

11g OCM Upgrade

EXAM Topic

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Reference
Security Guide
Streams Replication Administrator's Guide

1 Database, RMAN, EM and Network Configuration

[Y]Configure server-side network

Net Services Reference=> [7 Oracle Net Listener Parameters \(listener.ora\)](#)

#listener.ora

```
PROD=(ADDRESS_LIST= (ADDRESS=(PROTOCOL=tcp)(HOST=edu1)(PORT=1521)))
SID_LIST_PROD=(SID_LIST= (SID_DESC=(SID_NAME=prod)(ORACLE_HOME=/ora/db11g) ))
```

[Y]Configure client-side network

Net Services Reference=> [6 Local Naming Parameters \(tnsnames.ora\)](#)

#tnsnames.ora

```
prod=(DESCRIPTION= (ADDRESS_LIST=
  (load_balance=yes) (FAILOVER=on)
  (ADDRESS=(PROTOCOL=tcp)(HOST=edu1)(PORT=1522))
  (ADDRESS=(PROTOCOL=tcp)(HOST=edu1)(PORT=1523)))
(CONNECT_DATA=(SERVICE_NAME=prod))
PROD=(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=edu1)(PORT=1521))(CONNECT_DATA=(SERVICE_NAME=PROD)))
PRODSTD=(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp)(HOST=edu1)(PORT=1521))(CONNECT_DATA=(SERVICE_NAME=PRODSTD)))
```

[Y]Create and Manage encrypted tablespaces

Administrator's Guide=> 13 Managing Tablespaces=> Creating Tablespaces

Net Services Reference=> 5 Parameters for the sqlnet.ora File

#创建 wallet

mkdir -p /ora/db11g/admin/PROD/wallet

vi sqlnet.ora # 最后一行添加

```
WALLET_LOCATION=(SOURCE=(METHOD=FILE)(METHOD_DATA=(DIRECTORY=/ora/db11g/admin/PROD/wallet/)))
```

ALTER SYSTEM SET ENCRYPTION KEY IDENTIFIED BY "welcome1";

#创建加密表空间

CREATE TABLESPACE securespace DATAFILE '/u01/app/oracle/oradata/orcl/secure01.dbf' SIZE 10M

ENCRYPTION DEFAULT STORAGE(ENCRYPT);

#创建使用 3DES168 进行加密的表空间

CREATE TABLESPACE securespace DATAFILE '/u01/app/oracle/oradata/orcl/secure01.dbf' SIZE 10M

ENCRYPTION USING '3DES168' DEFAULT STORAGE(ENCRYPT);

#Check

```
SELECT t.name, e.encryptionalg algorithm FROM v$tablespace t, v$encrypted_tablespaces e WHERE t.ts# = e.ts#;
```

```
NAME ALGORITHM
```

```
SECURESPACE 3DES128
```

[Y]Create and Manage a tablespace that uses NFS mounted file system file

服务器端 修改文件 然后 service nfsd restart

vi /etc/exports

```
/ins *(rw)
```

客户端

mount nfs:/ins /ins

或者 修改 /etc/fstab

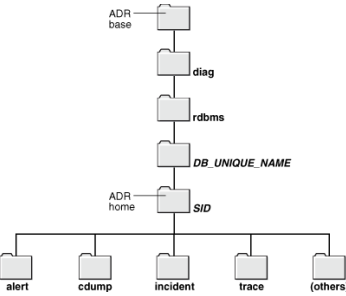
```
nfs:/ins /ins nfs rw,bg,hard,nointr,tcp,vers=3,timeo=300,rsize=32768,wsz=32768,actimeo=0 0 0
```

[Y]Set up ADR file based repository

Administrator's Guide=> [9 Managing Diagnostic Data](#)

log 及 trace 的统一管理模式 #Config ADR base

alter system set diagnostic_dest='/u01/oracle/log'



SELECT NAME, VALUE FROM V\$DIAG_INFO;

NAME	VALUE
Diag Enabled	TRUE
ADR Base	/u01/oracle/log
ADR Home	/u01/oracle/log/diag/rdbsms/dbn/osi
Diag Trace	/u01/oracle/log/diag/rdbsms/dbn/osi/trace
Diag Alert	/u01/oracle/log/diag/rdbsms/dbn/osi/alert
Diag Incident	/u01/oracle/log/diag/rdbsms/dbn/osi/incident
Diag Cdump	/u01/oracle/log/diag/rdbsms/dbn/osi/cdump
Health Monitor	/u01/oracle/log/diag/rdbsms/dbn/osi/hm
Default Trace File	/u01/oracle/log/diag/rdbsms/dbn/osi/trace/osi_ora_10533
Active Problem Count	0
Active Incident Count	0

[Y]Perform cold database backup

冷备，直接关了数据库 CP

[Y]Manage user accounts and use case sensitive passwords

Security Guide=> [3 Configuring Authentication](#)

敏感密码，主要是密码安全性方面的设置。

#安装密码验证 function

conn / as sysdba

@?/rdbsms/admin/utlpwdmg.sql

--配置给指定 profile

ALTER PROFILE DEFAULT LIMIT PASSWORD_VERIFY_FUNCTION verify_function_11g;

--撤销 profile 中的密码验证

ALTER PROFILE DEFAULT LIMIT PASSWORD_VERIFY_FUNCTION NULL;

alter user test profile default;

[Y]Use OPatch to install a patch

#用 opatch 修补或升级数据库部分模块

\$ORACLE_HOME/OPatch/patch apply

\$ORACLE_HOME/OPatch/patch lsinventory

cat /etc/oraInst.loc

```
inventory_loc=/ora/oraInventory
inst_group=oinstall
```

cat /ora/oraInventory/ContentsXML/inventory.xml

```
<?xml version="1.0" standalone="yes" ?>
<!-- Copyright (c) 2009 Oracle Corporation. All rights Reserved -->
<!-- Do not modify the contents of this file by hand. -->
<INVENTORY>
  <COMPOSITEHOME_LIST>
  </COMPOSITEHOME_LIST>
  <VERSION_INFO>
    <SAVED_WITH>10.2.0.5.0</SAVED_WITH>
    <MINIMUM_VER>2.1.0.6.0</MINIMUM_VER>
  </VERSION_INFO>
  <HOME_LIST>
    <HOME NAME="OraDb11g_home1" LOC="/ora/db/11g" TYPE="O" IDX="1"/>
    <HOME NAME="db10g" LOC="/ora/GC/db10g" TYPE="O" IDX="2"/>
    <HOME NAME="oms10g" LOC="/ora/GC/oms10g" TYPE="O" IDX="3"/>
    <HOME NAME="agent10g" LOC="/ora/GC/agent10g" TYPE="O" IDX="4"/>
  </HOME_LIST>
</INVENTORY>
```

[Y]Install and configure EM Agent

```
web 界面下载文件 http://edu2:4889/agent\_download/ 或者手工安装，并且指定端口及密码等信息
进入 10.2.0.1.1/linux 找到 agentDownload.linux 右键 save link as 到本地盘
export PATH=$PATH:$ORACLE_HOME/jdk/bin
agentDownload.linux -b /ora
#最终安装路径为 /ora/agent10g

代理的管理#重点看的是上传时间，如果为空则证明代理不通，检查网络

cd /ora/agent10g
./emctl status agent
./emctl upload
./emctl config addTarget -home/oracle/newTarget.xml

agentca -d #重新配置
agentca -f -c "node1 node2"
```

[Y]Create Base Recovery Catalog

```
Backup and Recovery User's Guide=> 12 Managing a Recovery Catalog
#创建表空间
CREATE TABLESPACE RCAT DATAFILE '/ora/DB/oradata/EMREP/rcat.dbf' SIZE 100M AUTOEXTEND ON;
#创建用户
CREATE USER RCADMIN IDENTIFIED BY rcadmin DEFAULT TABLESPACE RCAT ACCOUNT UNLOCK
GRANT CONNECT TO RCADMIN;
alter user rc_admin quota unlimited on rcat;
grant recovery_catalog_owner to rc_admin;
#创建 catalog
rman target sys/oracle@prod catalog rcadmin/rcadmin@emrep #连接目标库与编目库
create catalog; #创建编目
register database; #注册
report schema # 验证
```

[Y]Configure RMAN

```
Backup and Recovery User's Guide=> 5 Configuring the RMAN Environment
CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default
#保留策略 备份保留几份 # report obsolete #report need backup #delete obsolete #记录及是被备份文件
CONFIGURE RETENTION POLICY TO recovery window of 3 days; #可以恢复到 3 天内任何一个时间点
CONFIGURE BACKUP OPTIMIZATION OFF; # default#设定备份优化 完整备份后不发变化的文件下次不进行备份，
强制备份忽略掉此参数 backup database force
CONFIGURE DEFAULT DEVICE TYPE TO DISK; # default
# CONFIGURE DEFAULT DEVICE TYPE TO SBT; 设置备份设备
CONFIGURE CONTROLFILE AUTOBACKUP OFF; # default
#知否自动备份控制文件和 init 文件 建议打开，当控制文件发生变化时，自动进行备份
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default
#自动备份的备份文件保存的位置，默认闪回区，或者 dbs 下面
CONFIGURE DEVICE TYPE DISK PARALLELISM 2 BACKUP TYPE TO compress BACKUPSET;
#备份并发度 #备份集 #copy 完全和原文件相同
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default #备份 copy 备份几份
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default #备份 copy 归档 备份几份
CONFIGURE MAXSETSIZE TO UNLIMITED; # default #单个备份集大小限制
#加密备份 Backup and Recovery Advanced User's Guide
CONFIGURE ENCRYPTION FOR DATABASE ON; -- 开启加密备份功能
set encryption on identified by '111111' only; --设置加密密码
```

backup tablespace tbs1; --备份

set decryption identified by '111111'; --设置解密密码

restore tablespace tbs1 -- 恢复加密备份

CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default

CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default

CONFIGURE SNAPSHOT CONTROLFILE NAME TO '/ora/DB/dbs/snapcf_prod.f'; # default

#控制文件的快照 RAC 环境中快照需要指定在共享存储中

CONFIGURE DEVICE TYPE DISK BACKUP TYPE TO COMPRESSED BACKUPSET PARALLELISM 1; --压缩备份

backup as compressed backupset tablespace system;

CONFIGURE CHANNEL DEVICE TYPE DISK format '/ora/backup/backup_%U' --指定备份到某个目录

backup database format '/ora/backup/backup_%U'

enable fast incremental backup

alter database enable block change tracking using file '/ora/oradata/PROD.block.trace';

alter database disable block change tracking;

SELECT * FROM v\$block_change_tracking;

Backup Settings

Device	Backup Set	Policy
<h4>Backup Policy</h4> <p><input checked="" type="checkbox"/> Automatically backup the control file and server parameter file (SPFILE) with every backup and database structural change</p> <p>Autobackup Disk Location <input type="text"/> <small>An existing directory or diskgroup name where the control file and server parameter file will be backed up. If you do not specify a location, the flash recovery area location.</small></p> <p><input type="checkbox"/> Optimize the whole database backup by skipping unchanged files such as read-only and offline datafiles that have been backed up</p> <p><input type="checkbox"/> Enable block change tracking for faster incremental backups</p> <p>Block Change Tracking File <input type="text"/> <small>Specify a location and file, otherwise an Oracle managed file will be created in the database area.</small></p>		

[Y]Perform multisection backup of a datafile

Backup and Recovery User's Guide=> 9 Backing Up the Database: Advanced Topics 把一个文件被分成多个备份文件

backup section size 200M datafile 1 format '/ora/backup/%U_.bk';

[Y]Create an Archival Backup

Backup and Recovery User's Guide=> 8 Backing Up the Database

backup archivelog all delete input;

BACKUP ARCHIVELOG FROM SEQUENCE 121 UNTIL SEQUENCE 125;

2 Data Guard

[Y]Create Physical Standby Database with real-time apply.

Data Guard Concepts and Administration=>[3 Creating a Physical Standby Database](#)

Data Guard Concepts and Administration=>[7 Apply Services](#)

GC 建好 DataGuard 之后在 DataGuard 属性页面里面进行修改成 real-time apply

做好之后 show parameter log 查看 DG 日志传输为 **LGWR SYNC AFFIRM**

ORACLE Enterprise Manager 10g
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | All Targets

Database Instance: PROD >

Data Guard

Page Refreshed May 2, 2012 2:47:32 PM CST View Data Real Time: Manual Refresh

Overview

Data Guard Status **Normal**
Protection Mode **Maximum Protection**
Fast-Start Failover **Disabled**

Primary Database

Name **PROD**
Host **edu1**
Data Guard Status **Normal**
Current Log **28**
Properties **Edit**

Standby Progress Summary

Transport lag is the time difference between the primary last update and the standby last received redo. Apply lag is the time difference between the primary last update and the standby last applied redo.

seconds

1.0
0.5
0.0

0 0

PRODSTD

■ Transport Lag
■ Apply Lag

Standby Databases

Edit Remove Switchover Failover Convert Add Standby Database

Select Name	Host	Data Guard Status	Role	Real-time Query	Last Received Log	Last Applied Log	Estimated Failover Time
<input checked="" type="radio"/> PRODSTD	edu1	Normal	Physical Standby	Disabled	28	28	< 1 second

ORACLE Enterprise Manager 10g
Grid Control

Home Targets Deployments Alerts Compliance

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | All Targets

Database Instance: PROD > Data Guard >

Edit Standby Database Properties: PRODSTD

General Standby Role Properties Common Properties

Status **Normal**
Role **Physical Standby**

Redo Apply Services

Redo apply services automatically apply redo data to standby databases to maintain transactional consistency with the primary database

☒ **Apply On**
Redo apply is on. Redo data is being applied.
☒ **Real-time query** allows a physical standby database to be used for real-time reporting, with minimal latency between reporting and production data.
☒ **Enable Real-time Query**
The database is open read-only and redo apply is on.

