

【OGG】OGG 的单向复制配置-支持 DDL(二)

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1.2 前言部分

1.2.1 导读

各位技术爱好者，看完本文后，你可以掌握如下的技能，也可以学到一些其它你所不知道的知识，~O(∩\_∩)O~：

- ① OGG 的单向 DDL 实时复制功能

注意：本篇 BLOG 中代码部分需要特别关注的地方我都用黄色背景和红色字体来表示，比如下边的例子中，thread 1 的最大归档日志号为 33，thread 2 的最大归档日志号为 43

是需要特别关注的地方。

List of Archived Logs in backup set 11						
Thrd	Seq	Low SCN	Low Time	Next SCN	Next Time	
1	32	1621589	2015-05-29 11:09:52	1625242	2015-05-29 11:15:48	
1	33	1625242	2015-05-29 11:15:48	1625293	2015-05-29 11:15:58	
2	42	1613951	2015-05-29 10:41:18	1625245	2015-05-29 11:15:49	
2	43	1625245	2015-05-29 11:15:49	1625253	2015-05-29 11:15:53	

本文如有错误或不完善的地方请大家多多指正，ITPUB 留言或 QQ 皆可，您的批评指正是我写作的最大动力。

1. 2. 2 实验环境介绍

项目	source db	target db
db 类型	单实例	单实例
db version	11.2.0.3	11.2.0.3
db 存储	FS type	FS type
ORACLE_SID	ogg1	ogg2
db_name	ogg1	ogg2
主机 IP 地址：	192.168.59.129	192.168.59.130
OS 版本及 kernel 版本	RHEL6.5 64 位 , 2.6.32-504.16.2.el6.x86_64	RHEL6.5 64 位 , 2.6.32-504.16.2.el6.x86_64
OGG 版本	11.2.1.0.1 64 位	11.2.1.0.1 64 位
OS hostname	orcltest	rhel6_lhr

1. 2. 3 相关参考文章链接

【OGG】OGG 的下载和安装篇：<http://blog.itpub.net/26736162/viewspace-1693241/>

【OGG】OGG 的单向 DML 复制配置(一):<http://blog.itpub.net/26736162/viewspace-1696020/>

## 1.2.4 本文简介

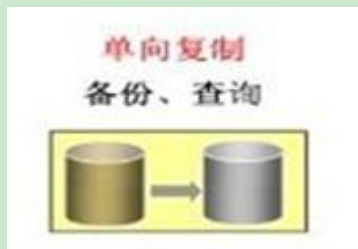
本文基于 OGG 的 DML 复制功能，加上 DDL 复制功能，后续会推出系列的 OGG 配置，包括双向复制，还有 rac 到单实例的复制等等，主要参考网址为：

<http://ylw6006.blog.51cto.com/all/470441/16>，非常感谢斩月大师。

## 1.3 实验部分

### 1.3.1 实验目标

配置 2 台服务器，搭建 OGG,实现 hr 用户下的数据 ddl 和 DML 复制功能。



### 1.3.2 先验证之前的配置不支持 DDL 复制

验证之前的配置不支持 DDL 复制，这里在 source 端，新建一张表，发现无法复制到 target 端！target 端也新建相同的表后，DML 操作可以成功复制。

```
[oracle@orcltest ~]$ sqlplus hr/hr@ogg1
```

```
SQL*Plus: Release 11.2.0.3.0 Production on Wed Jun 10 16:18:03 2015
```

```
Copyright (c) 1982, 2011, Oracle. All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL> create table t2 (id number primary key,name varchar2(20));

Table created.

SQL> conn hr/hr@ogg2
Connected.
SQL> select tname from tab where tname='T2';

no rows selected

SQL> create table t2 (id number primary key,name varchar2(20));

Table created.

SQL> conn hr/hr@ogg1
Connected.
SQL> insert into t2 values (1,'one');

1 row created.

SQL> commit;

Commit complete.

SQL> conn hr/hr@ogg2
Connected.
SQL> select * from t2;

   ID NAME
-----
    1 one

SQL>
```

此时 source 库：

```
GGSCI (orcltest) 26> dblogin userid ggusr@ogg1,password lhr
Successfully logged into database.

GGSCI (orcltest) 29> info trandata hr.t2

Logging of supplemental redo log data is disabled for table HR.T2.

GGSCI (orcltest) 30>
```

