

Zero Down time Database Upgradation and Migration from oracle 12c to oracle 19c on multi tenant architecture

[#Oracle](#) [#OracleDB](#) [#OracleDBA](#) [#GoldenGate](#) [#Database](#) [#DataReplication](#) [#CDB](#) [#PDB](#)

In this article I have implemented Database upgradation and migration from Oracle 12c to Oracle 19c multi-tenant architecture on Linux platform using Oracle Goldengate Classic architecture with zero down time.

I have also explained Zero Down time Seamless rollback strategy.

Why Golden Gate

- Data is sent in real time with min latency.
- Supports heterogenous environments using different database and hardware types.
- High Performance with low impact
- Ability to move large volume of data very efficiently.
- No single point of failure.

Architecture of GG

- Classic architecture
- Micro Service Architecture (GUI Interface, Integration with cloud)
- GG Veridata(Used to find the data discrepancies and can repair as well)

In this article I have cover GG classic architecture.

Two types of capture process

- a. Classic Capture
- b. Integrated Capture

Golden gate is changed data capture. The main difference between classic capture and integrated capture modes is that in the classic capture the extract reads online redo log files/archive log files to capture changes while the integrated capture mode the database log mining server reads the redo log files and captures changes in the form of LCR(Logical change record) which are then accessed by the Golden Gate extract process.

Types of Extracts

- Classic Extract(directly connectivity with db to get changes from redo logs)
- Integrated Extract (widly used)

Golden gate integrated capture (new extract process from 11.2.0.4) use for oracle to oracle data migration

- receive changes from logminer in ICR(logical change record)
- 5 times faster than classic
- in classic extract it goes to all data in log files for changes but in logminer (internal to db) it capture on required changes which need to be replicated.

Types of Replicat

Non Integrated/Classic Replicat

Integrated Replicat -Support from GG12.1 DB 12c

Cordinated Replicat

Parallel Replicat - GG 12.3

i. Parallel Non Integrated Support from DB version 12.1 and GG version 12.3

ii. Parallel integrated replicat – Support from DB version 12.2 and GG version 12.3

Capture Process

capture(extract process) process capture changes from logs to local trails

Pump Process

pump process move local trail file to remote trails using tcp network

Delivery Process

Delivery process(replicat process) read trails and apply to target db.

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Checking Pre-requisite

Before upgradation you need to check certification matrix , use below link to verify.

[Oracle Fusion Middleware Supported System Configurations](#)

Oracle GoldenGate 19c									
Data Store			GoldenGate Product					GoldenGa	
Data Store Name	Data Store Version	Endpoint Typ	Product Family	License Type	Architecture	GoldenGate Major Version	GoldenGate Minimum Version	Processor Type	OS Version
Oracle Database	11.2.0.4+; 12.1.0.2+; 12.2.0.1+; 19c; 19c	Source, Target	Oracle Databases	Oracle GoldenGate	Classic, Microservices	19c	19.1.0.0.0	Linux x86-64	Oracle Linux 7, RHEL 7

Environment Details

Detail	Source	Target
DBNAME	OGGDB1	ORCL
HOSTNAME	GGATE1	NODE1
SERVER IP	192.168.56.102	192.168.56.105
SCHEMA NAME	ggtraining1	ggtraining2
DB VERSION	12.2.0.1.0	19.0.0.0.0

HIGH LEVEL STEPS

- Check network between source and target
- Allocate space new mount point for Golden gate setup
- Install golden gate software on source and target as per certification matrix
- Setup extract and data pump on source site
- Setup replicat on target side
- Export and import initial load using SCN
- Restore on target
- Start replicat using SCN

Step 1: Create Directory for golden gate setup.

```
[oracle@node1]$ mkdir /u01/app/oracle/product/gg
```

Set Environment Variable file.

```
[oracle@node1 gg]$ cd /home/oracle/scripts/
```

```
[oracle@node1 scripts]$ vi setEnv.sh
```

```
# Oracle Settings
```

```
export TMP=/tmp
```

```
export TMPDIR=$TMP
```

```
export ORACLE_HOSTNAME=node1.localdomain
```

```
export ORACLE_UNQNAME=cdb1
```

```
export ORACLE_BASE=/u01/app/oracle
```

```
export ORACLE_HOME=$ORACLE_BASE/product/19.0.0/dbhome_1
```

```
export ORA_INVENTORY=/u01/app/oraInventory
```

```
export ORACLE_SID=cdb1
```

```
export PDB_NAME=pdb1
```

```
export DATA_DIR=/u02/oradata
```

```
export PATH=/usr/sbin:/usr/local/bin:$PATH
```

```
export PATH=$ORACLE_HOME/bin:$PATH
```

```
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib
```

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```
export CLASSPATH=$ORACLE_HOME/jlib:$ORACLE_HOME/rdbms/jlib
```

```
export GGATE=/u01/app/oracle/product/gg
```

Add a reference to the "setEnv.sh" file at the end of the "/home/oracle/.bash_profile" file.