☐ **Apply Off**
Redo apply is off. No redo data will be applied.

Diagnostics

Role	View Alert Log	Open Telnet Session
Primary	PROD	edu1
Physical Standby	PRODSTD	edu1

General Standby Role Properties Common Properties

[Y]Configure the data guard environment to reduce overheads of fast incremental backups on the primary database

使用快速增量备份的备份集创建 data guard?

enable fast incremental backup

alter database enable block change tracking using file '/ora/oradata/PROD.block.trace';

alter database disable block change tracking;

SELECT * FROM v\$block_change_tracking;

Backup Settings

Device Backup Set Policy

Backup Policy

☒ Automatically backup the control file and server parameter file (SPFILE) with every backup and database structural change

Autobackup Disk Location

An existing directory or diskgroup name where the control file and server parameter file will be backed up. If you do not specify a location, the flash recovery area location.

☐ Optimize the whole database backup by skipping unchanged files such as read-only and offline datafiles that have been backed up

☒ **Enable block change tracking for faster incremental backups**

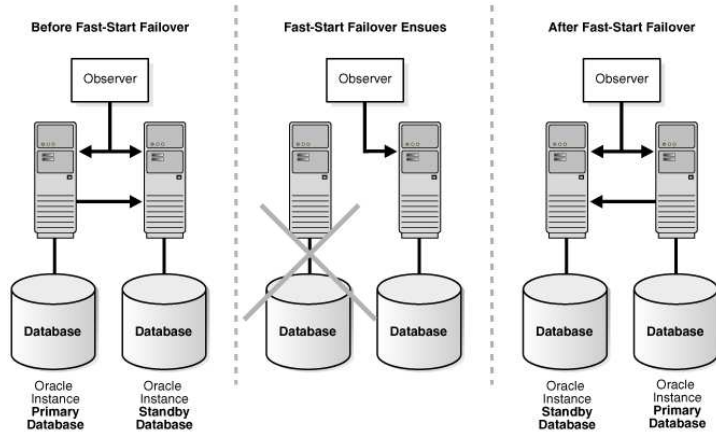
Block Change Tracking File

Specify a location and file, otherwise an Oracle managed file will be created in the database area.

[Y]Configure the Observer

Data Guard Broker=> [5 Switchover and Failover Operations](#) => 5.5 Fast-Start Failover

Figure 5-1 Relationship of Primary and Standby Databases and the Observer



指定 Observer 进行变更记录以达到快速切换的目的。

手工开启 Observer 进程#我们在主库上面做测试，如果 GC 起不来 OB 的时候再做。

```
$>dgmgrl
DGMGR>connect sys/oracle@prod
DGMGR>start observer file='/ora/observer.dat'
#启动后会一直挂在那里进行监听
```

配置 DG #注意：不能在 snapshot standby 上做

在界面里面点 **Fast-Start Failover** 进入配置界面

Fast-Start Failover: Configure Observer

Observer Location

There is currently no observer for this configuration. Select the discovered host and Oracle Home where Enterprise Manager will start the observer.

☒ TIP Specify an alternate observer location to enhance observer availability. If an unobserved condition is detected, Enterprise Manager will attempt to restart the observer on the original observer host, falling back to the alternate host if necessary.

Observer Host:

Observer Oracle Home:

Alternate Observer Host:

Alternate Observer Oracle Home:

Observer Connect Identifiers

Optionally specify alternate connect identifiers for the observer to use to connect to the primary and standby databases. By default, the observer will contact each database using the same connect identifier used for other Data Guard functions.

☒ Primary Database:

☒ Standby Database:

做好的效果

Data Guard

Page Refreshed May 4, 2012 2:21:57 PM CST View Data Real Time: Manual Refresh

Overview

Data Guard Status: **Normal**

Protection Mode: **Maximum Availability**

Fast-Start Failover: **Enabled to PRODSTD**

Observer Location: **edu1**

Primary Database

Name: **PROD**

Host: **edu1**

Data Guard Status: **Normal**

Current Log: **60**

Properties: [Edit](#)

Standby Progress Summary

Transport lag is the time difference between the primary last update and the standby last received redo. Apply lag is the time difference between the primary last update and the standby last applied redo.

1.0
0.5
0.0

No data is currently available.

Standby Databases

[Edit](#) [Remove](#) [Switchover](#) [Failover](#) [Convert](#) [Add Standby Database](#)

Select Name	Host	Data Guard Status	Role	Real-time Query	Last Received Log	Last Applied Log	Estimated Failover Time
<input checked="" type="radio"/> PRODSTD	edu1	Normal	Physical Standby	Disabled	59	59	Not available

[Y]Switchover and switch back

GC 中操作，切换回来之前先当前主库 switch 几下 logfile 以避免 GC 报错

[Y]Convert the standby to a snapshot standby

Data Guard Broker=> [6 Scenarios Using the DGMGRL Command-Line Interface](#)

Data Guard
Page Refreshed May 2, 2012 4:40:29 PM CST View Data Real Time: Manual Refresh

Overview
Data Guard Status: **Normal**
Protection Mode: **Maximum Availability**
Fast-Start Failover: **Disabled**

Primary Database
Name: **PROD**
Host: **edu1**
Data Guard Status: **Normal**
Current Log: **49**
Properties: [Edit](#)

Standby Progress Summary
Transport lag is the time difference between the primary last update and the standby last received redo. Apply lag is the time difference between the primary last update and the standby last applied redo.

Standby Databases
[Edit](#) [Remove](#) [Switchover](#) [Failover](#) [Convert](#) [Add Standby Database](#)

Select	Name	Host	Data Guard Status	Role	Real-time Query	Last Received Log	Last Applied Log	Estimated Failover Time
<input checked="" type="radio"/>	PRODSTD	edu1	Normal	Physical Standby	Disabled	48	48	< 1 second

Warning
This operation will convert the last physical standby database to a snapshot standby database. Although a snapshot standby database provides data protection, failover requires additional time compared to a physical standby database. If this is a concern, consider creating an additional physical standby database prior to performing conversion.

Confirmation: Convert Database
Are you sure you want to convert PRODSTD to a snapshot standby database?
[No](#) [Yes](#)

Processing: Convert Standby Database
After all steps are completed, you will be returned to the Data Guard overview page.

Converting database
Waiting for process to complete

TIP This process cannot be cancelled. It will continue even if the browser window is closed.

中间可能报错，重新刷新一下就好了，最终应该是这个样子的

Data Guard
Page Refreshed May 2, 2012 4:43:17 PM CST View Data Real Time: Manual Refresh

Overview
Data Guard Status: **Normal**
Protection Mode: **Maximum Availability**
Fast-Start Failover: **Disabled**

Primary Database
Name: **PROD**
Host: **edu1**
Data Guard Status: **Normal**
Current Log: **52**
Properties: [Edit](#)

Standby Progress Summary
Transport lag is the time difference between the primary last update and the standby last received redo. Apply lag is the time difference between the primary last update and the standby last applied redo.

Standby Databases
[Edit](#) [Remove](#) [Switchover](#) [Failover](#) [Convert](#) [Add Standby Database](#)

Select	Name	Host	Data Guard Status	Role	Real-time Query	Last Received Log	Last Applied Log	Estimated Failover Time
<input checked="" type="radio"/>	PRODSTD	edu1	Normal	Snapshot Standby	N/A	51	48	< 1 second

[Y]Configure archivelog deletion policy for the dataguard configuration

#PROD RMAN

CONFIGURE ARCHIVELOG DELETION POLICY TO APPLIED ON ALL STANDBY;
CONFIGURE DB_UNIQUE_NAME PRODSTD CONNECT IDENTIFIER 'PRODSTD';

#PRODSTD RMAN

CONFIGURE ARCHIVELOG DELETION POLICY TO BACKED UP 1 TIMES TO DEVICE TYPE DISK;

#PROD

CONFIGURE DB_UNIQUE_NAME 'PRODSTD' CONNECT IDENTIFIER 'PRODSTD';
CONFIGURE ARCHIVELOG DELETION POLICY TO APPLIED ON ALL STANDBY;

PRODSTD

CONFIGURE ARCHIVELOG DELETION POLICY TO BACKED UP 1 TIMES TO DISK;

3 Data and Data Warehouse Management

[Y]Troubleshoot fast materialized views to fast refresh and query rewrite

Data Warehousing Guide=> [8 Basic Materialized Views](#)

Data Warehousing Guide=> [9 Advanced Materialized Views](#)

-- MGv 多表合并组合查询物化视图 -- MAV 单表查询物化视图 -- 权限

grant execute on dbms_mview to hr;

grant create materialized view to hr;

-- create mview log

create materialized view log on t with rowid ,sequence(id,name) including new values ;

-- 语句改写

select id,name from t group by id,name;

等效于

select distinct id,name from t;

-- 快刷的

create materialized view mv1 refresh fast on commit enable query rewrite as select id,name from t group by id,name;

-- 快刷+自动刷新 # 每分钟一次

create materialized view mv1 refresh fast **start with sysdate next sysdate+1/24/60** as select id,name from t group by id,name;

--手工快刷

exec dbms_mview.refresh('mv1','fast');

[Y]Add a tablespace by using Transportable Tablespace Feature of Data Pump Import (cross platform transportable tablespace)

Administrator's Guide=> [13 Managing Tablespaces](#) => [Transporting Tablespaces Between Databases](#)

同构/异构迁移 可 GC

先要导入一个 dmp 文件到 PROD 需要 **fromuser=ssh touser=oltp_user** 然后传输到 EVEN 的 EMREP 上并导入表空间。源库，在 GC 中操作，表空间定义做成一个 DMP 文件，并且将数据文件复制到同一目录，目标库，在 GC 中进行导入操作，指定 DMP 文件和数据文件，选择导入后文件的位置后进行导入

[Y]Configure a schema to support a star transformation query

Note: Oracle does not recommend setting CURSOR_SHARING to FORCE in a DSS environment or if you are using complex queries. Also, star transformation is not supported with CURSOR_SHARING set to either SIMILAR or FORCE. For more information, see the "Enabling Query Optimizer Features" on page 11-5.

alter system set cursor_sharing=exact;

alter system set star_transformation_enabled=TRUE;

TRUE: Oracle 优化器自动识别语句中的事实表和约束维度表并进行星型转换。这一切优化尝试都在 CBO 的范畴内，优化器需要确定转换后的执行计划成本要低于不转换的执行计划；同时优化器还会尝试利用物化的临时表，如果那样真的好的话。

FALSE: 优化器不会考虑星型转换。

TEMP_DISABLE: 当一个维度表超过 100 个块时，如果简单地设置 star_transformation_enabled 为 TRUE 来启用星型变换，那么会话会创建一个内存中的全局临时表(global temporary table)来保存已过滤的维度数据，这在过去会造成很多问题；这里说的 100 个块其实是隐式参数 _temp_tran_block_threshold(number of blocks for a dimension before we temp transform)的默认值，此外隐式参数 _temp_tran_cache(determines if temp table is created with cache option，默认为 TRUE)决定了这类临时表是否被缓存住；为了避免创建全局临时表可能带来的问题，就可以用到 TEMP_DISABLE 这个禁用临时表的选项，让优化器不再考虑使用物化的临时表。

示例：我们以 ORACLE 默认 SAMPLE SH 为例

SELECT c.cust_city, t.calendar_quarter_desc, SUM(s.amount_sold) sales_amount

```
FROM sh.sales s, sh.times t, sh.customers c, sh.channels ch
WHERE s.time_id = t.time_id AND s.cust_id = c.cust_id AND s.channel_id = ch.channel_id
AND c.cust_state_province = 'FL' AND ch.channel_desc = 'Direct Sales'
AND t.calendar_quarter_desc IN ('2000-01', '2000-02', '1999-12')
GROUP BY c.cust_city, t.calendar_quarter_desc;
```