1. 3. 3 开始配置 OGG 支持 DDL 复制(在 source 端操作)

### 1.3.3.2 运行相关的 sql 脚本

1. @marker\_setup.sql
2. @ddl\_setup.sql
3. @role\_setup.sql

4.GRANT GGS\_GGSUSER\_ROLE TO gguser

5.@ddl\_enable.sql

6.@?/rdbms/admin/dbmspool.sql

7.@ddl\_pin.sql ggusr

```
[oracle@orcltest ggl1]$ sqlplus sys/lhr@oggl as sysdba
```

```
SQL*Plus: Release 11.2.0.3.0 Production on Wed Jun 10 16:30:45 2015
```

```
Copyright (c) 1982, 2011, Oracle. All rights reserved.
```

```
Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options
```

```
SQL> @marker_setup.sql
```

```
Marker setup script
```

```
You will be prompted for the name of a schema for the Oracle GoldenGate database objects.
NOTE: The schema must be created prior to running this script.
NOTE: Stop all DDL replication before starting this installation.
```

```
Enter Oracle GoldenGate schema name:ggusr
```

```
Marker setup table script complete, running verification script...
Please enter the name of a schema for the GoldenGate database objects:
Setting schema name to GGUSR
```

```
MARKER TABLE
-----
OK
```

```
MARKER SEQUENCE
-----
OK
```

```
Script complete.
```

```
SQL> @ddl_setup.sql
```

```
Oracle GoldenGate DDL Replication setup script
```

```
Verifying that current user has privileges to install DDL Replication...
```

```
You will be prompted for the name of a schema for the Oracle GoldenGate database objects.
NOTE: For an Oracle 10g source, the system recycle bin must be disabled. For Oracle 11g and later, it can be enabled.
NOTE: The schema must be created prior to running this script.
NOTE: Stop all DDL replication before starting this installation.
```

```
Enter Oracle GoldenGate schema name:ggusr
```

```
Working, please wait ...
Spooling to file ddl_setup_spool.txt
```

```
Checking for sessions that are holding locks on Oracle Golden Gate metadata tables ...
```

```
Check complete.
```

Using GGUSR as a Oracle GoldenGate schema name.

Working, please wait ...

DDL replication setup script complete, running verification script...  
Please enter the name of a schema for the GoldenGate database objects:  
Setting schema name to GGUSR

CLEAR\_TRACE STATUS:

Line/pos	Error
No errors	No errors

CREATE\_TRACE STATUS:

Line/pos	Error
No errors	No errors

TRACE\_PUT\_LINE STATUS:

Line/pos	Error
No errors	No errors

INITIAL\_SETUP STATUS:

Line/pos	Error
No errors	No errors

DDLVERSIONSPECIFIC PACKAGE STATUS:

Line/pos	Error
No errors	No errors

DDLREPLICATION PACKAGE STATUS:

Line/pos	Error
No errors	No errors

DDLREPLICATION PACKAGE BODY STATUS:

Line/pos	Error
No errors	No errors

DDL IGNORE TABLE  
-----  
OK

DDL IGNORE LOG TABLE  
-----  
OK

DDL AUX PACKAGE STATUS:

Line/pos	Error
----------	-------

```
No errors          No errors

DDL AUX PACKAGE BODY STATUS:

Line/pos          Error
-----
No errors          No errors

SYS.DDLCTXINFO  PACKAGE STATUS:

Line/pos          Error
-----
No errors          No errors

SYS.DDLCTXINFO  PACKAGE BODY STATUS:

Line/pos          Error
-----
No errors          No errors

DDL HISTORY TABLE
-----
OK

DDL HISTORY TABLE(1)
-----
OK

DDL DUMP TABLES
-----
OK

DDL DUMP COLUMNS
-----
OK

DDL DUMP LOG GROUPS
-----
OK

DDL DUMP PARTITIONS
-----
OK

DDL DUMP PRIMARY KEYS
-----
OK

DDL SEQUENCE
-----
OK

GGS_TEMP_COLS
-----
OK

GGS_TEMP_UK
-----
OK

DDL TRIGGER CODE STATUS:

Line/pos          Error
-----
No errors          No errors

DDL TRIGGER INSTALL STATUS
```



-----  
OK

DDL TRIGGER RUNNING STATUS

-----  
ENABLED

STAYMETADATA IN TRIGGER

-----  
OFF

DDL TRIGGER SQL TRACING

-----  
0

DDL TRIGGER TRACE LEVEL

-----  
0

LOCATION OF DDL TRACE FILE

-----  
/u02/app/oracle/diag/rdbms/ogg1/ogg1/trace/ggs\_ddl\_trace.log

Analyzing installation status...