```
[oracle@node1 scripts]$ echo ". /home/oracle/scripts/setEnv.sh" >> /home/oracle/.bash_profile
```

```
[oracle@node1 ~]$ . .bash_profile
```

```
[oracle@node1 ~]$ echo $GGATE
```

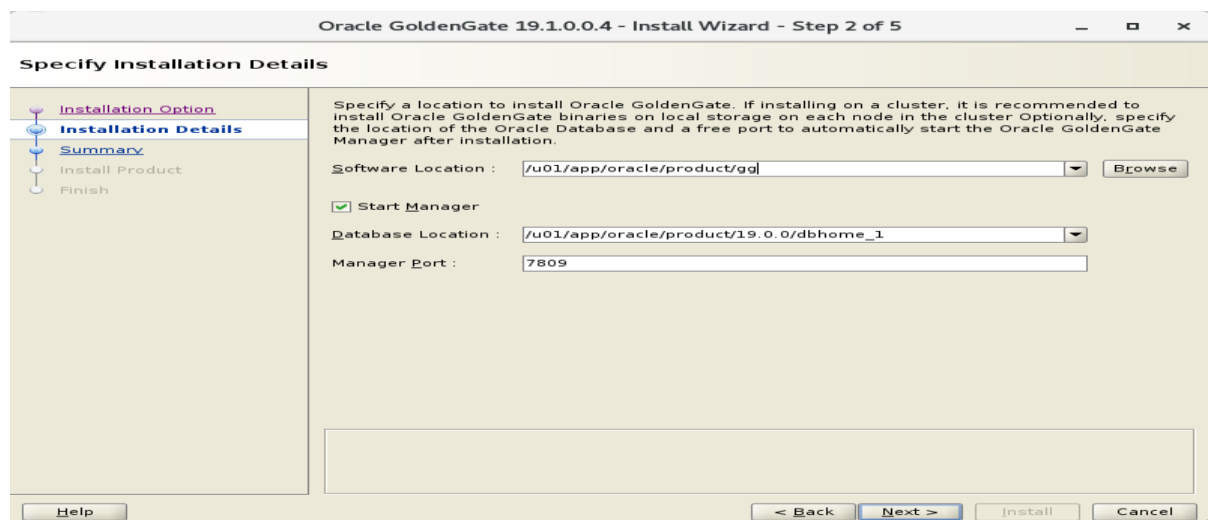
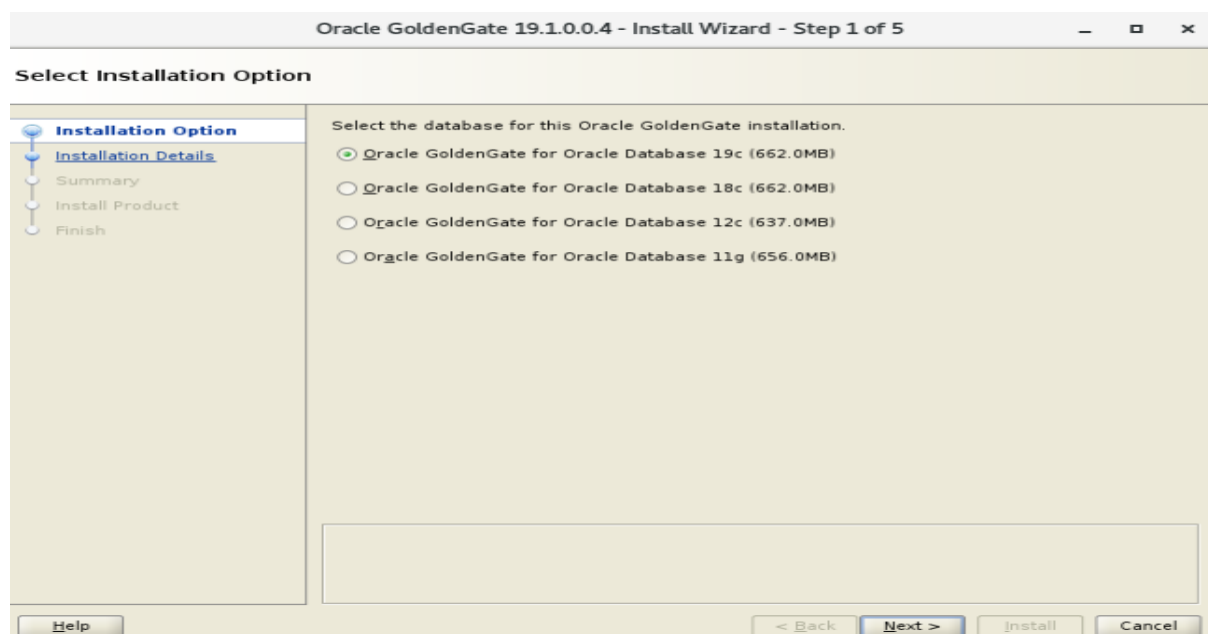
```
/u01/app/oracle/product/gg
```

Copy oracle 19c Goldengate software and unzip it.