未开启 star_transformation_enabled 的执行计划

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time	Pstart	Pstop
0	SELECT STATEMENT		607	46132	968 (3)	00:00:12		
1	HASH GROUP BY		607	46132	968 (3)	00:00:12		
* 2	HASH JOIN		2337	173K	967 (3)	00:00:12		
3	PART JOIN FILTER CREATE	:BF0000	274	4384	18 (0)	00:00:01		
* 4	TABLE ACCESS FULL	TIMES	274	4384	18 (0)	00:00:01		
* 5	HASH JOIN		12456	729K	948 (3)	00:00:12		
6	MERGE JOIN CARTESIAN		383	14937	409 (1)	00:00:05		
* 7	TABLE ACCESS FULL	CHANNELS	1	13	3 (0)	00:00:01		
8	BUFFER SORT		383	9958	406 (1)	00:00:05		
* 9	TABLE ACCESS FULL	CUSTOMERS	383	9958	406 (1)	00:00:05		
10	PARTITION RANGE JOIN-FILTER		918K	18M	533 (3)	00:00:07	:BF0000	:BF0000
11	TABLE ACCESS FULL	SALES	918K	18M	533 (3)	00:00:07	:BF0000	:BF0000

Predicate Information (identified by operation id):

```

2 - access("S"."TIME_ID"="T"."TIME_ID")
4 - filter("T"."CALENDAR_QUARTER_DESC"='1999-12' OR "T"."CALENDAR_QUARTER_DESC"='2000-01' OR
        "T"."CALENDAR_QUARTER_DESC"='2000-02')
5 - access("S"."CUST_ID"="C"."CUST_ID" AND "S"."CHANNEL_ID"="CH"."CHANNEL_ID")
7 - filter("CH"."CHANNEL_DESC"='Direct Sales')
9 - filter("C"."CUST_STATE_PROVINCE"='FL')
```

开启 star_transformation_enabled 后的执行计划

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time	Pstart	Pstop
0	SELECT STATEMENT		238	13566	551 (1)	00:00:07		
1	TEMP TABLE TRANSFORMATION							
2	LOAD AS SELECT	SYS_TEMP_OFD906617_D3180						
* 3	TABLE ACCESS FULL	CUSTOMERS	383	9958	406 (1)	00:00:05		
* 4	HASH GROUP BY		238	13566	145 (3)	00:00:02		
* 5	HASH JOIN		238	13566	144 (2)	00:00:02		
* 6	HASH JOIN		238	9996	142 (2)	00:00:02		
* 7	TABLE ACCESS FULL	TIMES	274	4384	18 (0)	00:00:01		
8	VIEW	VW_ST_A3F94988	238	6188	123 (1)	00:00:02		
9	NESTED LOOPS		238	13566	100 (1)	00:00:02		
10	PARTITION RANGE SUBQUERY		237	6660	56 (2)	00:00:01	KEY(SQ)	KEY(SQ)
11	BITMAP CONVERSION TO ROWIDS		237	6660	56 (2)	00:00:01		
12	BITMAP AND							
13	BITMAP MERGE							
14	BITMAP KEY ITERATION							
15	BUFFER SORT							
* 16	TABLE ACCESS FULL	CHANNELS	1	13	3 (0)	00:00:01	KEY(SQ)	KEY(SQ)
17	BITMAP INDEX RANGE SCAN	SALES_CHANNEL_BIX						
18	BITMAP MERGE							
19	BITMAP KEY ITERATION							
20	BUFFER SORT							
* 21	TABLE ACCESS FULL	TIMES	274	4384	18 (0)	00:00:01	KEY(SQ)	KEY(SQ)
* 22	BITMAP INDEX RANGE SCAN	SALES_TIME_BIX						
23	BITMAP MERGE							
24	BITMAP KEY ITERATION							
25	BUFFER SORT							
26	TABLE ACCESS FULL	SYS_TEMP_OFD906617_D3180	383	1915	2 (0)	00:00:01	KEY(SQ)	KEY(SQ)
* 27	BITMAP INDEX RANGE SCAN	SALES_CUST_BIX						
28	TABLE ACCESS BY USER ROWID	SALES	1	29	67 (0)	00:00:01	ROWID	ROWID
29	TABLE ACCESS FULL	SYS_TEMP_OFD906617_D3180	383	5745	2 (0)	00:00:01		

Predicate Information (identified by operation id):

```

3 - filter("C"."CUST_STATE_PROVINCE"='FL')
5 - access("ITEM_1"='CU')
6 - access("ITEM_2"="T"."TIME_ID")
7 - filter("T"."CALENDAR_QUARTER_DESC"='1999-12' OR "T"."CALENDAR_QUARTER_DESC"='2000-01' OR
        "T"."CALENDAR_QUARTER_DESC"='2000-02')
16 - filter("CH"."CHANNEL_DESC"='Direct Sales')
17 - access("S"."CHANNEL_ID"="CH"."CHANNEL_ID")
21 - filter("T"."CALENDAR_QUARTER_DESC"='1999-12' OR "T"."CALENDAR_QUARTER_DESC"='2000-01' OR
        "T"."CALENDAR_QUARTER_DESC"='2000-02')
22 - access("S"."TIME_ID"="T"."TIME_ID")
27 - access("S"."CUST_ID"="C"."CUST_ID")
```

Note

```

- star transformation used for this statement
```

我们可以看到执行计划尾部的 Note 中已经明确提示了使用 star transformation used for this statment

[Y]Configure and use parallel execution for queries

优先顺序 Hint > session > object

-- hint

```
select /*+ parallel(4) */ * from hr.employees;
```

```
select /*+ parallel(hr.employees,4) */ * from hr.employees;
```

-- objects

```
alter table employees parallel 4;
```

```
alter index emp_id parallel 4;
```

-- session

```
alter session enable parallel query;
```

```
alter session enable parallel dml;
```

alter session enable parallel ddl;

SELECT pdml_status,PQ_STATUS FROM v\$session where sid=170;

并行查询会占用更多的内存排序区，并行成本=成本*并行数*2,例如开 1G 的排序区，20 个并行进程，那么在极限情况下内存占用应为 20*1G*2=40G 内存小于此量会占用 pagefile 性能急剧下降

alter system set parallel_max_servers=50 -- 建议至少 2 倍于表指定并行的数量

redo 并行 x\$ksppi 中查询隐含参数

[Y]Use and access SecureFile LOBS

SecureFiles and Large Objects Developer's Guide=> [4 Using Oracle SecureFiles LOBs](#)

Net Services Reference=> 5 Parameters for the sqlnet.ora File

Administrator's Guide=> [13 Managing Tablespaces](#) => [Creating Tablespaces](#) => [Encrypted Tablespaces](#)

SQL Language Reference=> [12 SQL Statements: ALTER TABLE to ALTER TABLESPACE](#)

SQL Language Reference=> [16 SQL Statements: CREATE SYNONYM to CREATE TRIGGER](#)

启用

```
mkdir -p /ora/db11g/admin/PROD/wallet
```

vi sqlnet.ora # 最后一行添加

```
WALLET_LOCATION=(SOURCE=(METHOD=FILE)(METHOD_DATA=(DIRECTORY=/ora/db11g/admin/PROD/wallet/)))
```

SQL>ALTER SYSTEM SET ENCRYPTION KEY IDENTIFIED BY "welcome1";

#报错 ORA-28368: cannot auto-create wallet 的话 是目录或者 sqlnet.ora 的问题

#SQL> ALTER SYSTEM SET db_securefile = 'ALWAYS'; -- 修改模式

ALWAYS: 尝试将所有 LOB 创建为 SecureFile LOB, 但是仅可将自动段空间管理(ASM) 表空间外的任何 LOB 创建为 BasicFile LOB	FORCE: 强制将所有 LOB 创建为 SecureFile LOB	PERMITTED: 允许创建 SecureFiles (默认值)	NEVER: 禁止创建 SecureFiles	IGNORE: 禁止创建 SecureFiles, 并忽略使用 SecureFiles 选项强制创建 BasicFiles 而导致的任何错误
---	-------------------------------------	-----------------------------------	-------------------------	--

-- 创建 securefile



CREATE TABLE t1 (a CLOB ENCRYPT IDENTIFIED BY foo) LOB(a) STORE AS SECUREFILE (CACHE); --指定密码的 securefile

CREATE TABLE lob_1(id number, doc CLOB ENCRYPT USING 'AES128') LOB(doc) STORE AS SECUREFILE (DEDUPLICATE LOB);

CREATE TABLE lob_2 (id number, doc CLOB) LOB(doc) STORE AS SECUREFILE (COMPRESS HIGH KEEP_DUPPLICATES);

-- 由于创建好的 securefile 未创建相应的 LOB 段, 无法看到已经启用 securefile 我们插入几条数据后才能看到加密段

insert into lob_1 values(1,'asdfgjkqwetui2rtYu');

insert into lob_2 values(1,'asdfgjkqwetui2rtYu');

commit;

--此时可以看到数据已经有 securefile 加密的 LOB 段了

SELECT segment_name, segment_type, segment_subtype FROM user_segments where segment_type like 'LOB%';

SEGMENT_NAME	SEGMENT_TYPE	SEGMENT_SU
SYS_IL0000107267C00002\$\$	LOBINDEX	ASSM
SYS_IL0000107270C00002\$\$	LOBINDEX	ASSM
SYS_LOB0000107267C00002\$\$	LOBSEGMENT	SECUREFILE
SYS_LOB0000107270C00002\$\$	LOBSEGMENT	SECUREFILE

注意: 索引不被加密

delete lob_1;

truncate table lob_1;

drop table lob_1 purge;

delete lob_2;

truncate table lob_2;

drop table lob_2 purge;

commit;-- 删除数据后段仍然存在

--清空表后加密段还健在

-- 这样就删没了

ALTER TABLE t1 MODIFY LOB(a) (KEEP_DUPPLICATES); #禁用取消重复

ALTER TABLE t1 MODIFY PARTITION p1 LOB(a) (DEDUPLICATE LOB); #启用分区取消重复

ALTER TABLE t1 MODIFY LOB(a) (NOCOMPRESS); #禁用压缩

ALTER TABLE t1 MODIFY PARTITION p1 LOB(a) (COMPRESS HIGH); #对单一分区中的 SecureFiles 启用压缩

ALTER TABLE t1 MODIFY (a CLOB ENCRYPT USING '3DES168'); #使用 3DES168 启用加密

ALTER TABLE t1 MODIFY PARTITION p1(LOB(a) (ENCRYPT); #对分区启用加密

ALTER TABLE t1 MODIFY (a CLOB ENCRYPT IDENTIFIED BY ghYtp); #使用口令启用加密并构建加密密钥

SecureFiles 迁移: 示例

```

CREATE TABLE cust(c_id NUMBER PRIMARY KEY,c_zip NUMBER,c_name VARCHAR(30) DEFAULT NULL,c_lob CLOB);
INSERT INTO cust VALUES(1, 94065, 'hhh', 'ttt');
commit;

CREATE TABLE cust_int(c_id NUMBER NOT NULL,c_zip NUMBER,c_name VARCHAR(30) DEFAULT NULL,c_lob CLOB)
LOB(c_lob) STORE AS SECUREFILE (NOCACHE FILESYSTEM_LIKE_LOGGING);

-- 注意修改文档中 owner 的部分
DECLARE
col_mapping VARCHAR2(1000);
BEGIN
-- map all the columns in the interim table to the original table
col_mapping := 'c_id c_id , ' || 'c_zip c_zip , ' || 'c_name c_name , ' || 'c_lob c_lob';
DBMS_REDEFINITION.START_REDEF_TABLE('SH', 'cust', 'cust_int', col_mapping);
END;
/

DECLARE
error_count pls_integer := 0;
BEGIN
DBMS_REDEFINITION.COPY_TABLE_DEPENDENTS('SH', 'cust', 'cust_int', 1, TRUE,TRUE,TRUE,FALSE, error_count);
DBMS_OUTPUT.PUT_LINE('errors := ' || TO_CHAR(error_count));
END;
/

EXEC DBMS_REDEFINITION.FINISH_REDEF_TABLE('sh', 'cust', 'cust_int');

select table_name , column_name ,segment_name,SECUREFILE   from user_lobs;

```

[Y]Create partitioned tables (includes reference and interval partitioning)

SQL Language Reference=> [16 SQL Statements: CREATE SYNONYM to CREATE TRIGGER](#)

interval partitioning 按照指定规则自动创建分区,初始分区为创建时指定的分区,当新数据插入时自动创建新分区

```

CREATE TABLE interval_demo ( customer_id number, name varchar2(20))
PARTITION BY RANGE (customer_id) INTERVAL (10) (PARTITION p1 VALUES LESS THAN (10) tablespace users);

```

检查命令

```

col high_value format a20
col segment_name format a20
col partition_name format a20
SELECT partition_name, high_value FROM user_tab_partitions WHERE table_name like '%DEMO%';
select SEGMENT_NAME,PARTITION_NAME from user_segments where segment_name like '%DEMO%';

```

刚创建好的状态

PARTITION_NAME	HIGH_VALUE
P1	10

SEGMENT_NAME	PARTITION_NAME
INTERVAL_DEMO	P1

--插入 50 条数据

```

begin
for a in 1..50 loop
insert into interval_demo
values(a,'NAME');
end loop;
commit;
end;
/

