

Implementing Integrated Processes

Practice Overview

In this practice you will perform the following:

- Switch the Extract process from the classic mode to the integrated mode
- Switch the Replicat process from the non-integrated mode to the integrated mode
- Use monitoring tools to monitor the integrated processes
- Generate a healthcheck report on the integrated GoldenGate configuration



Implementing Integrated Processes

A. Setting the STREAMS_POOL_SIZE

Before converting your classic Extract into integrated Extract, you should study setting the STREAMS_POOL_SIZE to a proper value.

If the Automatic Shared Memory Management feature is configured, then the Oracle database will automatically set the size dedicated to the STREAMS_POOL_SIZE. The view V\$SGA_DYNAMIC_COMPONENTS will assist you to know the amount of memory dedicated to the Streams Pool.

In the practice environment, you have configured the SGA_MAX_SIZE parameter. In this case, if you set a value to the STREAMS_POOL_SIZE parameter, it will be the minimum amount of memory that to be dedicated to the streams pool.

Let's configure a value for the STREAMS_POOL_SIZE parameter.

1. Stop the Extract and the Replicat, if they are running.
2. In SQL*Plus, connect to db1 and set the STREAMS_POOL_SIZE parameter

```
alter system set STREAMS_POOL_SIZE=250m scope=spfile;  
alter system set SGA_MAX_SIZE=1536M scope=spfile;
```

3. Restart the database.
4. Verify the amount of memory dedicated to the parameter.

```
select COMPONENT, CURRENT_SIZE/1024/1024 MB from V$SGA_DYNAMIC_COMPONENTS  
where COMPONENT='streams pool' ;
```

B. Switch the Extract process from the classic mode to the integrated mode

In this section, you will convert the classic Extract process into an integrated Extract process

5. Register the Extract in the database.

```
DBLogin UserIDAlias oggdb1  
REGISTER EXTRACT esrv1 DATABASE
```

6. Make sure the Extract is ready for an upgrade.

```
INFO esrv1 UPGRADE
```

7. If the step 4 succeeds, skip this step and go to next step. If it fails, do not proceed to next step till you fix the error returned by the command in the previous step.

Usually the error you may receive is as follows:

```
ERROR: Extract <extract group name> is not ready to be upgraded because recovery  
SCN *** has not reached SCN ***
```

This error simply means that the database SCN has been incremented and the Extract is still positioned at some SCN point in the past. To resolve this error, you need to start the Extract process so that it reaches to the current SCN.

Some people suggest to resolve the issue with the command “alter extract ... begin now”. This solution may lead to losing some transactions and I am therefore against it.

A better solution is to stop the Extract, wait for a few seconds, stop it, and try again. The procedure to do that is as follows:

- a. Start the Extract
- b. Wait till the Extract advances to the current SCN.
- c. Stop the Extract and **repeat the previous step**.

8. Upgrade the Extract

```
ALTER EXTRACT esrv1, UPGRADE INTEGRATED TRANLOG
```

9. Add the following parameter to the Extract parameter file.

```
TRANLOGOPTIONS INTEGRATEDPARAMS (MAX_SGA_SIZE 250, PARALLELISM 3)
```

10. Verify that the parameter LOGALLSUPCOLS is included in the Extract parameter file. This step is the default behavior of OGG 12.2. It is mentioned here to emphasize its importance.

11. Start the Extract

```
START EXTRACT esrv1
```

12. Display the information of the Extract process

```
INFO esrv1, detail
```

13. Verify that no error is reported in the ggserr.log file.

14. Start the Replicat

C. Verify the change synchronization is working properly

Notice that the configuration is working fine when the Extract is operating in the integrated mode and the Replicat is operating in the nonintegrated mode.