```
[oracle@node1 u01]$ unzip 191004_fbo_ggs_Linux_x64_shiphome.zip
```

```
[oracle@node1 fbo_ggs_Linux_x64_shiphome]$ cd Disk1/
```

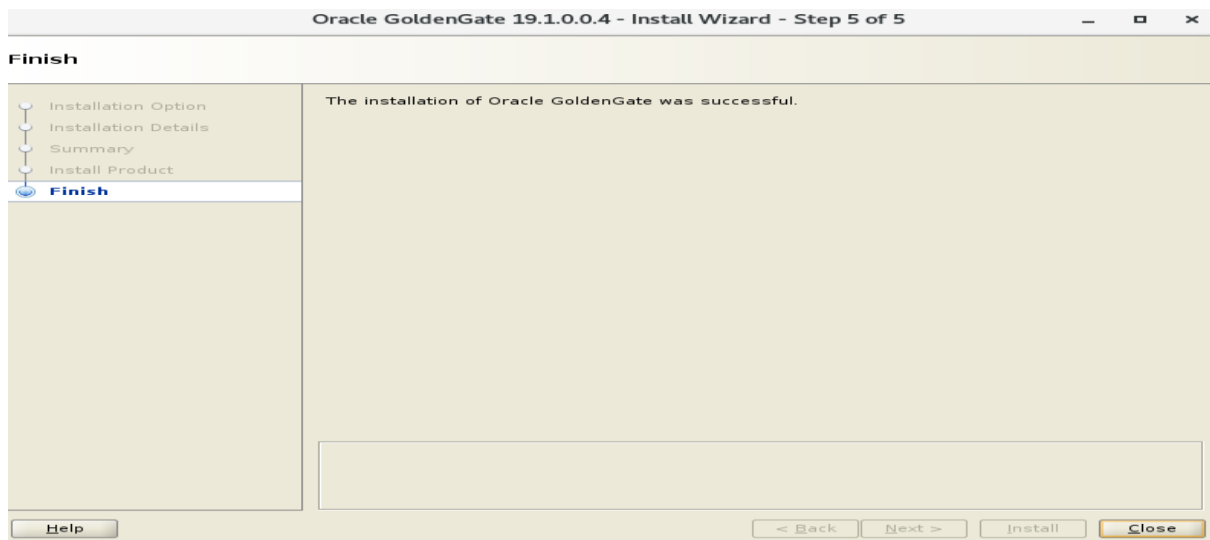
```
[oracle@node1 Disk1]$ ./runInstaller
```



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Pre-Requisites for Golden Gate replication

- Set Parameter enable_goldengate_replicatin to true on both source and target
- Create user for golengate replication on source and target DB(ggtraining1,ggtraining2)
- Create global user with prefix c## on both source and target DB
- Grant dba role to the user on both source and target db
- Enable supplemental log on source db
- Enable archive log on source db

[oracle@ggate1 12.2.0.1]\$ sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Thu Apr 4 00:52:17 2024

Copyright (c) 1982, 2016, Oracle. All rights reserved.

Connected to:

Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> show pdbs

CON_ID	CON_NAME	OPEN MODE	RESTRICTED
2	PDB\$SEED	READ ONLY	NO
3	PDB1	MOUNTED	

2 PDB\$SEED READ ONLY NO

3 PDB1 MOUNTED

SQL> alter session set container=pdb1;

Session altered.

SQL> alter pluggable database pdb1 open;

Pluggable database altered.

SQL> show pdbs

CON_ID	CON_NAME	OPEN MODE	RESTRICTED
3	PDB1	READ WRITE	NO

3 PDB1 READ WRITE NO

create user ggtraining1 identified by welcome1;

conn ggtraining1/welcome1@pdb1

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```

create user ggtraining2 identified by welcome1;

conn ggtraining2/welcome1@pdb2

Connected.

alter system set enable_goldengate_replication=true;

create user c##sourcegg1 identified by welcome1;

grant dba to c##sourcegg1 container=all;

exec dbms_goldengate_auth.grant_admin_privilege('c##sourcegg1',container=>'all');

create tablespace ggs_tblsp datafile '/u01/app/oracle/oradata/pdb1/datafile/gg.dbf' size 2G;

GGSCI (ggate1) 1> dblogin userid c##sourcegg1@pdb1 password welcome1

Successfully logged into database PDB1.