```

PARTITION_NAME	HIGH_VALUE
P1	10
SYS_P21	20
SYS_P22	30
SYS_P23	40
SYS_P24	50
SYS_P25	60

SEGMENT_NAME	PARTITION_NAME
INTERVAL_DEMO	P1
INTERVAL_DEMO	SYS_P21
INTERVAL_DEMO	SYS_P22
INTERVAL_DEMO	SYS_P23
INTERVAL_DEMO	SYS_P24
INTERVAL_DEMO	SYS_P25

#Reference Partitioning 外键自动关联主键分区

```

--主分区表 必须有主键, 且主键关键字 not null 并且不支持 interval 形式分区表
CREATE TABLE ref_m_demo(customer_id number not null,name varchar2(20),
CONSTRAINT ref_m_demo_pk PRIMARY KEY(customer_id))
PARTITION BY RANGE (customer_id) (PARTITION p1 VALUES LESS THAN (10),PARTITION p2 VALUES LESS THAN (20));

-- 外键同步分区表,同样, 外键关联字段必须 not null

```

<pre>CREATE TABLE ref_s_demo (emp_id number not null, city varchar2(20), CONSTRAINT ref_s_demo_fk FOREIGN KEY(emp_id) REFERENCES ref_m_demo(customer_id)) PARTITION BY REFERENCE (ref_s_demo_fk);</pre>	
<pre>col owner format a5 col segment_name format a20 col partition_name format a20 select OWNER, SEGMENT_NAME,PARTITION_NAME from dba_segments where SEGMENT_NAME like 'REF%';</pre>	<pre>OWNER SEGMENT_NAME PARTITION_NAME ----- - SH REF_M_DEMO P1 SH REF_M_DEMO P2 SH REF_M_DEMO_PK SH REF_S_DEMO P1 SH REF_S_DEMO P2</pre>
<p>分区类型</p> <p>Range 数值范围</p> <p>Hash 关键词值进行分区，分的更均匀，适合等值查询</p> <p>List 等于指定值，精确匹配分区</p> <p>range-hash 组合分区，大 range 小 hash</p> <p>Range-list 组合分区，大 range 小 list 子分区定义模板，如果在水分区之内特意指定了子分区信息则不使用模板</p>	
<pre>alter table p1 rename partition part_1 to partx_1; --分区改名字 alter table p1 truncate partition partx_1 update index; --清除分区数据自动更新索引 alter table p1 drop partition part_3; -- 删除分区时自动清理掉本地索引 删除分区 alter table p1 add partition part_4 values less than ('40') tablespace users; --增加 range 分区 ALTER TABLE "HR"."P1" MOVE PARTITION "PART_MAX" TABLESPACE "P3"; --移动 alter table p1 split partition part_4 at ('35'); ---range partition 切割分区 alter table p3 split partition part_1 values('good'); ---list partition 切割分区 alter table p1 merge partitions part_3,part_4; ---range ,list 合并分区 alter table p2 coalesce partition; --收缩 hash 分区，每次减少一个合并分区 alter table p3 modify partition part_4 drop values('zzz'); --修改 list 分区分区关键字 alter table p3 modify partition part_4 add values('zzz'); --修改 list 分区分区关键字</pre> <p>分区表的分区与普通表进行交换</p> <pre>alter table p1 exchange partition part_1 with table test [without validation]; 不校验数据是否符合分区规范 alter table p1 exchange partition part_1 with table test [with validation];--default 校验数据 alter table p1 exchange partition part_1 with table test [including indexes]; alter table p1 exchange partition part_1 with table test [excluding indexes];--default</pre> <p>导出一个分区</p> <pre>exp hr/hr tables=p1:part_1 file=p1_part_1.dmp</pre> <p>移动分区，包括 LOB 的</p> <pre>alter table image_table move tablespace users lob (image_DATA) store as (tablespace users);</pre>	

[Y]Configure Flashback Data Archive

<p>配置</p> <pre>alter system set DB_RECOVERY_FILE_DEST='/ora/archive/EDU' scope=spfile; alter system set DB_RECOVERY_FILE_DEST_SIZE=2G scope=spfile; alter system set db_flashback_retention_target=4320 scope=spfile; -- 保存 3 天</pre> <p>select flashback_on from v\$database</p>	<p>shutdown immediate -- 启用</p> <p>startup mount</p> <p>alter database flashback on;</p> <p>alter database open;</p>
<p>Flash Recovery</p> <p>Flash Recovery Area is enabled for this database. The chart shows space used by each file type that is not reclaimable by Oracle. Performing backups to a tertiary storage is one way to make space reclaimable. Usable Flash Recovery Area includes free and reclaimable space.</p> <p>Flash Recovery Area Location <input type="text" value="/ora/db/flash_recovery_area"/></p> <p>Flash Recovery Area Size <input type="text" value="2"/> GB</p> <p>Reclaimable Flash Recovery Area (MB) 35.18</p> <p>Free Flash Recovery Area (MB) 797.54</p> <p><input checked="" type="checkbox"/> Enable Flashback Database - flashback logging can be used for fast database point-in-time recovery* The flash recovery area must be set to enable flashback logging. When using flashback logs, you may recover your entire database to a prior point-in-time without restoring files. Flashback is the preferred point-in-time recovery method in the recovery wizard when appropriate.</p> <p>Specify how far back you wish to flash the database in the future</p> <p>Flashback Retention Time <input type="text" value="24"/> Hours</p> <p>Current size of the flashback logs(MB) 7.812</p> <p>Lowest SCN in the flashback data 510989</p> <p>Flashback Time Nov 30, 2011 5:15:27 AM</p> <p><input type="checkbox"/> Apply changes to SPFILE only. Otherwise the changes will be made to both SPFILE and the running instance which requires that you restart the database to invoke static parameters.</p> <p>*TRIP * indicates controls, if changed, must restart database to invoke.</p> <p>Show SQL Revert Apply</p>	

查看 FLA 指定的目录，一般看看用了多少，以及剩余空间

闪回数据库到指定时间

start mount

RMAN> flashback database to time=to_date('20111110 14:35','yyyymmdd hh24:mi')

闪回到指定 SCN

SQL> flashback database to scn=200127;

-- select CURRENT_SCN from v\$database;

根据 LOG 号 闪回

-- select * from v\$log;

RMAN> flashback database to sequence=52 thread=1;

TIMESTAMP 闪回

SQL> flashback database to timestamp (sysdate-1/24); -- 1 小时前

回收站有几个删除的表，有一个带指定的列，闪回来就行

-- query from recyclebin (DROP TYPE)

select OWNER,ORIGINAL_NAME, OBJECT_NAME from dba_recyclebin;

show recyclebin;

DESC "BIN\$tKhVpDPPhdSvgQKjACxwGcw==\$0"

-- flash back drop table and rename to new tablename

flashback table "BIN\$tKhVpDPPhdSvgQKjACxwGcw==\$0" to before drop rename to emp_bdrop;

-- flash backup transaction

create table t_ft(id number,dt date);

```
begin
for a in 1..1000 loop
insert into t_ft values(a,sysdate);
dbms_lock.sleep(0.01);
commit;
end loop;
end;
/
```

-- 查看每个动作的回退命令

```
SELECT operation, undo_sql, table_name,
a.start_scn,a.start_timestamp,a.commit_scn,a.commit_timestamp
FROM flashback_transaction_query a
where table_name='T_FT';
```

-- 闪回表

FLASHBACK TABLE t_ft TO TIMESTAMP to_timestamp('10:42','hh24:mi');

FLASHBACK TABLE t_ft TO SCN 257322;

根据历史版本创建一个视图供查询

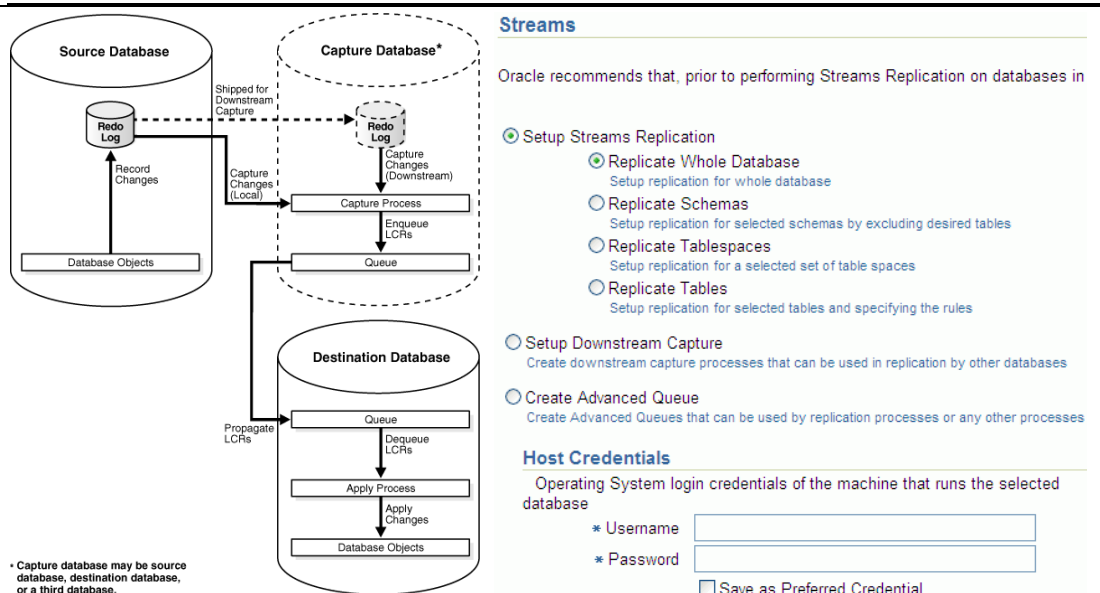
```
create view hist_salary as
select * from hr.t_ft as of scn 257464
```

[Y]Use Oracle Streams to capture and propagate changes in a table

Streams Advanced Queuing User's Guide

Streams Replication Administrator's Guide=> [1 Preparing for Oracle Streams Replication](#)

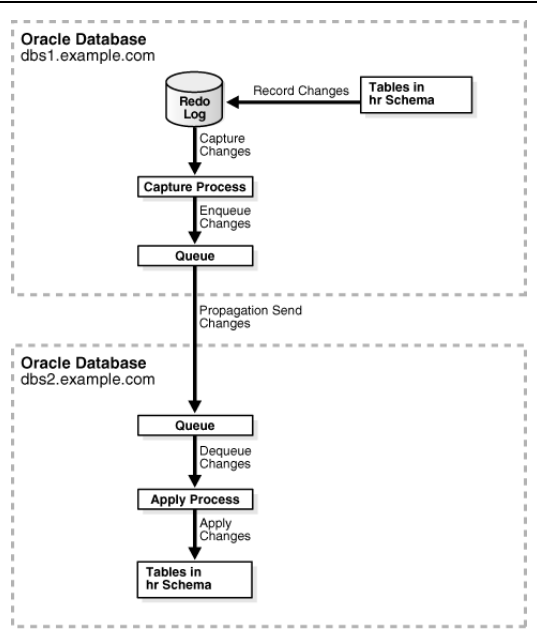
=> [2 Simple Oracle Streams Replication Configuration](#)



Stream 捕捉 LOG 中的变化进行记录并保存在高级队列中进行发布, 目标库去队列中取得相应数据并且到本地库进行重做。可以实现整个数据库以及指定用户、指定表空间、指定表的流复制。

需要配置三种角色 1、数据捕捉者 2、数据分发者 3、订阅者。

考纲说了 Use Oracle Streams to capture and propagate changes in a table 只考虑表 stream 就行了
建议 GC, 手工是在太麻烦了



1、Create Streams Administrator

Create Streams Administrator

Select the databases, on which you want to create Streams Administrator, and enter the DBA credentials. The DBA User for creating Streams Administrator should be an existing Administrator with SYSDBA, have the same DBA user and password, and the tablespace entered for the Streams Administrator.

Credentials

DBA Username

DBA Password

Streams Administrator Username

Streams Administrator Password

Tablespace
It is not recommended that Streams Administrator use the SYSTEM tablespace.

List of Databases

<input type="button" value="Remove"/>	<input type="button" value="Add"/>			
<input type="button" value="Select All"/>	<input type="button" value="Select None"/>			
Select	Target Name	Target Version	Host Name	Target Type
<input type="checkbox"/>	PROD	11.2.0.3.0	edu1	oracle_database
<input type="checkbox"/>	ST	11.2.0.3.0	edu1	oracle_database

2、Connfig Replicate tables #注意, 这里需要使用 readmin 登陆才可以要不然做不成功

Streams

Warning

SYS - is not in the Streams Administrator group and may not have full privileges to setup successfull replication. Oracle recommends that, prior to performing Streams Replication on databases in your configuration, you ensure that the user has the necessary privileges.

