subnet group default	Certificate authority rds-ca-2015
	Subnets subnet-cd036083	Certificate authority date

Above – rebooted the instance to implement the changes

sdev350mrieser

Summary

DB Name sdev350mrieser	CPU 19.83%	Info configuring-log-exports	Class db.t2.micro
Role Instance	Current activity 3 Connections	Engine Oracle Standard Edition Two	Region & AZ us-east-2c

Connectivity

Endpoint & port	Networking	Security
Endpoint sdev350mrieser.ckguqlaftai.us-east-2.rds.amazonaws.com	Availability zone us-east-2c	VPC security groups rds-launch-wizard-1 (sg-0a7c67a3ef61e667b) (active)
Port 1521	VPC vpc-c53705ad	Public accessibility Yes
	Subnet group default	Certificate authority rds-ca-2015
	Subnets subnet-cd036083	Certificate authority date

Above – instance is configuring audit changes

The screenshot shows a browser window with multiple tabs open, including "Homepage - ANTH", "Auditing Oracle Data", "Lab4.pdf", "RDS - AWS Console", "Using Amazon RDS", "Auditing Database", "HG Seasonal Affective", "Discover Card: Ses", and "RDS - AWS Console". The main content area is titled "Viewing Log: audit/ORCL_ora_31220_20181216224500421883143795.aud (1.5 kB)". The left sidebar of the RDS console shows "Amazon RDS" with "Databases" selected, and a list of database-related options like Dashboard, Performance Insights, Snapshots, etc. The main pane displays Oracle audit log entries. One entry is highlighted:

```
Version: 7.3.00 Tue May 27 10:33:22 PDT 2017
Machine: x86_64
VM name: Xen Version: 4.2 (HVM)
Instance name: ORCL
Redo thread mounted by this instance: 1
Oracle process number: 35
Unix process pid: 31220, image: oracle@ip-10-20-2-59 (TNS VI-V3)

Sun Dec 16 22:45:00 2018 +00:00
LENGTH : '154'
ACTION :[7] 'CONNECT'
DATABASE USER:[1] '/'
PRIVILEGE:[6] 'SYSDBA'
CLIENT USER:[5] 'rdsadb'
CLIENT TERMINAL:[0] ''
STATUS:[1] '0'
DHID:[10] '1521627940'

Sun Dec 16 22:45:00 2018 +00:00
LENGTH : '153'
ACTION :[6] 'COMMIT'
DATABASE USER:[1] '/'
PRIVILEGE:[6] 'SYSDBA'
CLIENT USER:[5] 'rdsadb'
CLIENT TERMINAL:[0] ''
STATUS:[1] '0'
```

Displaying ~ 1000 lines of audit/ORCL_ora_31220_20181216224500421883143795.aud

Above – nothing usual in the AWS logs to report on, other than commits made by me

Things that didn't work correctly

The screenshot shows the Oracle SQL Developer interface. In the left sidebar, there's a tree view of database objects under a connection named 'DBA1'. The 'Connections' node is expanded, showing various schema objects like 'sdev350rieser', 'Tables (Filtered)', 'Views', 'Indexes', 'Packages', 'Procedures', 'Functions', 'Operators', 'Queues', and 'Queue Tables'. Below these are 'Triggers', 'Crossedition Triggers', 'Types', 'Synonyms', 'Materialized Views', 'Materialized View Logs', 'Public Synonyms', 'Database Links', 'Directories', 'ADUMP', 'BDUMP', and 'DATA_PUMP_DIR'. There are also nodes for 'Editors', 'Java', 'XML Schemas', 'Scheduler', 'RDX Semantic Graph', 'Other Bin', 'Other Users', and 'user_L\$UID'. Under 'Database Schema Service Connections', there's an entry for 'Oracle NoSQL'. In the main workspace, three tabs are open: 'sdev350rieser_audit.sql', 'DBA1_audit.sql', and 'user_L\$UID_audit.sql'. The 'DBA1_audit.sql' tab is active and contains the following PL/SQL code:

```
219  END IF;
220  END;
221  /
222
223  select parameter,value from v$option where parameter='Unified Auditing';
224  show parameter audit
225  SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;
226  SELECT * FROM DBA_ROLE_PRIVS ORDER BY GRANTEE DESC;
227
228  SELECT * FROM BIDRATES2018;
229  SELECT * FROM BIDRATES2018;
```

Below the code, the 'Query Result' tab is active, showing the output of the 'show parameter audit' command:

PARAMETER	VALUE
1 Unified Auditing	FALSE

At the bottom of the interface, status bars indicate 'Line 242 Column 6 | Insert | Modified | Windows: 0'.