```

Add Credential store to enhance security.

```

GGSCI (ggate1 as c##sourcegg1@oggdb1/PDB1) 14> add credentialstore

Credential store created.

GGSCI (ggate1 as c##sourcegg1@oggdb1/PDB1) 16> alter credentialstore add user c##sourcegg1@oggdb1,password welcome1,alias
sourcegg1_cdb

Credential store altered.

GGSCI (ggate1 as c##sourcegg1@oggdb1/PDB1) 17> info credentialstore

Reading from credential store:

Default domain: OracleGoldenGate

Alias: sourcegg1_cdb

Userid: c##sourcegg1@oggdb1

GGSCI (ggate1) 1> dblogin useridalias sourcegg1_cdb

Successfully logged into database CDB$ROOT.

```

Configure Manager

```

GGSCI (ggate1) 26> view param mgr

PORT 7809

USERIDALIAS sourcegg1_cdb

```

Enable Supplemental logging

To enable Table level Supplemental logging, Database level supplemental logging is required, also dblogin to the pluggable database is required if database architecture is Multitenant.

```

alter database add supplemental log data(all) columns;

select supplemental_log_data_all from v$database;

```

Enabling Supplemental Logging at Table level

Supplemental logging is required to add extra columns to redo logs to uniquely identify rows on target db when a row is update or delete on source

Two types of supplemental logging

database level

table level (2 ways)

1) ggsci level -- add trandata <pluggable database name>,<schema name>,<table name>

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2) sql prompt -- alter table <table name> add supplemental log data (PK|UK|ALL) column

How supplemental logs works.

Check below constrains on table columns.

- 1) primary key
- 2) unique key
- 3) if above constrains not found in table supplemental logs enable on all columns

Check supplemental logging enable on table

```
GGSCI (ggate1 as c##sourcegg1@ogpdb1/PDB1) 3> add trandata pdb1.ggtraining1.dept11
```

```
2024-04-04 03:52:44 INFO   OGG-15132 Logging of supplemental redo data enabled for table PDB1.GGTRAINING1.DEPT11.
2024-04-04 03:52:44 INFO   OGG-15133 TRANDATA for scheduling columns has been added on table PDB1.GGTRAINING1.DEPT11.
2024-04-04 03:52:44 INFO   OGG-15135 TRANDATA for instantiation CSN has been added on table PDB1.GGTRAINING1.DEPT11.
2024-04-04 03:52:44 INFO   OGG-10471 ***** Oracle Goldengate support information on table GGTRAINING1.DEPT11 *****
Oracle Goldengate support native capture on table GGTRAINING1.DEPT11.
```

Oracle Goldengate marked following column as key columns on table GGTRAINING1.DEPT11: DEPTNO.

```
GGSCI (ggate1 as c##sourcegg1@ogpdb1/CDB$ROOT) 34> add trandata pdb1.ggtraining1.emp11
```

```
2024-04-17 03:40:48 INFO   OGG-15132 Logging of supplemental redo data enabled for table PDB1.GGTRAINING1.EMP11.
2024-04-17 03:40:48 INFO   OGG-15133 TRANDATA for scheduling columns has been added on table PDB1.GGTRAINING1.EMP11.
2024-04-17 03:40:48 INFO   OGG-15135 TRANDATA for instantiation CSN has been added on table PDB1.GGTRAINING1.EMP11.
2024-04-17 03:40:48 INFO   OGG-10471 ***** Oracle Goldengate support information on table GGTRAINING1.EMP11 *****
Oracle Goldengate support native capture on table GGTRAINING1.EMP11.
```

Oracle Goldengate marked following column as key columns on table GGTRAINING1.EMP11: EMPNO.

Check status of transdata

```
GGSCI (ggate1 as c##sourcegg1@ogpdb1/CDB$ROOT) 158> info trandata pdb1.ggtraining1.dept11
```

```
2024-04-17 08:32:55 INFO   OGG-10471 ***** Oracle Goldengate support information on table GGTRAINING1.DEPT11 *****
Oracle Goldengate support native capture on table GGTRAINING1.DEPT11.
```

Oracle Goldengate marked following column as key columns on table GGTRAINING1.DEPT11: DEPTNO.

Logging of supplemental redo log data is enabled for table PDB1.GGTRAINING1.DEPT11.

Columns supplementally logged for table PDB1.GGTRAINING1.DEPT11: "DEPTNO".

```
GGSCI (ggate1) 27> dblogin userid alias sourcegg1_cdb
```

Successfully logged into database CDB\$ROOT.

Archivelog mode

Shutdown immediate

Startup mount

Alter database archivelog;

Alter database open;

```
GGSCI (ggate1) 9> dblogin userid c##sourcegg1@pdb1 password welcome1
```

Successfully logged into database PDB1.