Setup Streams Replication

Replicate Whole Database

Replicate Schemas

Replicate Tablespaces

Replicate Tables

Setup Streams Replication: Object Selection

Remove

Add

Select All

Select None

Select Schema

Table

Subset Condition

HR

JOBS

Tip

A subset condition is a special type of table rule for DML changes that is relevant only to a subset of the rows in a table. You can specify a condition on a table to replicate only those rows that match the condition. For example, to replicate the regions table where the region_id is 2, enter 'region_id=2' against the condition column.

Setup Streams Replication: Destination Options

Destination Database

Streams Administrator

Password

Setup Streams Replication: Replication Options

Error

Warning

Warning

Warning: Datapump Directory Path - Datapump import and export directory path can not be same while source and destination database.

Directory Path

Specify existing directories or directory objects to be used for datapump export and import. They will be used to move data but not initial setup. If directories option is selected, Enterprise Manager will create a temporary directory objects that will be deleted after the setup is complete.

Specify Directory objects

Source Database

Destination Database

Advanced Options

Options

Capture, Propagate and Apply data manipulation language (DML) changes

Capture, Propagate and Apply data definition language (DDL) changes

Setup Bi-directional replication

Setup Streams Replication: Schedule Job

Start

Immediately

Later

Date

Time

Setup Streams Replication: Review

Warning

Warning

Warning: Oracle recommends that following issues be resolved before submitting the Streams replication setup job. SYS - is not in the Streams administrator group and may not have full privileges to setup successful replication. Review the summary results and click the submit button to start the replication setup process. Setup process will be started as the Enterprise Manager job. You can also edit the configuration parameters by using the edit script option.

Source Database

Destination Database

Object Selection

Selected Tables

7467 "JOBS"

-- 配置脚本

config stream.txt

--右侧为配置好的效果

Database Instance: PROD

Streams

Overview Streams Topology

Last Refresh: May 9, 2012 3:58:25 PM CST

View Data

Real Time: 1 Minute Refresh

General

Component Summary

Path Summary

Streams Pool Size(MB)

Streams Pool Size Used(%)

Capture

Propagation

Apply

Performance

View

Path Level

Show Data for

Last 1 Hour

Path Level Latency

Path Level Throughput

17 / 30

4 Performance Management

[Y]Set up and configure Resource Manager to control active sessions, number of I/Os, execution time..etc

创建资源计划

Edit Resource Plan: PLAN1

Actions: [Create Like](#) [Go](#) [Execute On Multiple Databases](#) [Show SQL](#)

Information
You have not made any changes to the current property sheet

General [Parallelism](#) [Session Pool](#) [Undo Pool](#) [Maximum Execution Time](#) [Consumer Group Switching](#) [Idle Time](#)

Plan: **PLAN1**
Description:
☐ Activate this plan
☒ Automatic Plan Switching Enabled

Selected Groups/Subplans

Group/Subplan	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8
CC	50	0	0	0	0	0	0	0
CDD	20	0	0	0	0	0	0	0
LOW_GROUP	0	100	0	0	0	0	0	0
OTHER_GROUPS	0	0	0	0	0	0	0	0

General [Parallelism](#) [Session Pool](#) [Undo Pool](#) [Maximum Execution Time](#) [Consumer Group Switching](#) [Idle Time](#)

可以分别指定 CPU 资源分配比例、并行度、会话数、undo 容量分配、最大持续执行时间、超时切换、空闲时间

创建资源计划组 policy round robin 随机分配 Run to completion 抢占

Database Instance: BR > Resource Consumer Groups > **Create Resource Consumer Group** [Execute On Multiple Databases](#)

General [Roles](#)

Consumer Group: gp01
Description:
Scheduling Policy: **Round Robin**
[Round Robin](#)
[Run to Completion](#)

Selected Users
[Remove](#) [Add](#)
[Select All](#) [Select None](#)

Select User	Admin Option
<input type="checkbox"/> BI	<input type="checkbox"/>

General [Roles](#)

分配资源计划给指定的用户或者资源

Oracle User Map
[Remove](#)

Select Consumer Group	Oracle User
<input checked="" type="radio"/> GRP1	HR
<input type="radio"/> SYS_GROUP	SYS
<input type="radio"/> SYS_GROUP	SYSTEM

[Add Another Row](#)

Client OS User Map
[Remove](#)

Select Consumer Group	Client OS User
No items found	

[Add Another Row](#)

Client Program Map
[Remove](#)

Select Consumer Group	Client Program
No items found	

[Add Another Row](#)

Client Machine Map
[Remove](#)

Select Consumer Group	Client Machine
No items found	

[Add Another Row](#)

Service Map
[Remove](#)

Select Consumer Group	Service
<input checked="" type="radio"/> GRP2	BR

[Add Another Row](#)

Module Map
[Remove](#)

Select Consumer Group	Module
No items found	

[Add Another Row](#)

Module and Action Map
[Remove](#)

Select Consumer Group	Module and Action
No items found	

[Add Another Row](#)

General [Priorities](#)

Resource Consumer Group Mapping

General **Priorities**

Reorder the list of mappings to set priorities. Mappings at the top of the list receive the highest priority.

Attribute Mappings

Service, Module, and Action
Service and Module
Module and Action
Module
Service
Oracle User
Client Program
Client OS User
Client Machine

[X](#)
[A](#)
[V](#)
[D](#)

General **Priorities**

指定当一个用户同时隶属于不同资源组时先分配顺序

[Y]Use Result Cache

NAME	TYPE	VALUE	RESULT_CACHE_MOD

client_result_cache_lag	big integer	3000	#MANUAL 默认不使用，只有加了/*+result_cache*/才使用 #FORCE 默认使用，只有加了/*+no_result_cache*/才不使用

client_result_cache_size

big integer 0

result_cache_max_result

integer 5

result_cache_max_size

big integer 10M

result_cache_mode

string MANUAL

result_cache_remote_expiration

integer 0

RESULT_CACHE_MAX_SIZE

#设置为 32K 的倍数, 如果为 0 则 Result Cache 功能失效 需要和上面的 MOD 配合

RESULT_CACHE_MAX_RESULT

#0-100 指定最大内存使用比例

set autotrace on;

select * from COUNTRIES;

Execution Plan

Plan hash value: 3996818343

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time
0	SELECT STATEMENT		25	350	9 (0)	00:00:01
1	INDEX FAST FULL SCAN	COUNTRY_C_ID_PK	25	350	9 (0)	00:00:01

Statistics

1 recursive calls

0 db block gets

6 consistent gets

0 physical reads

0 redo size

1167 bytes sent via SQL*Net to client

430 bytes received via SQL*Net from client

3 SQL*Net roundtrips to/from client

0 sorts (memory)

0 sorts (disk)

25 rows processed

alter system set result_cache_max_size =10M;

alter system set result_cache_max_result=80;

alter system set result_cache_mod=FORCE;

select * from COUNTRIES;

Execution Plan

Plan hash value: 3996818343

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time
0	SELECT STATEMENT		25	350	9 (0)	00:00:01
1	RESULT CACHE	21d03qy1vvhmvgjbbvrramruw6				
2	INDEX FAST FULL SCAN	COUNTRY_C_ID_PK	25	350	9 (0)	00:00:01

Result Cache Information (identified by operation id):

1 - column-count=3; dependencies=(HR.COUNTRIES); name="select * from COUNTRIES"

Statistics

0 recursive calls

0 db block gets

0 consistent gets

0 physical reads

0 redo size

1167 bytes sent via SQL*Net to client

430 bytes received via SQL*Net from client

3 SQL*Net roundtrips to/from client

0 sorts (memory)

0 sorts (disk)

25 rows processed

[Y]Use multi column statistics

dbms_stat 包的使用, 要会分析表 分析索引 分析一个 schema, 分析数据库

Dbms_stats	Dba_tables	Dba_tab_statistics	Dba_indexes
------------	------------	--------------------	-------------

exec dbms_stats.gather_table_stats('HR','EMPLOYEES'); --分析表

exec dbms_stats.gather_index_stats('HR','EMPLOYEES_ID'); --分析索引

exec dbms_stats.gather_schema_stats('HR'); --分析 schema

生成指定列的直方图, 适用于数据分布不均匀的情况, **COLUMNS SIZE** 数量为桶的数量

```
begin
dbms_stats.gather_table_stats(
ownname=> 'HR',
tablename=> 'EMPLOYEES',
method_opt=> 'FOR salary,department_id
COLUMNS SIZE 255');
end;
/
```



[Y]Gather statistics on a specific table without invalidating cursors

exec dbms_stats.gather_table_stats('HR','EMPLOYEES'); --分析表
exec DBMS_STATS.LOCK_TABLE_STATS ('HR','EMPLOYEES'); 锁定统计数据

[Y]Use partitioned indexes

CREATE INDEX "HR"."P1_LOCAL" ON "HR"."P1" (a) TABLESPACE "P1" LOCAL ; -- 本地
CREATE INDEX "HR"."P1_GLOBAL" ON "HR"."P1" (a) TABLESPACE "P1"; 全局
create index p2_i1 on p2(b) global partition by range (b) - 全局分区索引

(partition part_1 values less than ('30') tablespace users, partition part_2 values less than (maxvalue) tablespace users);

prefixed index 前缀索引，分区关键字在前需要索引的列在后，非前缀相反

create index p2_i on p2(a,b) local ;#本地前缀索引

CREATE INDEX HR.P1_com ON HR.P1 (a,b) compress; -- 压缩只能在多索引列情况下使用

alter index XX partition P2001 rebuild ;

[Y]Use SQL Tuning Advisor

对给出的语句进行分析，语句语法级别的建议。 **dbms_sqltune**

Related Links

Access Alert Log Content Deployments Jobs Metric Collection Errors Reports Target Properties	Advisor Central All Metrics Execute SQL Metric and Policy Settings Monitoring Configuration Rules Manager User-Defined Metrics	Alert History Blackouts SQL*Plus Metric Baselines Monitor in Memory Access Mode SQL History
--	--	--

Advisors

ADDM Segment Advisor Undo Management	Memory Advisor SQL Access Advisor	MTTR Advisor SQL Tuning Advisor
--	--	--

[Y]Use SQL Access Advisor

--对语句进行分析，给出建立索引 MVIEW IOT 的建议。 Dbms_advisor

begin

dbms_advisor.QUICK_TUNE

(ADVISOR_NAME=>dbms_advisor.sqlaccess_advisor, TASK_NAME=>'mytask3', ATTR1=>'select * from hr.emp where manager_id=100');

end;

/

Select DBMS_ADVISOR.GET_TASK_SCRIPT('MYTASK3') from dual;

[Y]Configure baseline templates

创建一个自动重复的 baseline 模板

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AWR Baselines

Page Refreshed May 15, 2012 11:39:49 AM CST (Refresh)

Search Go

Select Name	Type	Valid	Statistics Computed	Last Time Computed	Start Time	End Time	Error Count
SYSTEM_MOVING_WINDOW (4 Days)	MOVING_WINDOW (4 Days)	Yes	Yes	May 15, 2012 10:16:22 AM	May 15, 2012 10:16:19 AM	May 15, 2012 11:00:51 AM	0

Related Links

[AWR Baseline Templates](#) [Baseline Metric Thresholds](#)

Create Baseline: Baseline Interval Type

Choose one of the baseline interval types listed below.

☐ Single
The single type of baseline has a single and fixed time interval. For example, from Jan 1, 2007 10:00 AM to Jan 1, 2007 12:00 PM

☒ Repeating
The repeating type of baseline has a time interval that repeats over a time period. For example, every Monday from 10:00 AM to 12:00 PM for the year 2007.

Create Baseline: Repeating Baseline Template

The repeating type of baseline has a time interval that repeats over a time period. For example, every Monday from 10:00 AM to 12:00 PM for the year 2007.

• Baseline Name Prefix

Baseline Time Period

Start Time Duration (hours)

Frequency

☐ Daily
☒ Weekly
☐ Monthly
☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday

Interval of Baseline Creation

Start Time End Time

Purge Policy

Retention Time (days)

select dbid from v\$database;

select template_name from DBA_HIST_BASELINE_TEMPLATE

创建单次 baseline 模板脚本

```
DBMS_WORKLOAD_REPOSITORY.CREATE_BASELINE_TEMPLATE(
start_time IN DATE,
end_time IN DATE,
baseline_name IN VARCHAR2,
template_name IN VARCHAR2,
expiration IN NUMBER,
dbid IN NUMBER DEFAULT NULL);
```

创建自动重复 baseline 模板脚本

```
DBMS_WORKLOAD_REPOSITORY.CREATE_BASELINE_TEMPLATE(
day_of_week IN VARCHAR2,
hour_in_day IN NUMBER,
duration IN NUMBER,
start_time IN DATE,
end_time IN DATE,
baseline_name_prefix IN VARCHAR2,
template_name IN VARCHAR2,
expiration IN NUMBER,
dbid IN NUMBER DEFAULT NULL);
```

删除模板

```
DBMS_WORKLOAD_REPOSITORY.DROP_BASELINE_TEMPLATE(
template_name IN VARCHAR2,
dbid IN NUMBER DEFAULT NULL);
```

-- 查看一下

AWR Baselines Page Refreshed May 15, 2012 11:22:39 AM CST [Refresh](#)

Search [Go](#) [Create](#)

[Edit](#) [View](#) [Delete](#) [Actions](#) [Schedule Statistics Computation](#) [Go](#)

Select Name	Type	Valid	Statistics Computed	Last Time Computed	Start Time	End Time	Error Count
SYSTEM_MOVING_WINDOW	MOVING_WINDOW (4 Days)	Yes	Yes	May 15, 2012 10:16:22 AM	May 15, 2012 10:16:19 AM	May 15, 2012 11:00:51 AM	0

Related Links

[AWR Baseline Templates](#) [Baseline Metric Thresholds](#)

AWR Baseline Templates Page Refreshed May 15, 2012 11:26:55 AM CST [Refresh](#)

Baseline Template is a specification that enables the database to automatically generate a baseline for a future time period.

