

Oracle10g 中可以抛弃命令行吗

在 Oracle10g 中我们是否可以抛弃命令行来做日常的数据库维护呢？本文作一个尝试，需要做到的是安装完 Oracle10gR2 之后，修改数据库到归档模式，然后创建一个自动备份的策略，完成数据库的定时 RMAN 备份，然后删除一张表，之后再作一次恢复。

以下所有操作均在 Oracle Enterprise Manager 10g 中实现。

设置数据库到归档模式

Database -> Maintenance -> Recovery Settings -> Media Recovery

Media Recovery

The database is currently in ARCHIVELOG mode. In ARCHIVELOG mode, hot backups and recovery to the latest time is possible, but you must provide space for logs. If you change the database to ARCHIVELOG mode, you should make a backup immediately. In NOARCHIVELOG mode, you can make only cold backups and data may be lost in the event of database corruption.

☒ ARCHIVELOG Mode*

Log Archive Filename Format*
The naming convention for the archived log files. %s: log sequence number; %t: thread number; %S and %T: padding the filename to the left with zeroes.

Number	Archive Log Destination	Quota (512B)	Status	Type
1				Local
2				Local
3				Local
4				Local
5				Local
6				Local
7				Local
8				Local
9				Local
10	USE_DB_RECOVERY_FILE_DEST	n/a	VALID	Local

☒ **TIP** It is recommended that archive log files be written to multiple locations spread across the different disks.
☒ **TIP** You can specify up to 10 archive log destinations.

在 ARCHIVELOG Mode 处打勾，表示启用归档模式。

如果需要改动归档文件的命名方式，可以在“Log Archive Filename Format”中修改，通常我们不做改动。

表格中的 1-10 用于设置归档路径，在 Oracle10g 中通常我们将 1-9 空着，而使用默认的 10，也就是归档文件将放入 Flash Recovery Area 中，下面会介绍 Flash Recovery Area 的设置。

注意：10g EM 中的很多 TIP 都写的比较详细，在设置之前仔细读一下很有好处。

Database -> Maintenance -> Recovery Settings -> Flash Recovery

Flash Recovery

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.

Flash Recovery Area Location

Flash Recovery Area Size GB

Flash Recovery Area Size must be set when the location is set

Reclaimable Flash Recovery Area (B) 0

Free Flash Recovery Area (GB) 1.85

☐ Enable Flashback Database - flashback logging can be used for fast database point-in-time recovery*

The flashback 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.

Specify how far back you wish to flash the database in the future

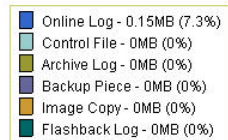
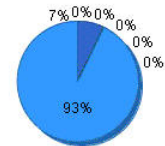
Flashback Retention Time Hours

Current size of the flashback logs(GB) n/a

Lowest SCN in the flashback data n/a

Flashback Time n/a

Flash Recovery Area Usage



Flash Recovery Area 默认是一个 2G 的空间，用于存放重作日志，备份文件，闪回日志等，具体的文件种类和各种类目前占用了多少空间可以看右方的饼状图以及图示。

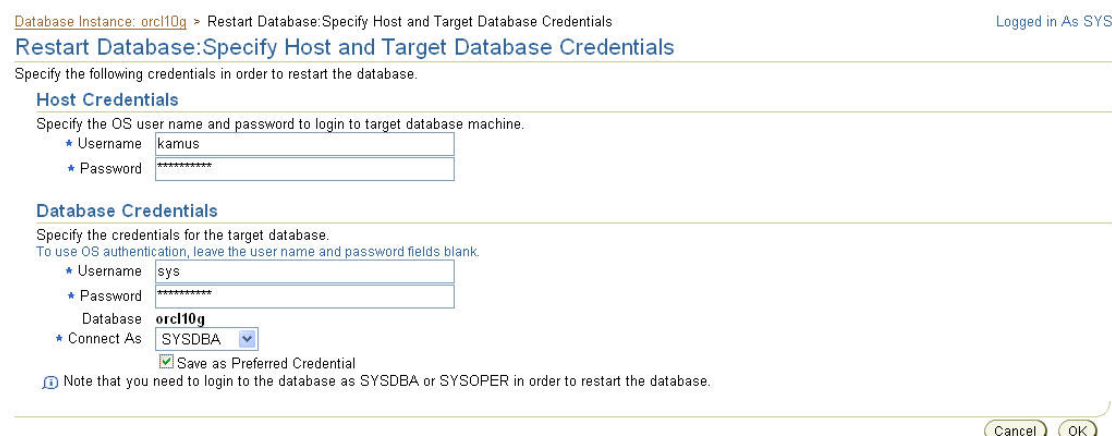
“Flash Recovery Area Location” 用于设置该区域的位置，指定一个有足够空间的地方就行了。