Extract Process

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To create extract process, you need to connect to container database as multiple PDBS sharing archive log to container db

While on replicat site you need to connect to pluggable db.

```
GGSCI (ggate1) 4> dblogin user=alias source=gg1_cdb
```

Successfully logged into database CDB\$ROOT.

```
GGSCI (ggate1 as c##sourcegg1@oggdb1/CDB$ROOT) 5> add extract extint46, integrated tranlog, begin now
```

EXTRACT (Integrated) added.

Note: From 11gR2 onwards, Oracle Goldengate introduces a new feature called as Integrated extract .

```
GGSCI (ggate1) 8> dblogin user=alias source=gg1_cdb
```

Successfully logged into database CDB\$ROOT.

```
GGSCI (ggate1 as c##sourcegg1@oggdb1/CDB$ROOT) 36> add extract extint46, integrated tranlog, begin now
```

EXTRACT (Integrated) added.

Register Extract

```
GGSCI (ggate1 as c##sourcegg1@oggdb1/CDB$ROOT) 167> register extract extint46, database container(pdb1)
```

Register extract ensure that archive log not delete until extract process completed even if purging time period exceeds

Add Local Trail

```
GGSCI (ggate1) 2> add exttrail /u01/app/oracle/product/ogg_src/dirdat/lt,extract extint46
```

EXTTRAIL added.

Add data pump process (Secondary extract process Path must be same with primary extract)

Pump process read data from local trail and write to remote trail.

```
GGSCI (ggate1) 10> add extract dpint46,exttrailsource /u01/app/oracle/product/ogg_src/dirdat/lt
```

EXTRACT added.

Add remote trail

```
GGSCI (ggate1) 2> add rmttrail /u01/app/oracle/product/gg/dirdat/rt,extract dpint46
```

RMTTRAIL added.

```
GGSCI (ggate1 as c##sourcegg1@oggdb1/CDB$ROOT) 44> view param extint46
```

extract EXTINT46

SETENV(ORACLE_SID='oggdb1')

SETENV(ORACLE_HOME = '/u01/app/oracle/product/12.2.0.1')

user=alias source=gg1_cdb

DDL INCLUDE ALL

TRANLOGOPTIONS INTEGRATEDPARAMS(MAX_SGA_SIZE 100)

exttrail /u01/app/oracle/product/ogg_src/dirdat/lt

TABLE pdb1.ggtraining1.dept11;

```
GGSCI (ggate1 as c##sourcegg1@oggdb1/CDB$ROOT) 52> view param dpint46
```

EXTRACT DPINT46

userid c##sourcegg2@pdb2 password welcome1

RMTHOST node1,mgrport 7810

RMTTRAIL /u01/app/oracle/product/gg/dirdat/rt

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TABLE pdb1.ggtraining1.dept11;

TABLE pdb1.ggtraining1.emp11;

Start all the process.

Start extint46

Start dpint46

Target Site 19c database GG Configuration

GGSCI (node1.localdomain) 15> alter credentialstore add user c##sourcegg2@ORCL password welcome1,alias sourcegg2_cdb

Credential store altered.

GGSCI (node1.localdomain) 16> info credentialstore

Reading from credential store:

Default domain: OracleGoldenGate

Alias: sourcegg2_cdb

Userid: c##sourcegg2@ORCL

alter system set enable_goldengate_replication=true

SQL> show pdbs

CON_ID	CON_NAME	OPEN MODE	RESTRICTED
2	PDB\$SEED	READ ONLY	NO
3	ORCLPDB	MOUNTED	

SQL> alter session set container=ORCLPDB ;

Session altered.

SQL> alter pluggable database orclpdb open read write;

SQL> create user ggtraining2 identified by welcome1;

User created.

SQL> create user c##sourcegg2 identified by welcome1;

User created.

SQL> grant dba to c##sourcegg2;

Grant succeeded.

SQL> alter database add supplemental log data(all) columns;

Database altered.

SQL> select supplemental_log_data_all from v\$database;

SUP

YES

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```
SQL> exec dbms_goldengate_auth.grant_admin_privilege('c##sourcegg2',container=>'all');
```

PL/SQL procedure successfully completed.

Checkpoint table creation

Use ADD CHECKPOINTTABLE to create a checkpoint table in the target database. Replicat uses the table to maintain a record of its read position in the trail for recovery purposes. Check point information found in dirchk directory. Checkpoint only created for replicat process only. Each process has its own checkpoint file. GG checkpoint process ensure zero data loss ensure data integrity. Check point file regularly updated as process stop and starts. Updated ideally every 10 seconds.

To check checkpoint information

```
Info repint26,showch
```

Integrated Replicat does not require a checkpoint table, however, it is recommended that you use it. Both integrated Replicat and parallel Replicat in integrated mode maintain the checkpoint table if it exists.