Repeating Baseline Templates

Repeating baseline template defines repeating time intervals over a future time period. For example, every Monday from 10:00 AM to 12:00 PM for the year 2007.

[View](#) [Delete](#)

Select Name	Repeating Start Time	Repeating End Time	Day of the Week	Start Time	Retention Days Expired
template_123	May 16, 2012 11:20:00 AM	May 16, 2012 11:35:00 AM	MONDAY	12:00 AM	10 No

Single Baseline Templates

Single baseline template defines a single and fixed time interval in the future. For example, from Jan 1, 2010 10:00 AM to Jan 1, 2010 12:00 PM

Select Name	Start Time	End Time	Expired
(No Single Baseline Templates)			

[Y]Use SQL Plan Management feature

PL/SQL Packages and Types Reference=> **132 DBMS_SPM**

用来管理执行计划，设置

optimizer_capture_sql_plan_baselines

=true 之后可以自动对进行计划进行捕捉。可以把执行计划保存下来或者传输给别的数据库使用，或者把别的数据库的执行计划拿来用，DBMS_SPM 包具体功能列表如下。

Summary of DBMS_SPM Subprograms

This table lists the package subprograms in alphabetical order.

Table 132-2 DBMS_SPM Package Subprograms

Subprogram	Description
ALTER_SQL_PLAN_BASELINE Function	Changes an attribute of a single plan or all plans associated with a SQL statement using the attribute name/value format
CONFIGURE Procedure	Sets configuration options for SQL management base, in parameter/value format
CREATE_STGTAB_BASELINE Procedure	Creates a staging table that used for transporting SQL plan baselines from one system to another
DROP_SQL_PLAN_BASELINE Function	Drops a single plan, or all plans associated with a SQL statement
EVOLVE_SQL_PLAN_BASELINE Function	Evolves SQL plan baselines associated with one or more SQL statements
LOAD_PLANS_FROM_CURSOR_CACHE Function	Loads one or more plans present in the cursor cache for a SQL statement
LOAD_PLANS_FROM_CURSOR_CACHE Function	Loads plans stored in a SQL tuning set (STS) into SQL plan baselines
MIGRATE_STORED_OUTLINE Function	Migrates existing stored outlines to SQL plan baselines
PACK_STGTAB_BASELINE Function	Packs (exports) SQL plan baselines from SQL management base into a staging table
UNPACK_STGTAB_BASELINE Function	Unpacks (imports) SQL plan baselines from a staging table into SQL management base

界面如下

Database Instance: PROD

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- Manage Optimizer Statistics
- [SQL Plan Control](#)
- [SQL Tuning Sets](#)

Change Database

- Convert to Cluster Database
- Add Instance
- Delete Instance

要先启用 baseline 功能，未启用的时候 **Capture** 那里为 **False**

SQL Plan Control

[SQL Profile](#) [SQL Patch](#) [SQL Plan Baseline](#) [Refresh](#)

A SQL Plan Baseline is an execution plan deemed to have acceptable performance for a given SQL statement.

Settings

Capture SQL Plan Baselines **FALSE**

Use SQL Plan Baselines **TRUE**

Plan Retention(Weeks) [Configure](#)

Jobs for SQL Plan Baselines

[Load Jobs](#) [Pending](#) [Completed](#)

Search

SQL Text [Go](#)

By default, the search returns all uppercase matches beginning with the string you entered. To run an exact or case-sensitive match, double quote the search string. You can use the wildcard symbol (%) in a double quoted string.

[Load](#) [Unpack](#)

Select Name	SQL Text	Enabled	Accepted	Fixed	Auto Purge	Created	Last Modified
No Items Found							

[SQL Profile](#) [SQL Patch](#) [SQL Plan Baseline](#)

alter system set optimizer_capture_sql_plan_baselines=true scope=both;

对于一个已有的执行计划可以做以下操作

[Enable](#) [Disable](#) [Drop](#) [Evolve](#) [Copy To A Database](#) [Pack](#) [Fixed - Yes](#) [Go](#) [Load](#) [Unpack](#)

[Select All](#) [Select None](#)

Select Name	SQL Text	Enabled	Accepted	Fixed	Auto Purge	Created	Last Modified
<input type="checkbox"/> SQL_PLAN_asd25wf07qtiLd870c4a	select sum(d) from xx	YES	YES	NO	YES	May 25, 2012 1:53:07 PM	May 25, 2012 1:53:07 PM

[SQL Profile](#) [SQL Patch](#) [SQL Plan Baseline](#)

Enable **启用该执行计划 DBMS_SPM.ALTER_SQL_PLAN_BASELINE**

Disable	禁用该执行计划 DBMS_SPM.ALTER_SQL_PLAN_BASELINE				
Drop	删除该执行计划 DBMS_SPM.DROP_SQL_PLAN_BASELINE				
Evolve	<p>进化！ 是否允许执行计划进化为效率更高的执行计划 DBMS_SPM.EVOLVE_SQL_PLAN_BASELINE</p> <p>Evolve SQL Plan Baselines</p> <p>Plans that have not yet been accepted can be evolved (verified) to confirm they are suitable plan baselines.</p> <table border="1"> <thead> <tr> <th>Name</th><th>SQL Text</th></tr> </thead> <tbody> <tr> <td>SQL_PLAN_asd25wf07qju1d870c4a</td><td>select sum(id) from xx</td></tr> </tbody> </table> <p>Verify Performance <input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>Time Limit <input checked="" type="radio"/> Auto <input type="radio"/> Unlimited <input type="radio"/> Specify <input type="text" value="1"/> (minutes)</p> <p>Action <input checked="" type="radio"/> Report and Accept <input type="radio"/> Report only</p>	Name	SQL Text	SQL_PLAN_asd25wf07qju1d870c4a	select sum(id) from xx
Name	SQL Text				
SQL_PLAN_asd25wf07qju1d870c4a	select sum(id) from xx				
Copy To A database	<p>把执行计划复制到其他的数据库</p> <p>Copy SQL Plan Baselines Cancel OK</p> <table border="1"> <thead> <tr> <th>SQL Handle</th><th>Name</th></tr> </thead> <tbody> <tr> <td>SQL_ac3445e3807b663a</td><td>SQL_PLAN_asd25wf07qju1d870c4a</td></tr> </tbody> </table> <p>* Destination Database <input type="text" value="PROD"/> </p> <p>* Directory Object <input type="text" value="ORACLE_OCM_CONFIG_DIR"/> Create Directory Object</p> <p>Directory Name /ora/db11g/ccr/state</p> <p><input checked="" type="checkbox"/> TIP Select a directory which will be used temporarily to store the data for the copy operation.</p> <div> <p>Source Credentials</p> <p>* Host Username <input type="text" value="oradb"/></p> <p>* Host Password <input type="password" value="*****"/></p> <p><input type="checkbox"/> Save as Preferred Credential</p> </div> <div> <p>Destination Credentials</p> <p>* Host Username <input type="text" value="oradb"/></p> <p>* Host Password <input type="password" value="*****"/></p> <p>* Database Username <input type="text" value="system"/></p> <p>* Database Password <input type="password" value="*****"/></p> <p>* Connect As <input type="text" value="Normal"/></p> <p><input type="checkbox"/> Save as Preferred Credential</p> </div> <p>Job Parameters</p> <p>Job Name <input type="text" value="COPY_1337926011755"/></p> <p>Description <input type="text"/></p> <p>Schedule</p> <p><input checked="" type="radio"/> Immediately</p> <p><input type="radio"/> Later</p> <p>Time Zone <input type="text" value="(UTC+08:00) Beijing, Shanghai"/></p> <p>Date <input type="text" value="May 25, 2012"/> </p> <p>(example: May 25, 2012)</p> <p>Time <input type="text" value="06:00"/> <input type="radio"/> AM <input checked="" type="radio"/> PM</p>	SQL Handle	Name	SQL_ac3445e3807b663a	SQL_PLAN_asd25wf07qju1d870c4a
SQL Handle	Name				
SQL_ac3445e3807b663a	SQL_PLAN_asd25wf07qju1d870c4a				
PACK	打包保存起来 DBMS_SPM.PACK_STGTAB_BASELINE				
Fixed-Yes	固定 DBMS_SPM.ALTER_SQL_PLAN_BASELINE				
Fixed-No	不固定 DBMS_SPM.ALTER_SQL_PLAN_BASELINE				
AutoPurge - Yes	自动删除 是 DBMS_SPM.ALTER_SQL_PLAN_BASELINE				
AutoPurge - No	自动删除 是 DBMS_SPM.ALTER_SQL_PLAN_BASELINE				

[Y]Replay a captured workload

1. Capture the workload on a database. (Task 1)
2. Optionally export the AWR data. (Task 1)
3. Restore the replay database on a test system to match the capture database at the start of the workload capture.
4. Make changes (such as performing an upgrade) to the test system as required.
5. Copy the generated workload files to the test system.
6. Preprocess the captured workload on the test system. (Task 2)
7. Configure the test system for the replay.
8. Replay the workload on the restored database. (Task 3)

>Capture the workload on a database

-- 创建基础构架

create user twoworkload identified by tt account unlock default tablespace users;

grant dba to twoworkload;

conn twoworkload/tt

create table xx(id number,text varchar2(20),dd date);

Database Instance: PROD

Home	Performance	Availability	Server	Schema	Data Movement	Software and Support
Software						
Configuration Search Compare Configuration Compare to Multiple Configurations (Job) View Saved Configurations Last Collected Configuration Collection Status Clone Oracle Home Host Configuration Oracle Home Inventory Real Application Testing Database Replay SQL Performance Analyzer			Database Software Patching View Patch Cache Patch Prerequisites Apply Patch Deployment Procedure Manager Getting Started with Deployment Procedure Manager Deployment Procedures Procedure Completion Status Deployment and Provisioning Software Library			

Database Replay

Database Replay allows workloads to be captured from production systems and re-executed with high fidelity on test copies of production databases. This enables detailed analysis of how the proposed changes may affect production systems; for instance, patching or upgrading database software.

Page Refreshed May 24, 2012 9:34:49 AM CST [Refresh](#)

Task List

[Expand All](#) | [Collapse All](#)

Task Name	Description	Go to Task
Capture Production Workload	Initiate or schedule a workload capture, export AWR data after capture, and copy captured files to the workload staging area.	
Capture Workload	Capture a workload from the production environment. This can be scheduled to accommodate a database restart if desired.	
Export AWR Data	Export AWR data to provide a better performance comparison between captured and replayed workloads.	
Copy to Workload Staging Area	Copy captured files away from production to the workload staging area for later preprocessing. For a cluster database, captured files from different database instances can be consolidated in the workload staging area.	
Prepare Test Database	Set up a test database from production, upgrade or otherwise modify the test database, and isolate the test database prior to replay.	
Prepare for Replay	Prepare the workload capture files for replay (preprocess), copy the preprocessed workload files to the workload staging area, deploy the Replay Clients, and copy the preprocessed workload files to the Replay Client hosts.	
Replay Workload on Test Database	Set up the workload replay on the test database, copy the replay results to the workload staging area, and analyze the results.	



Capture Workload: Plan Environment

Database: **PROD** [Cancel](#) [Step 1 of 5](#) [Next](#)
Logged In As: **system**

The following prerequisites should be met to avoid potential problems before proceeding to capture the workload.

Prerequisite	Acknowledge
Make sure there is enough disk space to hold the captured workload. Consider doing a short duration workload capture and using it for estimating the disk space requirement of a full workload capture.	<input checked="" type="checkbox"/>
Make sure you can restore the replay database to match the capture database at the start of the workload capture. A successful workload replay depends on application transactions accessing application data identical to that on a capture system. Common ways to restore application data state include point-in-time recovery, flashback, and import/export.	<input checked="" type="checkbox"/>



Capture Workload: Options

Database: **PROD** [Cancel](#) [Back](#) [Step 2 of 5](#) [Next](#)
Logged In As: **system**

Database Restart Options

A database restart prior to a workload capture is recommended to ensure a complete and accurate capture. Not restarting could capture in-flight transactions, which may adversely affect the replay of subsequent captured transactions.