15. In the `db1`, perform an UPDATE statement on the employees table as follows:

```
conn hr/oracle
UPDATE EMPLOYEES SET SALARY=15500 WHERE EMPLOYEE_ID=110;
COMMIT;
```

16. In the `db2` database, verify that the change has been synchronized

```
SELECT SALARY FROM EMPLOYEES WHERE EMPLOYEE_ID=110;
```

D. Monitor the integrated Extract process

In this section of the practice, you will use the monitoring tools to obtain information about the integrated Extract process.

17. In SQL*Plus session to `db1`, display the basic information about the capture process (Extract).

```
col CAPTURE_NAME format a15
select CAPTURE_NAME, STATUS, PURPOSE from DBA_CAPTURE;
```

18. Display further details about the Extract process.

```
col state format a25
select CAPTURE#, CAPTURE_NAME, STATE, SGA_ALLOCATED/1024/1024 MB from
V$GOLDENGATE_CAPTURE;
```

19. Display information about the active LogMiner sessions created by the capture.

```
select SESSION_NAME,SESSION_STATE,round(USED_MEMORY_SIZE/1024/1024,2) USED_MEMORY
from V$LOGMNR_SESSION;
```

Note: Once converted into integrated mode, the Extract will take a little bit more time to stop when you try to stop it using the `STOP` command. After you stop the Extract process, wait for few seconds before you check the its status with the `INFO` command.

E. Switch the Replicat from the Nonintegratedmode to the Integrated mode

In this section of the practice, you will convert the Replicat from the nonintegrated mode to the integrated mode.

20. Stop the Extract

21. Make sure the Data Pump finished processing all the records

```
lag psrv1

Sending GETLAG request to EXTRACT PSRV1 ...
Last record lag 4 seconds.
At EOF, no more records to process.
```

22. Stop the Data Pump

23. Make sure the Replicat finished processing all the records

24. Stop the Replicat

25. Alter Replicat to integrated mode

```
DBLogin UserIDAlias oggdb2
ALTER REPLICAT rsrv2, INTEGRATED
```

26. Add the following parameter to the Replicat parameter file.

```
DBOPTIONS INTEGRATEDPARAMS (parallelism 3)
```

27. Start the Replicat

```
START rsrv2
```

28. Verify that Replicat is operating in integrated mode

```
info rsrv2
```

29. Start the Extract and Data Pump processes

Note: Once the Replicat process starts operating in an integrated mode, it does not use the checkpoint table anymore.

F. Verify the change synchronization is working properly

30. In the db1, perform an UPDATE statement on the employees table as follows:

```
conn hr/oracle
UPDATE EMPLOYEES SET SALARY=16500 WHERE EMPLOYEE_ID=110;
COMMIT;
```

31. In the db2 database, verify that the change has been synchronized

```
conn hrtrg/oracle
SELECT SALARY FROM EMPLOYEES WHERE EMPLOYEE_ID=110;
```

G. Monitor the integrated Replicat process

In this section of the practice, you will use the monitoring tools to obtain information about the integrated Replicat process.

32. In the ggsci command prompt, display the lag information of the Replicat.

```
dblogin useridalias oggdb2
lag rsrv2
```

33. In SQL*Plus session to db2, execute the following queries:

```
conn / as sysdba
select REPLICAT_NAME, SERVER_NAME from DBA_GOLDENGATE_INBOUND;
select APPLY_NAME, QUEUE_NAME, STATUS from DBA_APPLY;
select APPLY_NAME, STATE from V$GG_APPLY_COORDINATOR;
select SERVER_ID, TOTAL_MESSAGES_APPLIED from V$GG_APPLY_SERVER;
select SID, SERIAL#, APPLY#, APPLY_NAME, STATE, TOTAL_MESSAGES_DEQUEUED from
V$GG_APPLY_READER;
```

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H. Generate Healthcheck Report

In this section of the practice, you will generate a healthcheck report about your GoldenGate configuration after converting the processes to integrated processes.

Reference: Document ID 1448324.1 in Oracle Support site provides the healthcheck scripts for different Oracle database versions. You will use the one of the Oracle database 12.1.0.2.