-----  
STATUS OF DDL REPLICATION

-----  
SUCCESSFUL installation of DDL Replication software components

Script complete.

SQL> @role\_setup.sql

GGS Role setup script

This script will drop and recreate the role GGS\_GGSUSER\_ROLE

To use a different role name, quit this script and then edit the params.sql script to change the gg\_role parameter to the preferred name. (Do not run the script.)

You will be prompted for the name of a schema for the GoldenGate database objects.

NOTE: The schema must be created prior to running this script.

NOTE: Stop all DDL replication before starting this installation.

Enter GoldenGate schema name:ggusr

Wrote file role\_setup\_set.txt

PL/SQL procedure successfully completed.

Role setup script complete

Grant this role to each user assigned to the Extract, GGSCI, and Manager processes, by using the following SQL command:

GRANT GGS\_GGSUSER\_ROLE TO <loggedUser>

where <loggedUser> is the user assigned to the GoldenGate processes.

SQL> grant ggs\_ggsuser\_role to ggusr;

Grant succeeded.

SQL> @ddl\_enable.sql

Trigger altered.

SQL> @?/rdbms/admin/dbmspool.sql

Package created.

1. 3. 4      **source 端修改 extract 进程的 params 文件，添加"ddl include all"参数，重启 extract 进程**

```
setenv (ORACLE_HOME=/u02/app/oracle/product/11.2.0/dbhome_1)
setenv (NLS_LANG=AMERICAN_AMERICA.ZHS16GBK)
ddl include all
userid ggusr,password lhr
exttrail ./dirdat/hr
table hr.*;
```

```
GGSCI (orcltest) 6> stop eora_hr
```

Sending STOP request to EXTRACT EORA\_HR ...  
Request processed.

```
GGSCI (orcltest) 7> start eora_hr
```

Sending START request to MANAGER ...  
EXTRACT EORA\_HR starting

```
GGSCI (orcltest) 8> info all
```

Program	Status	Group	Lag at Chkpt	Time Since Chkpt
MANAGER	RUNNING			
EXTRACT	RUNNING	EORA_HR	00:00:00	00:00:07
EXTRACT	RUNNING	PORA_HR	00:00:00	00:00:09

```
GGSCI (orcltest) 9>
GGSCI (orcltest) 9> view report EORA_HR
```

```
*****
      Oracle GoldenGate Capture for Oracle
      Version 11.2.1.0.1 OGGCORE_11.2.1.0.1_PLATFORMS_120423.0230_FBO
      Linux, x64, 64bit (optimized), Oracle 11g on Apr 23 2012 08:42:16
```

Copyright (C) 1995, 2012, Oracle and/or its affiliates. All rights reserved.

```
      Starting at 2015-06-10 16:41:04
*****
```

```
Operating System Version:
Linux
Version #1 SMP Sun Nov 10 22:19:54 EST 2013, Release 2.6.32-431.el6.x86_64
Node: orcltest
Machine: x86_64

      soft limit  hard limit
Address Space Size : unlimited unlimited
Heap Size          : unlimited unlimited
File Size          : unlimited unlimited
CPU Time           : unlimited unlimited
```