- ☒ Do not restart the database prior to the capture.
☐ Restart the database prior to the capture.

Workload Filters

Workload filters can customize the workload to be captured. By default, most external client requests made to the database are captured. Refer to the Oracle Real Application Testing User's Guide for more information.

Filter Mode: **Exclusion**

Excluded Sessions

All sessions will be captured except for those listed below.

Filter Name	Type	Session Attribute	Value
Oracle Management Service (DEFAULT)	Excluded	Program	OMS
Oracle Management Agent (DEFAULT)	Excluded	Program	emagent%

[Add Another Row](#)☒ TIP You may use % for wildcard in a filter value.

Capture Workload: Parameters

Database: **PROD** [Cancel](#) [Back](#) [Step 3 of 5](#) [Next](#)
Logged In As: **system**

Workload Capture Parameters

* Capture Name: **CAPTURE-PROD-20120524093650**
 Directory Object: **DATA_PUMP_DIR** [Create Directory Object](#)
Select a directory object to hold the captured workload. The selected directory must be empty.

Plan Environment Options Parameters **Schedule** Review

Capture Workload: Schedule

Database: **PROD** Cancel Back Step 4 of 5 Next
 Logged In As: **system**

Job Parameters

* Job Name:
 Description:

Job Schedule

Choose a start time and a capture duration so that the workload you are interested in replaying at a later time can be captured.

Start **Capture Duration**

☒ Immediately ☒ Not Specified
 Capture must be stopped manually if an end is not specified

☐ Later ☐ Duration

Date: (example: May 24, 2012)
 Time: : : AM ☐ PM

Hours: Minutes:

Job Credentials

Host Credentials

* Username:
 * Password:
 * Confirm Password:
☒ Save as Preferred Credential

Plan Environment Options Parameters **Schedule** Review

Capture Workload: Review

Database: **PROD** Cancel Back Step 5 of 5 Submit
 Logged In As: **system**

Review the following settings for capturing the workload.

Job Name	CAPTURE-PROD-20120524093650
Capture Name	CAPTURE-PROD-20120524093650
Directory Object	DATA_PUMP_DIR
Directory Path	/ora/db/admin/PROD/dpdump/
Start Time	Immediately
Capture Duration	Not Specified
Restart Database	No

Workload Filters: Excluded Sessions

Filter Name	Type	Session Attribute	Value
Oracle Management Service (DEFAULT)	Excluded	Program	OMS
Oracle Management Agent (DEFAULT)	Excluded	Program	emagent%

Cancel Back Step 5 of 5 Submit

注意！如果提交后报错，直接去 dump 目录删除所有的文件。

ORA-15505: cannot start workload capture because instance 1 encountered errors

while accessing directory "/ora/db/admin/PROD/dpdump/"

ORA-06512: at "SYS.DBMS_WORKLOAD_CAPTURE", line 883

ORA-06512: at line 1

提交成功后在 Active Capture and Replay 会看到，此时在执行一些负载脚本，都会被记录下来

▼ Active Capture and Replay

View Stop

Select	Name	Type	Directory Object	Start Time
<input checked="" type="radio"/>	CAPTURE-PROD-20120524093650	Capture	DATA_PUMP_DIR	May 24, 2012 10:17:39 AM CST

手工提交过程

```
--create capture filter
BEGIN
DBMS_WORKLOAD_CAPTURE.ADD_FILTER (fname => 'filter_test',fattribute => 'USER',fvalue => 'SYSTEM');
END;
/

--start capture
BEGIN
dbms_workload_capture.start_capture(UNISTR('CAPTURE-PROD-20120524093650'), UNISTR('DATA_PUMP_DIR'), NULL,
'INCLUDE', FALSE);
END;
/
```

跑个压力脚本瞧瞧

```
truncate table xx;

begin
  for ctr in 1..1000000 loop
    insert into xx values (ctr,lpad(round(dbms_random.value(1,9999999999999999999)),20,0),sysdate);
```



```

commit;

end loop;

commit;

end;

/

update xx set text=text*10;

commit;

```

跑完压力脚本后，去停掉 capture,点 STOP 就行

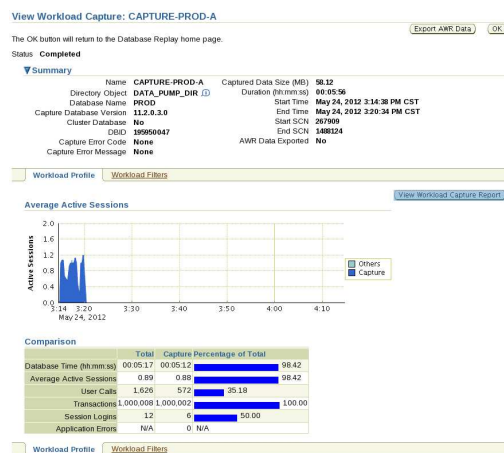
Active Capture and Replay			
View Stop			
Select Name	Type	Directory Object	Start Time
<input checked="" type="radio"/> CAPTURE-PROD-20120524093650	Capture	DATA_PUMP_DIR	May 24, 2012 10:17:39 AM CST

```

-- stop capture
exec dbms_workload_capture.FINISH_CAPTURE();

```

看看记录的小结,已经成功的记录了刚刚压力脚本的信息



#保存的文件

```

[root@edul dpdump]# pwd
/ora/db/admin/PROD/dpdump
[root@edul dpdump]# du -m
1      ./capfiles/inst1/af
1      ./capfiles/inst1/ad
1      ./capfiles/inst1/ab
1      ./capfiles/inst1/ah
1      ./capfiles/inst1/ai
59     ./capfiles/inst1/aa
1      ./capfiles/inst1/ae
1      ./capfiles/inst1/ag
1      ./capfiles/inst1/aj
1      ./capfiles/inst1/ac
59     ./capfiles/inst1
59     ./capfiles
10     ./cap
68     .

```

>Optionally export the AWR data.

导出 AWR 数据作为参考值,其实就是个快照,并且把这个快照保存起来,方便比对。

[Export AWR Data](#)

Do you want to export the relevant AWR (Automatic Workload Repository) data to the workload directory now?

Exporting the AWR data from this database enables in-depth capture and replay analysis. A database scheduler job will be created to perform the export immediately.

☒ **TIP** If you choose not to export the AWR data now, you may perform the export at a later time from the page that lists the capture history on this database.

☒ **TIP** This job can be resource-intensive and may take a long time.

[No](#) [Yes](#)

>Replay captured workload

#文件复制, 可以用 GC 的 Copy to Workload Staging Area 或者直接拿命令行复制, 注意! 整个 dmp 目录都要复制过去。

#我们以 /ora/db/admin/PROD/dpdump => /ora/db/admin/PROD/repdir 为例

>> 准备工作 replay 文件准备

Database Instance: PROD > Logged in As SYSTEM

Database Replay

Database Replay allows workloads to be captured from production systems and re-executed with high fidelity on test copies of production databases. This enables detailed analysis of how the proposed changes may affect production systems, for instance, patching or upgrading database software.

Page Refreshed May 24, 2012 3:42:53 PM CST [Refresh](#)

Task List

[Expand All](#) [Collapse All](#)

Task Name	Description	Go to Task
Capture Production Workload	Initiate or schedule a workload capture, export AWR data after capture, and copy captured files to the workload staging area.	Go to Task
Prepare Test Database	Set up a test database from production, upgrade or otherwise modify the test database, and isolate the test database prior to replay.	Go to Task
Prepare for Replay	Prepare the workload capture files for replay (preprocess), copy the preprocessed workload files to the workload staging area, deploy the Replay Clients, and copy the preprocessed workload files to the Replay Client hosts.	Go to Task
Preprocess Workload	Preprocessing prepares a captured workload for replay. You must do this once for every captured workload. Preprocessing is best performed in the test database. The captured workload must be accessible from the test database.	Go to Task
Copy to Workload Staging Area	Copy preprocessed workload files to the workload staging area. The preprocessed workload files must be accessible by the database server and the Replay Clients during replay.	Go to Task
Deploy Replay Clients	Deploy the Replay Client to one or more host machines. Replay Clients are used to replay the preprocessed workload.	Go to Task
Copy Workload to Replay Client Hosts	Copy the preprocessed workload to one or more Replay Client host machines. Each Replay Client must be able to access the preprocessed workload during replay.	Go to Task
Replay Workload on Test Database	Set up the workload replay on the test database, copy the replay results to the workload staging area, and analyze the results.	Go to Task

Active Capture and Replay

Select Name	Type	Directory Object	Start Time
No items found			

[Workload Capture History](#)

选择目录准备方式，我们用一个手工复制过来的目录

Locate Workload

Copy Workload

Select Directory

Schedule

Review

Preprocess Captured Workload: Locate Workload

Database: PROD

Version: 11.2.0.3.0

Logged In As: system

Cancel

Step 1 of 5

Next

The captured workload directory must be accessible from this database.

☐

Copy the workload directory to this host from another host.

☒

Use an existing workload directory on this host.

指定目录位置后会自动把选定目录中的捕捉信息显示出来

Locate Workload

Copy Workload

Select Directory

Schedule

Review

Preprocess Captured Workload: Select Directory

Database: PROD

Version: 11.2.0.3.0

Logged In As: system

Cancel

Back

Step 3 of 5

Next

Select a directory object that contains a captured workload.

Directory Object: repdir

Create Directory Object

Capture Summary

Name	CAPTURE-PROD-A	Captured Data Size (MB)	58.12
Status	Completed	Duration (hh:mm:ss)	00:05:56
Directory Object	repdir	Start Time	May 24, 2012 3:14:30 PM CST
Database Name	PROD	End Time	May 24, 2012 3:20:34 PM CST
Capture Database Version	11.2.0.3.0	Start SCN	267909
Cluster Database	No	End SCN	1488124
DBID	195950047	AWR Data Exported	Yes
Capture Error Code	0	Preprocessed Database Version	N/A
Capture Error Message	None		

Capture Details

定义个任务名，根据目录中的信息生成 replay 基础信息

Locate Workload

Copy Workload

Select Directory

Schedule

Review

Preprocess Captured Workload: Schedule

Database: PROD

Version: 11.2.0.3.0

Logged In As: system

Cancel

Back

Step 4 of 5

Next

Specify the following information to schedule the preprocessing job.

Job Parameters

* Job Name: PREPROCESS-PROD-20120524154447

Description:

Start

☒

Immediately

☐

Later

Date: May 24, 2012

Time: 3:40:00 AM

Host Credentials

* Username: oradb

* Password: *****

* Confirm Password: *****

☐ Save as Preferred Credential

Preprocess Captured Workload: Review

Logged In As: system

Cancel

Back

Step 5 of 5

Submit

做成功后会在目录中生成 /ora/db/admin/PROD/repdir/pp11.2.0.3.0 目录，并且在下面会有很多 replay 包的信息

```
[root@edul pp11.2.0.3.0]# pwd
/ora/db/admin/PROD/repdir/pp11.2.0.3.0
[root@edul pp11.2.0.3.0]# ls -l
total 96
-rw-r----- 1 oradb install 3508 May 24 15:56 wcr_calibrate.xml
-rw-r----- 1 oradb install 12288 May 24 15:56 wcr_commits.extb
-rw-r----- 1 oradb install 12288 May 24 15:56 wcr_conn_data.extb
-rw-r----- 1 oradb install 12288 May 24 15:56 wcr_data.extb
-rw-r----- 1 oradb install 12288 May 24 15:56 wcr_dep_graph.extb
-rw-r----- 1 oradb install 603 May 24 15:56 wcr_login.pp
-rw-r----- 1 oradb install 35 May 24 15:56 wcr_process.wmd
-rw-r----- 1 oradb install 12288 May 24 15:56 wcr_references.extb
-rw-r----- 1 oradb install 12288 May 24 15:56 wcr_scn_order.extb
-rw-r----- 1 oradb install 12288 May 24 15:56 wcr_seq_data.extb
```

>> Replay Workload 重演

▼ Replay Workload on Test Database	Set up the workload replay on the test database, copy the replay results to the workload staging area, and analyze the results.	
Replay Workload	Replay the preprocessed workload on a test copy of the production database.	➡
Copy to Workload Staging Area	Copy replay results to the workload staging area for comparison analysis with future replays.	➡
Analyze Results	Analyze the effects of changes on workload performance.	➡

使用已有的目录

Locate Workload

Copy Workload

Select Directory

Initialize Options

Customize Options

Prepare Replay Clients

More

Information

Replay should be performed on a test database. If the current database target is not the intended test database, click Cancel and select the test database target before continuing the replay setup.

Replay Workload: Locate Workload

Database: PROD

Logged In As: system

Cancel

Step 1 of 8

Next

The last replayed or preprocessed workload directory must be accessible from this database.

Copy the workload directory to this host from another host.

Use an existing workload directory on this host.