```
dblogin userialias sourcegg2_cdb
```

```
add checkpointtable c##sourcegg2.chkpttbl
```

Add Credentialstore

```
GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB$ROOT) 34> alter credentialstore add user c##sourcegg2@pdb2,password  
welcome1,alias sourcegg2_pdb
```

Credential store altered.

```
GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB$ROOT) 35> info credentialstore
```

Reading from credential store:

Default domain: OracleGoldenGate

Alias: sourcegg2_cdb

Userid: c##sourcegg2@ORCL

Alias: sourcegg2_pdb

Userid: c##sourcegg2@pdb2

Add replicat

```
GGSCI (node1.localdomain) 2> dblogin userialias sourcegg2_pdb
```

```
dblogin userialias sourcegg1_cdb
```

Successfully logged into database PDB2.

```
GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 4> add replicat repint26,integrated exttrail /u01/app/oracle/product/gg/dirdat/rt
```

REPLICAT (Integrated) added.

```
edit param repint26
```

```
REPLICAT REPINT26
```

```
userialias sourcegg2_pdb
```

```
DBOPTIONS INTEGRATEDPARAMS(parallelism 6)
```

```
ASSUMETARGETDEFS
```

```
MAP pdb1.ggtraining1.dept11,target pdb2.ggtraining2.dept22;
```

```
MAP pdb1.ggtraining1.emp11,target pdb2.ggtraining2.emp22;
```

Start the initial dataload using Datapump

```
SQL> select count(*) from ggtraining1.dept11;
```

COUNT(*)

4

```
SQL> select count(*) from ggtraining1.emp11;
```

COUNT(*)

7

```
SQL> select current_scn from v$database;
```

CURRENT_SCN

6130586

Export the schema using flashback_scn

```
SQL> create or replace directory dir1 as '/home/oracle/';
```

Directory created.

```
[oracle@ggate1 ~]$ expdp ggtraining1/welcome1@pdb1 dumpfile=exp_gg.dmp schemas=ggtraining1 directory=dir1 logfile=exp_gg.log flashback_scn=6130586
```

Export: Release 12.2.0.1.0 - Production on Mon Apr 15 06:30:25 2024

Copyright (c) 1982, 2017, Oracle and/or its affiliates. All rights reserved.

Connected to: Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

FLASHBACK automatically enabled to preserve database integrity.

Starting "GGTRAINING1"."SYS_EXPORT_SCHEMA_01": ggtraining1/*****@pdb1 dumpfile=exp_gg.dmp schemas=ggtraining1 directory=dir1 logfile=exp_gg.log flashback_scn=6130586

Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA

Processing object type SCHEMA_EXPORT/TABLE/INDEX/STATISTICS/INDEX_STATISTICS

Processing object type SCHEMA_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS

Processing object type SCHEMA_EXPORT/STATISTICS/MARKER

Processing object type SCHEMA_EXPORT/USER

Processing object type SCHEMA_EXPORT/SYSTEM_GRANT

Processing object type SCHEMA_EXPORT/ROLE_GRANT

Processing object type SCHEMA_EXPORT/DEFAULT_ROLE

Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROCACT_SCHEMA

Processing object type SCHEMA_EXPORT/TABLE/PROCACT_INSTANCE

Processing object type SCHEMA_EXPORT/TABLE/TABLE

Processing object type SCHEMA_EXPORT/TABLE/COMMENT

Processing object type SCHEMA_EXPORT/TABLE/INDEX/INDEX

Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/CONSTRAINT

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```

.. exported "GGTRAINING1"."EMP11"          8.492 KB    7 rows
.. exported "GGTRAINING1"."DEPT11"         6.031 KB    4 rows

Master table "GGTRAINING1"."SYS_EXPORT_SCHEMA_01" successfully loaded/unloaded

*****

Dump file set for GGTRAINING1.SYS_EXPORT_SCHEMA_01 is:

/home/oracle/exp_gg.dmp

Job "GGTRAINING1"."SYS_EXPORT_SCHEMA_01" successfully completed at Mon Apr 15 06:33:43 2024 elapsed 0 00:03:05

[oracle@ggate1 ~]$ scp exp_gg.dmp oracle@node1:/home/oracle

oracle@node1's password:

exp_gg.dmp                                100% 400KB 400.0KB/s  00:00

[oracle@node1 ~]$ impdp ggtraining2/welcome1@pdb2 directory=dir2 dumpfile=exp_gg.dmp remap_schema=ggtraining1:ggtraining2
remap_table=ggtraining1.emp11:emp22,ggtraining1.dept11:dept22 logfile=impdmp.log

Import: Release 19.0.0.0.0 - Production on Mon Apr 15 17:54:19 2024

Version 19.3.0.0.0

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Connected to: Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production

Master table "GGTRAINING2"."SYS_IMPORT_FULL_01" successfully loaded/unloaded

Starting "GGTRAINING2"."SYS_IMPORT_FULL_01": ggtraining2/*****@pdb2 directory=dir2 dumpfile=exp_gg.dmp
remap_schema=ggtraining1:ggtraining2 remap_table=ggtraining1.emp11:emp22,ggtraining1.dept11:dept22 logfile=impdmp.log

Processing object type SCHEMA_EXPORT/USER

ORA-31684: Object type USER:"GGTRAINING2" already exists

Processing object type SCHEMA_EXPORT/SYSTEM_GRANT

Processing object type SCHEMA_EXPORT/ROLE_GRANT

Processing object type SCHEMA_EXPORT/DEFAULT_ROLE

Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROCACT_SCHEMA

Processing object type SCHEMA_EXPORT/TABLE/PROCACT_INSTANCE

Processing object type SCHEMA_EXPORT/TABLE/TABLE

Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA

.. imported "GGTRAINING2"."EMP22"          8.492 KB    7 rows
.. imported "GGTRAINING2"."DEPT22"         6.031 KB    4 rows

Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/CONSTRAINT

Processing object type SCHEMA_EXPORT/TABLE/INDEX/STATISTICS/INDEX_STATISTICS

Processing object type SCHEMA_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS

Processing object type SCHEMA_EXPORT/STATISTICS/MARKER

Job "GGTRAINING2"."SYS_IMPORT_FULL_01" completed with 1 error(s) at Mon Apr 15 17:54:41 2024 elapsed 0 00:00:20

GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 52> start replicat repint26 aftercsn 6130586