34. In `ggsrv1`, create the following directory:

```
mkdir /home/oracle/scripts
```

35. Using the Winscp utility, copy the `ogg_12102.sql` file to the directory `/home/oracle/scripts` in the source system.

36. Login to `db1` as `sysdba`.

37. Set a html spool file.

```
spool /home/oracle/scripts/output.html
```

38. Execute the script

```
@/home/oracle/scripts/ogg_12102.sql
```

39. After the script execution is finished, copy the `output.html` file to the local hosting machine and open it with a browser.

Summary

If all the requirements apply, you can switch the Extract and Replicat processes into operating in integrated mode. This mode has tight integration with Oracle database. The processes can be monitored from the databases.



By the end of this practice, following are the code in each process parameter file:

```
Extract esrv1
INCLUDE /u01/app/oracle/product/ogg/dirprm/header.mac
UserIDAlias oggdb1
ALLOWDUPTARGETMAP
TRANLOGOPTIONS INTEGRATEDPARAMS (MAX_SGA_SIZE 250, PARALLELISM 3)
LOGALLSUPCOLS
ExtTrail ./dirdat/es
Table HR.JOB_HISTORY;
Table HR.EMPLOYEES,
TOKENS ( TK-OSUSER = @GETENV ('GGENVIRONMENT' , 'OSUSERNAME'),
TK-HOST = @GETENV('GGENVIRONMENT' , 'HOSTNAME'));
Table HR.JOBS;
Table HR.DEPARTMENTS;
Table HR.LOCATIONS;
Table HR.REGIONS;
Table HR.SAMPLE;
TABLE HR.EVENTS, FILTER (@STREQ (EVENT, 'STOP EXTRACT' )), EVENTACTIONS (IGNORE
TRANS,STOP);
TABLE HR.EVENTS;
```

```
Extract psrv1
EncryptTrail AES256
RmtHost ggsrv2, MgrPort 7810
RmtTrail ./dirdat/rt
Passthru
Table HR.*;
```

```
Replicat rsrv2
INCLUDE /u01/app/oracle/product/ogg/dirprm/header.mac
DiscardFile ./dirrpt/rsrv2.dsc, Purge
UserIDAlias oggdb2
DBOPTIONS INTEGRATEDPARAMS (parallelism 3)
Map HR.EMPLOYEES, Target HRTRG.EMPLOYEES,
SQLEXEC (id GET_TITLE, QUERY ' SELECT JOB_TITLE FROM HRTRG.JOBS
WHERE JOB_ID = :V_JOB_ID ',
PARAMS (V_JOB_ID = JOB_ID)),
COLMAP (USEDEFAULTS, IT_JOB_FLAG = @IF (@STREQ (JOB_ID, 'IT_PROG'), 'Y', 'N'),
WORKING_DAYS = @DATEDIFF ('DD', HIRE_DATE, @DATENOW ()),
TITLE = @GETVAL(GET_TITLE.JOB_TITLE))
);
Map HR.EMPLOYEES, Target HRTRG.EMP_HISTORY, INSERTALLRECORDS,
ColMap (USEDEFAULTS,
OP_TYPE = @GetEnv('GGHEADER', 'OPTYPE'),
TRAN_TIME = @GetEnv('GGHEADER', 'COMMITTIMESTAMP'),
```

```
BEFORE_AFTER = @GETENV ('GGHEADER', 'BEFOREAFTERINDICATOR'),  
OSUSERNAME = @TOKEN('TK-OSUSER'),  
HOSTNAME = @TOKEN('TK-HOST')  
);  
MAP HR.EVENTS, TARGET HRTRG.EVENTS, FILTER (@STREQ (EVENT, 'STOP REPLICAT' )),  
EVENTACTIONS (IGNORE TRANS,STOP);  
Map HR.*, Target HRTRG.*;
```