选择目录，会自动带出目录中捕捉的重演脚本信息

Replay Workload: Select Directory

Database: PROD

Capture Name: CAPTURE-PROD-A

Logged In As: system

Cancel

Back

Step 3 of 8

Next

Select a directory object that contains the last replayed workload or a preprocessed workload.

Directory Object: repdir

Create Directory Object

▼ Capture Summary

Name: CAPTURE-PROD-A

Status: Completed

Directory Object: repdir

Database Name: PROD

Capture Database Version: 11.2.0.3.0

Cluster Database: No

DBID: 195950047

Capture Error Code: 0

Capture Error Message: None

Captured Data Size (MB): 58.12

Duration (hh:mm:ss): 00:05:56

Start Time: May 24, 2012 3:14:38 PM CST

End Time: May 24, 2012 3:20:34 PM CST

Start SCN: 267009

End SCN: 1488124

AWR Data Exported: Yes

Preprocessed Database Version: 11.2.0.3.0

▼ Capture Details

Workload Profile

Workload Filters

Average Active Sessions

View Workload Capture Report

Active Sessions

Others

Capture

Comparison

	Total	Capture Percentage of Total
Database Time (hh:mm:ss)	00:05:17	00:05:12 98.42
Average Active Sessions	0.89	0.88 98.42
User Calls	1,626	572 35.18
Transactions	1,000,008	1,000,002 100.00
Session Logins	12	6 50.00
Application Errors	N/A	0 N/A

惯例，要给个名字

Locate Workload

Copy Workload

Select Directory

Initialize Options

Customize Options

Prepare Replay Clients

More

Replay Workload: Initialize Options

Database: PROD

Capture Name: CAPTURE-PROD-A

Logged In As: system

Cancel

Back

Step 4 of 8

Next

* Replay Name: REPLAY-PROD-A

Identify Source

Choose the initial replay options.

Use the default replay options

Use replay options from a previous replay

Replay Name

指定重演连接方式

Locate Workload Copy Workload Select Directory Initialize Options **Customize Options** Prepare Replay Clients More

Information
The connection test was successful.

Replay Workload: Customize Options

Database: **PROD** Cancel Back Step 5 of 8 Next
 Capture Name: **CAPTURE-PROD-A**
 Logged In As: **system**

Connection Mappings **Replay Parameters**

Replay Clients must establish connections to the replay database. Specify connection details to the replay database using either a single connect descriptor or net service name. Optionally, you can map every captured connect descriptor to a separate connect descriptor or net service name for the replay database.

TIP Connections must point to the replay database for a successful replay.

☒ Use a single connect descriptor for all client connections. Test Connection
 (DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=edu1)(PORT=1522)))(CONNECT_DATA=(SID=PROD)))

☐ Use a single TNS net service name for all client connections.

TIP All Replay Clients must be able to resolve the net service name (for example through a local tnsnames.ora file).

☐ Use a separate connect descriptor or net service name for each client connect descriptor captured in the workload.

Connection Mappings **Replay Parameters**

指定重演客户端

Previous **Customize Options** Prepare Replay Clients Wait for Client Connections Review

Replay Workload: Prepare Replay Clients

Database: **PROD** Cancel Back Step 6 of 8 Next
 Capture Name: **CAPTURE-PROD-A**
 Logged In As: **system**

Specify the list of Replay Clients below that Enterprise Manager should start automatically. You can also start more Replay Clients manually in the next step. Refer to the Oracle Real Application Testing User's Guide for information on how to set up and start the Replay Clients.

Number of Replay Clients and CPUs
 The number of Replay Clients needed to replay the workload depends on the number of captured database sessions. Click the Estimate button to find the estimated number of Replay Clients and CPUs needed.
 Total Number of Replay Clients Needed: **1** Estimate
 Total Number of CPUs Needed: **1**
 Consider starting at least 1 Replay Client(s) divided among 1 CPU(s).

Replay Client Hosts
 If the Replay Client has been installed on one or more targets, Enterprise Manager can start the Replay Clients automatically. Specify the list of Replay Clients to start automatically when you continue to the next step. You must configure each Replay Client host before proceeding.

Last Updated: May 24, 2012 4:22:51 PM CST Refresh

Select Target	Number of Replay Clients Configured	Client Version	Status	Number of CPUs	Memory Size (MB)	CPU Utilization %	Memory Utilization %
(No Replay Client hosts specified)							
Add Replay Client Hosts							

Cancel Back Step 6 of 8 Next

Search and Select: Replay Client Host

TIP A Replay Client host is a Host target on which one or more Replay Clients should be started to replay the selected workload. Cancel Select

Search

Target Type: **Host**
 Target Name: % Go

☐ include only targets with detected Replay Client installation

Select All Select None

Select	Target	Client Version	Status	Number of CPUs	CPU Utilization %
<input checked="" type="checkbox"/>	edu1		↑	1	9.34

Cancel Select

这里必须取消才能进行选择

Replay Client Hosts

If the Replay Client has been installed on one or more targets, Enterprise Manager can start the Replay Clients automatically. Specify the list of Replay Clients to start automatically when you continue to the next step. You must configure each Replay Client host before proceeding.

Last Updated: May 24, 2012 4:27:48 PM CST Refresh

Configure Remove

Select Target	Number of Replay Clients	Configured	Client Version	Status	Number of CPUs	Memory Size (MB)	CPU Utilization %	Memory Utilization %
<input checked="" type="radio"/> edu1	1	No		↑	1	2026	9.34	75.42

Add Replay Client Hosts

Cancel Back Step 6 of 8 Next

指定好重演 client 之后，配置他

Configure: Replay Client Host Close Apply

Target: **edu1**
 Operating System: **Linux**

Name	Value
* Host User Name	<input type="text" value="oradb"/>
* Host Password	<input type="password" value="*****"/>
* Database User Name	<input type="text" value="system"/>
* Database Password	<input type="password" value="*****"/>
* Server Connection Identifier	<input type="text" value="edu1.1522/PROD"/>
* Number of Replay Clients	<input type="text" value="1"/>
* Client Oracle Home	<input type="text" value="/ora/db/11g"/>
* Client Replay Directory	<input type="text" value="/ora/db/admin/PROD/repdir"/>
Client Work Directory	<input type="text"/>
Additional Parameters	<input type="text"/>

Close Apply

配置好之后 apply 再 close 掉，配置成功的状态

Replay Client Hosts

If the Replay Client has been installed on one or more targets, Enterprise Manager can start the Replay Clients automatically. Specify the list of Replay Clients to start automatically when you continue to the next step. You must configure each Replay Client host before proceeding.

Last Updated May 24, 2012 4:33:57 PM CST [Refresh](#)

Select	Target	Number of Replay Clients	Client Version	Status	Number of CPUs	Memory Size (MB)	CPU Utilization %	Memory Utilization %
<input checked="" type="radio"/>	edu1	1	Yes	↑	1	2026	7.49	75.22

[Add Replay Client Hosts](#) [Cancel](#) [Back](#) [Step 6 of 8](#) [Next](#)

下一步之后会进入 重演等待状态，另外开窗口手工启动重演命令 Number client 会变成 1 然后点 NEXT 开始重演

Replay Workload: Wait for Client Connections

Database: **PROD** [Cancel](#) [Back](#) [Step 7 of 8](#) [Next](#)
 Capture Name: **CAPTURE-PROD-A**
 Logged In As: **system**

At this point all the clients that have been asked to start have been started. If you want to start more manually, do so now. Then proceed to the next step.

Client Connections

Host	Expected Number of Client Connections	Actual Number of Client Connections	Error Output
edu1	1	1	

[Cancel](#) [Back](#) [Step 7 of 8](#) [Next](#)

wrc system/oracle mode=replay replaydir=/ora/db/admin/PROD/replaydir

直接提交就可以了

**Replay Workload: Review**

Logged In As: **system** [Cancel](#) [Back](#) [Step 8 of 8](#) [Submit](#)

Information
 Time for resetting the clock: May 24, 2012 3:14:38 PM CST.
 It is recommended that the system time on the database host platform be changed to a value that is close to the capture start time. This must be done just before replay is started. Not doing so might present an invalid data set to the replayed time-sensitive workload, thus causing data divergence. Examples include statements that use the SYSDATE and SYSTIMESTAMP functions. Resetting the time will also minimize job scheduling inconsistencies between replay and capture.

Workload CAPTURE-PROD-A will be replayed on database 'PROD'.

Database: **PROD**
 Capture Name: **CAPTURE-PROD-A**
 Replay Name: **REPLAY-PROD-A**
 Directory Object: **replaydir**
 Connected Replay Clients: **1**

Client Connections

Host	Expected Number of Client Connections	Actual Number of Client Connections	Error Output
edu1	1	1	

[Cancel](#) [Back](#) [Step 8 of 8](#) [Submit](#)

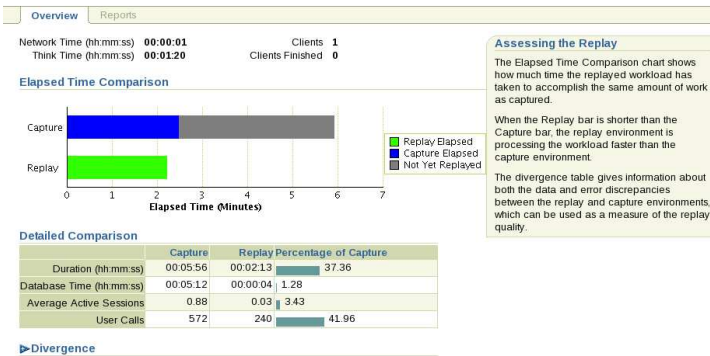
看看执行状态 可以看到 capture 了多少时间，现在重演了多少时间，展开 Divergence 还可以看到重演是否有错误等信息

跑完之后点 ViewWorkload Replay Report 看看折腾半天的结果

View Workload Replay: REPLAY-PROD-A

Page Refreshed May 24, 2012 4:46:34 PM CST [Refresh](#) [OK](#)

Status: **In Progress** [Stop Replay](#)

Summary

DB Replay Report for REPLAY-PROD-A

DB Name	DB Id	Release	RAC	Replay Name	Replay Status
PROD	195950047	11.2.0.3.0	NO	REPLAY-PROD-A	COMPLETED

Replay Information

Information	Replay	Capture
Name	REPLAY-PROD-A	CAPTURE-PROD-A
Status	COMPLETED	COMPLETED
Database Name	PROD	PROD
Database Version	11.2.0.3.0	11.2.0.3.0
Start Time	24-05-12 16:44:20	24-05-12 15:14:38
End Time	24-05-12 16:50:06	24-05-12 15:20:34
Duration	5 minutes 46 seconds	5 minutes 56 seconds
Directory Object	repdir	repdir
Directory Path	/ora/db/admin/PROD/repdir	/ora/db/admin/PROD/repdir

Replay Options

Option Name	Value
Synchronization	SCN
Connect Time	100%
Think Time	100%
Think Time Auto Correct	TRUE
Number of WRC Clients	1 (1 Completed, 0 Running)

Replay Statistics

Statistic	Replay	Capture
DB Time	5.187 seconds	312.267 seconds
Average Active Sessions	.01	.88
User calls	572	572
Network Time	1.353 seconds	N/A
Think Time	553.346 seconds	N/A

Replay Divergence Summary

Divergence Type	Count	% Total
Session Failures During Replay	0	0.00
Errors No Longer Seen During Replay	0	0.00
New Errors Seen During Replay	0	0.00
Errors Mutated During Replay	0	0.00
DMLs with Different Number of Rows Modified	0	0.00
SELECTs with Different Number of Rows Fetched	1	0.17

Workload Profile

Top Events

[Hide](#)

No data exists for this section of the report.

Top Service/Module/Action

[Hide](#)

No data exists for this section of the report.

Top SQL with Top Events

[Hide](#)

No data exists for this section of the report.

Top Sessions with Top Events

[Hide](#)

No data exists for this section of the report.

Replay Divergence

Session Failures

By Application

[Hide](#)

No data exists for this section of the report.

Error Divergence

By Application

[Hide](#)

No data exists for this section of the report.

By SQL

[Hide](#)

No data exists for this section of the report.

By Session

[Hide](#)

No data exists for this section of the report.

DML Data Divergence

By Application

[Hide](#)

No data exists for this section of the report.

By SQL

[Hide](#)

No data exists for this section of the report.

By Divergence magnitude

[Hide](#)

No data exists for this section of the report.

SELECT Data Divergence

By Application

[Hide](#)

Service Name	Module Name	Action Name	Avg Rows Affected	Avg Absolute Rows Affected	Number of Distinct Sessions	Count	First Occurrence	Last Occurrence
SYS\$USERS	PL/SQL Developer	SQL Window * select * from xx	-100	100	1	1	2012-05-24T16:45:42.671280+08:00	2012-05-24T16:45:42.671280+08:00

By Divergence magnitude

[Hide](#)

Max divergence magnitude Divergence distribution (%) Count