```

```

[oracle@node1 ~]$ sqlplus ggtraining2/welcome1@pdb2

SQL*Plus: Release 19.0.0.0.0 - Production on Mon Apr 15 17:56:59 2024

Version 19.3.0.0.0

Copyright (c) 1982, 2019, Oracle. All rights reserved.

Last Successful login time: Mon Apr 15 2024 17:54:19 +05:00

Connected to:

Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 - Production

Version 19.3.0.0.0

SQL> select * from tab;

TNAME
-----

```

```

TABTYPE    CLUSTERID
-----
DEPT22
TABLE
EMP22
TABLE
SQL> select count(*) from dept22;

COUNT(*)
-----

4

SQL> select count(*) from emp22;

COUNT(*)
-----

7

```

Zero downtime rollback strategy

Suppose we came to a scenario to perform rollback to previous version, so using Oracle Golden Gate we can perform zero down time seamless rollback to previous database version.

Configure golden gate in bidirectional active passive mode.

Environment Details

Detail	Source	Target
DBNAME	orcl	oggdb1
HOSTNAME	NODE1	GGATE1
SERVER IP	192.168.56.105	192.168.56.102
SCHEMA NAME	Ggtraining2	Ggtraining1
DB VERSION	19.0.0.0.0	12.2.0.1.0

Zero Down time rollback Seamless Strategy

Configure bidirectional active passive mode (One process will up and other is down)

Stop extract , pump,replicat process

Configure Extract and pump on 19c db (source)

Configure replicat on 12c (target).

Start extract process

Switch application to other site

Start replicat process

Pre Requisites for replication source db

set parameter enable_goldengate_replication to true on both source and target

create global user in db 12 c with prefix c## on both source and target db

grant dba role to the user on both source and target db

enable supplemental log on source db

enable db in archive log mode on source db

Configure extract and pump process on source

Configure replicat on target

Start extract and pump

Start initial load

Start replicat process

SQL> show parameter goldengate

NAME	TYPE	VALUE
------	------	-------

enable_goldengate_replication	boolean	TRUE
-------------------------------	---------	------

SQL> create user ggtraining2 identified by welcome1;

User created.

SQL> create user c##sourceegg2 identified by welcome1;

User created.

SQL> grant dba to c##sourceegg2 container=all;

Grant succeeded.

SQL> exec dbms_goldengate_auth.grant_admin_privilege('c##sourceegg2',container=>'all');

GGSCI (node1.localdomain as c##sourceegg2@orcl/PDB2) 16> info credentialstore

Reading from credential store:

Default domain: OracleGoldenGate

Alias: sourceegg2_cdb

Userid: c##sourceegg2@ORCL

Alias: sourceegg2_pdb

Userid: c##sourceegg2@pdb2

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```
SQL> select supplemental_log_data_all from v$database;
```

SUP

YES

```
SQL> archive log list
```

Database log mode Archive Mode

Automatic archival Enabled

Archive destination /home/oracle/dbs/arch

Oldest online log sequence 12

Next log sequence to archive 14

Current log sequence 14

Check supplemental logging enable on table