Process id: 22734

Description:

```
*****
**      Running with the following parameters      **
*****
```

```
2015-06-10 16:41:04 INFO    OGG-03035  Operating system character set identified as UTF-8. Locale: en_US, LC_ALL:.
extract eora_hr
setenv (ORACLE_SID=ogg1)
Set environment variable (ORACLE_SID=ogg1)
```

```
setenv (ORACLE_HOME=/u02/app/oracle/product/11.2.0/dbhome_1)
Set environment variable (ORACLE_HOME=/u02/app/oracle/product/11.2.0/dbhome_1)
setenv (NLS_LANG=AMERICAN_AMERICA.ZHS16GBK)
Set environment variable (NLS_LANG=AMERICAN_AMERICA.ZHS16GBK)
ddl include all
userid ggusr,password ***
exttrail ./dirdat/hr
table hr.*;
```

```
2015-06-10 16:41:04 INFO OGG-01815 Virtual Memory Facilities for: BR
anon alloc: mmap(MAP_ANON) anon free: munmap
file alloc: mmap(MAP_SHARED) file free: munmap
target directories:
/u01/gg11/BR/EORA_HR.
```

```
Bounded Recovery Parameter:
BRINTERVAL = 4HOURS
BRDIR      = /u01/gg11
```

```
2015-06-10 16:41:04 INFO OGG-01815 Virtual Memory Facilities for: COM
anon alloc: mmap(MAP_ANON) anon free: munmap
file alloc: mmap(MAP_SHARED) file free: munmap
target directories:
/u01/gg11/dirtmp.
```

```
CACHEMGR virtual memory values (may have been adjusted)
CACHESIZE: 64G
CACHEPAGEOUTSIZE (normal): 8M
PROCESS VM AVAIL FROM OS (min): 128G
CACHEsizEMAX (strict force to disk): 96G
```

```
Database Version:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
PL/SQL Release 11.2.0.3.0 - Production
CORE 11.2.0.3.0 Production
TNS for Linux: Version 11.2.0.3.0 - Production
NLSRTL Version 11.2.0.3.0 - Production
```

```
Database Language and Character Set:
NLS_LANG = "AMERICAN_AMERICA.ZHS16GBK"
NLS_LANGUAGE = "AMERICAN"
NLS_TERRITORY = "AMERICA"
NLS_CHARACTERSET = "ZHS16GBK"
```

```
2015-06-10 16:41:04 WARNING OGG-01423 No valid default archive log destination directory found for thread 1.
```

```
2015-06-10 16:41:04 INFO OGG-01513 Positioning to Sequence 8, RBA 4283920, SCN 0.1107430.
```

```
2015-06-10 16:41:04 INFO OGG-01516 Positioned to Sequence 8, RBA 4283920, SCN 0.1107430, Jun 10, 2015 4:40:34 PM.
```

```
2015-06-10 16:41:04 INFO OGG-01055 Recovery initialization completed for target file ./dirdat/hr000001, at RBA 1076.
```

```
2015-06-10 16:41:04 INFO OGG-01478 Output file ./dirdat/hr is using format RELEASE 11.2.
```

```
2015-06-10 16:41:04 INFO OGG-01026 Rolling over remote file ./dirdat/hr000001.
```

```
2015-06-10 16:41:04 INFO OGG-01053 Recovery completed for target file ./dirdat/hr000002, at RBA 1076.
```

```
2015-06-10 16:41:04 INFO OGG-01057 Recovery completed for all targets.
```

```
*****
** Run Time Messages **
*****
```

```
2015-06-10 16:41:04 INFO OGG-01517 Position of first record processed Sequence 8, RBA 4283920, SCN 0.1107430, Jun 10, 2015 4:40:34 PM.
```

```
GGSCI (orcltest) 10>
GGSCI (orcltest) 10> info extract eora_hr

EXTRACT      EORA_HR      Last Started 2015-06-10 16:41      Status RUNNING
Checkpoint Lag      00:00:00 (updated 00:00:04 ago)
Log Read Checkpoint      Oracle Redo Logs
                        2015-06-10 16:42:16      Seqno 8, RBA 4302848
                        SCN 0.1107495 (1107495)

GGSCI (orcltest) 11>
```