Above – ran the command to enable unified auditing

--ENABLE UNIFIED AUDITING

EXECUTE

```
DBMS_AUDIT_MGMT.SET_AUDIT_TRAIL_PROPERTY(DBMS_AUDIT_MGMT.AUDIT_
TRAIL_UNIFIED, DBMS_AUDIT_MGMT.AUDIT_TRAIL_WRITE_MODE,
DBMS_AUDIT_MGMT.AUDIT_TRAIL_IMMEDIATE_WRITE);
```

and then rebooted the aws instance but unified auditing stayed false. So I'm not really sure what to do.

The screenshot shows the Oracle SQL Developer interface with the following details:

- File Bar:** File, Edit, View, Navigate, Run, Source, Team, Tools, Window, Help.
- Toolbars:** Reports, Com, Reports, Com.
- Worksheet:** Shows a script named "user1_SUID_audit.sql" containing audit session configuration code. The code includes:
 - INSERT INTO PP2018_audit(new_id, old_id, user_name, entry_date, operation) VALUES (:NEW.proposal_id, :OLD.proposal_id, v_user, v_date, 'Update');
 - END IF;
 - END;
 - AUDIT SESSION FOR user1_SUID
 - AUDIT SESSION
 - By user1_SUID;
 - select parameter,value from v\$option where parameter='Unified Auditing';
 - show parameter audit
 - SELECT * FROM dba_segments WHERE TABLESPACE_NAME='TABLE_AUDIT' ORDER BY bytes DESC;
 - SELECT * FROM DBA_ROLE_PRIVS ORDER BY GRANTEE DESC;
 - SELECT * FROM BIDRATES2018;
 - SELECT * FROM BIDRATES2018;
 - SELECT * FROM PROPOSALS2017;
 - SELECT * FROM PROPOSALS2018;
 - SELECT * FROM BR2017_AUDIT;
 - SELECT * FROM BR2018_AUDIT;
- Script Output:** Shows the compilation of triggers:
 - Trigger PROPOSALS2017_AUDIT compiled
 - Trigger PROPOSALS2018_AUDIT compiled
- Query Result:** Shows the message "Audit succeeded."
- Status Bar:** Line 222 Column 15 | Insert | Modified | Windows O

Above – running the command AUDIT SESSION BY user1_SUID; and the audit succeeded

The screenshot shows the Oracle SQL Developer interface with the following details:

- File Bar:** File, Edit, View, Navigate, Run, Source, Team, Tools, Window, Help.
- Toolbars:** Reports, Com, Reports, Com.
- Worksheet:** Shows a script named "user1_SUID_audit.sql" containing audit session configuration code. The code includes:
 - SELECT * FROM DBA_ROLE_PRIVS ORDER BY GRANTEE DESC;
 - SELECT * FROM BIDRATES2018;
 - SELECT * FROM BIDRATES2018;
 - SELECT * FROM PROPOSALS2017;
 - SELECT * FROM PROPOSALS2018;
 - SELECT * FROM BR2017_AUDIT;
 - SELECT * FROM BR2018_AUDIT;
 - SELECT * FROM PP2017_AUDIT;
 - SELECT * FROM PP2018_AUDIT;
 - select * from DBA_AUDIT_SESSION;
- Script Output:** Shows the execution results:
 - All Rows Fetched: 0 in 0.027 seconds
- Query Result:** Shows the output of the "select * from DBA_AUDIT_SESSION;" query, which is empty.
- Status Bar:** Line 247 Column 1 | Insert | Modified | Windows O

Above – however whenever I run the select * FROM DBA_AUDIT_SESSION; nothing shows up. The user's sessions are supposed to be displayed. Tried logging in with user1_SUID multiple times but it still wouldn't show up. If you have any theories, I'm all ears.

Miscellaneous code that I forgot to mention in the above sections

Alter session set current_schema = DBA1;

This command provides user's (examples – user1_SUID) with the ability to access the tables created, if they have been granted access to them. Example - user1_SUID (Select, Update, Insert, and Delete) can access DBA1 tables.

Examples –

*select * from DBA1.BIDRATES2017;*

Audit commands –

AUDIT SESSION

BY user1_SUID;

Used to audit user1_SUID sessions and should be displayed in DBA_AUDIT_SESSION

AUDIT SESSION

BY DBA1;

Used to audit DBA1 user's sessions and should be displayed in DBA_AUDIT_SESSION