```
GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 19> info trandata pdb2.ggtraining2.dept22
```

2024-04-20 01:18:52 INFO OGG-10471 ***** Oracle Goldengate support information on table GGTRAINING2.DEPT22 *****

Oracle Goldengate support native capture on table GGTRAINING2.DEPT22.

Oracle Goldengate marked following column as key columns on table GGTRAINING2.DEPT22: DEPTNO.

Logging of supplemental redo log data is disabled for table PDB2.GGTRAINING2.DEPT22.

Enable schema level supplemental logging

You can also perform at schema level to be applied on all tables

```
GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 23> add schematrandata ggtraining2
```

2024-04-20 01:24:12 INFO OGG-01788 SCHEMATRANDATA has been added on schema "ggtraining2".

2024-04-20 01:24:12 INFO OGG-01976 SCHEMATRANDATA for scheduling columns has been added on schema "ggtraining2".

2024-04-20 01:24:12 INFO OGG-10154 Schema level PREPARECSN set to mode NOWAIT on schema "ggtraining2".

2024-04-20 01:24:13 INFO OGG-10471 ***** Oracle Goldengate support information on table GGTRAINING2.DEPT22 *****

Oracle Goldengate support native capture on table GGTRAINING2.DEPT22.

Oracle Goldengate marked following column as key columns on table GGTRAINING2.DEPT22: DEPTNO.

2024-04-20 01:24:13 INFO OGG-10471 ***** Oracle Goldengate support information on table GGTRAINING2.EMP22 *****

Oracle Goldengate support native capture on table GGTRAINING2.EMP22.

Oracle Goldengate marked following column as key columns on table GGTRAINING2.EMP22: EMPNO.

```
GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 25> info schematrandata ggtraining2
```

2024-04-20 01:36:47 INFO OGG-06480 Schema level supplemental logging, excluding non-validated keys, is enabled on schema "GGTRAINING2".

2024-04-20 01:36:47 INFO OGG-10462 Schema "GGTRAINING2" have 2 prepared tables for instantiation.

Manager process

```
GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 24> view param mgr
```

PORT 7810

Add Extract

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GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 26> add extract newext46, integrated tranlog, begin now

EXTRACT (Integrated) added.

GGSCI (node1.localdomain as c##sourcegg2@orcl/PDB2) 44> dblogin userdalias sourcegg2_cdb

Successfully logged into database CDB\$ROOT.

GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB\$ROOT) 45> register extract newext46,database container(pdb2)

2024-04-20 02:08:55 INFO OGG-02003 Extract NEWEXT46 successfully registered with database at SCN 3169237.

GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB\$ROOT) 31> add exttrail /u01/app/oracle/product/gg/dirdat/lt,extract newext46

EXTTRAIL added.

GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB\$ROOT) 32> add extract newdp46,exttrailsource
/u01/app/oracle/product/gg/dirdat/lt

EXTRACT added.

GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB\$ROOT) 33> add rmttrail /u01/app/oracle/product/ogg_src/dirdat/rt,extract
newdp46

RMTRAIL added.

GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB\$ROOT) 88> view param newext46

extract NEWEXT46

--SETENV(ORACLE_SID='oggdb1')

--SETENV(ORACLE_HOME = '/u01/app/oracle/product/12.2.0.1')

userdalias sourcegg2_cdb

DDL INCLUDE ALL

TRANLOGOPTIONS INTEGRATEDPARAMS(MAX_SGA_SIZE 100)

exttrail /u01/app/oracle/product/gg/dirdat/lt

TABLE pdb1.ggtraining1.dept22;

TABLE pdb1.ggtraining1.emp22;

GGSCI (node1.localdomain as c##sourcegg2@orcl/CDB\$ROOT) 90> view param newdp46

EXTRACT NEWDP46

--userid c##sourcegg2@orcl, password welcome1

RMTHOST ggate1,mgrport 7809

RMTRAIL /u01/app/oracle/product/ogg_src/dirdat/rt

TABLE pdb2.ggtraining1.dept22;

TABLE pdb2.ggtraining1.emp22;

Start Extract and data pump process.

Start newext46

Start newdp46

GGSCI (ggate1) 8> info credentialstore

Reading from credential store:

Default domain: OracleGoldenGate

Alias: sourcegg1_cdb

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Userid: c##sourcegg1@oggdb1

GGSCI (ggate1) 9> **dblogin useridalias sourcegg1_cdb**

Successfully logged into database CDB\$ROOT.

add replicat newrep26,integrated exttrail /u01/app/oracle/product/ogg_src/dirdat/rt

GGSCI (ggate1 as c##sourcegg1@oggdb1/CDB\$ROOT) 29> alter credentialstore add user c##sourcegg1@pdb1,password welcome1,alias sourcegg11_pdb

Credential store altered.

Switch your application to new source

Start Replicat

Start newrep26