1.3.5 target端修改 replicat 进程的 params 文件 ,添加"ddl include all"和"ddlerror default ignore retryop maxretries 3 retrydelay 5" 参数 ,重启 replicat 进程

```
[oracle@rhel6_lhr gg11]$ ggsci

Oracle GoldenGate Command Interpreter for Oracle
Version 11.2.1.0.1 OGGCORE_11.2.1.0.1_PLATFORMS_120423.0230_FBO
Linux, x64, 64bit (optimized), Oracle 11g on Apr 23 2012 08:32:14

Copyright (C) 1995, 2012, Oracle and/or its affiliates. All rights reserved.

GGSCI (rhel6_lhr) 1> info all

Program      Status      Group      Lag at Chkpt  Time Since Chkpt

MANAGER      RUNNING
REPLICAT     RUNNING     RORA_HR    00:00:00      00:00:07

GGSCI (rhel6_lhr) 2> edit params rora_hr

GGSCI (rhel6_lhr) 3> view params rora_hr

replicat rora_hr
setenv (ORACLE_SID=ogg2)
setenv (ORACLE_HOME=/u01/app/oracle/product/11.2.0/dbhome_1)
setenv (NLS_LANG=AMERICAN_AMERICA.ZHS16GBK)
ddl include all
ddlerror default ignore retryop maxretries 3 retrydelay 5
userid ggusr,password lhr
handlecollisions
assumetargetdefs
discardfile ./dirrpt/rora_hr.dsc,purge
map hr.* ,target hr.*;

GGSCI (rhel6_lhr) 4> stop rora_hr

Sending STOP request to REPLICAT RORA_HR ...
Request processed.
```

```
[oracle@orcltest ~]$ sqlplus hr/hr@ogg1

SQL*Plus: Release 11.2.0.3.0 Production on Wed Jun 10 16:47:12 2015

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Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options

SQL> alter table t2 add location varchar2(200);

Table altered.

SQL> conn hr/hr@ogg2
Connected.
SQL> desc t2

```

Name	Null?	Type
ID	NOT NULL	NUMBER
NAME		VARCHAR2(20)
LOCATION		VARCHAR2(200)

```

SQL> conn hr/hr@ogg1
Connected.
SQL> create table t3 as select object_id,object_name from dba_objects;

Table created.

SQL> select count(1) from t3;

```

```
COUNT(1)
-----
       75262

SQL> conn hr/hr@ogg2
Connected.
SQL> select tname from tab where tname='T3';

TNAME
-----
T3

SQL> select count(1) from t3;

COUNT(1)
-----
       75217
```

可以看到 DDL 语句已经执行了，我们看看 DDL 语句的日志：

```
SESS 380011-2015-06-10 16:47:19 : DDL : ***** Start of log for DDL sequence [14], v[ $Id: ddl_setup.sql /st_oggcore_11.2.1/8 2012/04/02 11:11:33 smijatov Exp $ ] trace level [0], owner schema of DDL package [GGUSR], objtype [TABLE] name [HR.T2]
SESS 380011-2015-06-10 16:47:19 : DDLTRACE1 : Before Trigger: point in execution = [1.0], objtype [TABLE] name [HR.T2]
SESS 380011-2015-06-10 16:47:19 : DDL : DDL operation [alter table t2 add location varchar2(200) ], sequence [14], DDL type [ALTER] TABLE, real object type [TABLE], validity [VALID], object ID [76836], object [HR.T2], real object [HR.T2], base object schema [], base object name [], logged as [HR]
SESS 380011-2015-06-10 16:47:19 : DDL : Start SCN found [1107605]
SESS 380011-2015-06-10 16:47:20 : DDL : ----- End of log for DDL sequence [14]

SESS 390002-2015-06-10 16:48:14 : DDL : ***** Start of log for DDL sequence [501], v[ $Id: ddl_setup.sql /st_oggcore_11.2.1/8 2012/04/02 11:11:33 smijatov Exp $ ] trace level [0], owner schema of DDL package [GGUSR], objtype [TABLE] name [HR.T3]
SESS 390002-2015-06-10 16:48:14 : DDLTRACE1 : Before Trigger: point in execution = [1.0], objtype [TABLE] name [HR.T3]
SESS 390002-2015-06-10 16:48:14 : DDL : DDL operation [create table t3 as select object_id,object_name from dba_objects ], sequence [501], DDL type [CREATE] TABLE, real object type [TABLE], validity [], object ID [], object [HR.T3], real object [HR.T3], base object schema [], base object name [], logged as [HR]
SESS 390002-2015-06-10 16:48:14 : DDL : Start SCN found [1107994]
SESS 390002-2015-06-10 16:48:14 : DDL : ----- End of log for DDL sequence [501]
```

### 1. 3. 7 实验总结

DDL 复制，我们可以从日志看出其执行的 SQL 语句，若 DML 配置熟悉的话，DDL 配置就很简单了。

### 1. 4 About Me

本文作者：小麦苗，只专注于数据库的技术，更注重技术的运用

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