“Flash Recovery Area Size” 指定该区域的大小，在安装数据库的时候就有选项，默认是 2G，在此处也可以修改。注意，这个区域如果被 100% 占用，那么可能会导致数据库意外关闭并且无法重新启动，当然解决方法也是简单的，这是另外的话题了。

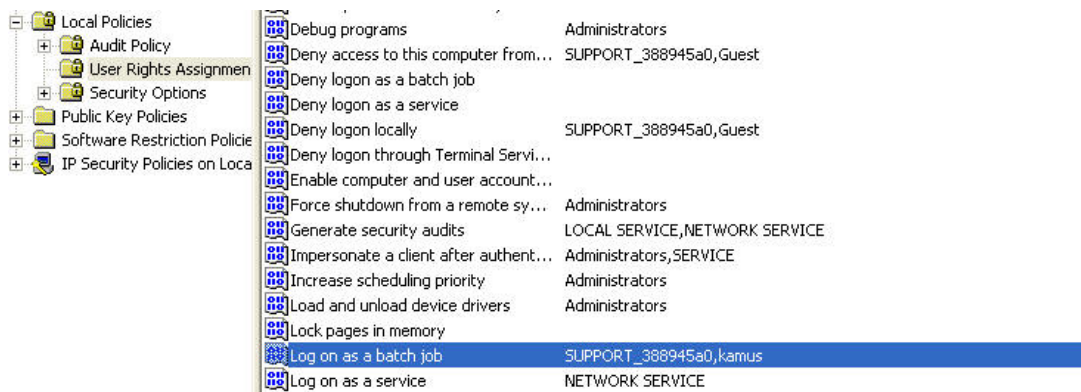
设置完毕以后，点击“Apply”，确认将数据库设置为归档模式，提示将重新启动数据库。



然后进入 Credentials 设置页面



其中 Host Credantials 设置登录操作系统的用户名和密码，在 Windows 操作系统中需要注意该用户必须拥有“Log on as a batch job”权限，否则将始终报密码不正确。设置界面如下：



再次点击“OK”，进入最终确认页面

Restart Database:Confirmation

Operation restart database after shutdown immediate

Are you sure you want to perform this operation?

Note that the following parameters have been used to startup the database. Please replace your initialization parameter file with the following contents.

```
spfile='C:\ORACLE\10.2.0\DB_1\DATABASE\SPFILEORCL10G.ORA'
```

Show SQLAdvanced OptionsNoYes

如果在这个页面点击“Show SQL”按钮，就会看到实际上将要执行的 SQL 是哪些。

Show SQL

SHUTDOWN immediate

STARTUP mount

ALTER DATABASE ARCHIVELOG

ALTER DATABASE OPEN READ WRITE

The startup command will use a temporary file as pfile with the following init.ora parameters:

```
spfile='C:\ORACLE\10.2.0\DB_1\DATABASE\SPFILEORCL10G.ORA'
```

Return

点击“Yes”之后，将提示数据库正在重新启动，稍等一段时间再重新登入 EM，这样数据库就已经处于归档模式了。

我们作一次日志切换，我们知道在 Oracle10g 中只要将数据库设置为归档模式，那么后台归档进程就会自动启动，不再需要象 9i 中那样再去设置 LOG_ARCHIVE_START 参数了，所以日志切换之后后台归档进程将会作自动归档。

Database -> Administration -> Redo Log Groups

Redo Log Groups

Object Type Redo Log Group

Search

Select an object type and optionally enter an object name to filter the data that is displayed in your results set.

Object Name

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.

Selection Mode Single

Create

EditViewDeleteActions

Select	Group	Status	# of Members	Archived	Size (KB)	Sequence#
<input checked="" type="radio"/>	1	Inactive	2	Yes	51200	1
<input type="radio"/>	2	Current	2	No	51200	1
<input type="radio"/>	3	Inactive	2	Yes	51200	1

Switch logfile

Go

Clear logfile

Create Like

Force checkpoint

Generate DDL

Sizing advice

Switch logfile

Range#

154069

164786

141842

然后查看一下归档文件保存的路径，可以看到归档文件存放在 Flash Recvoery Area 所指

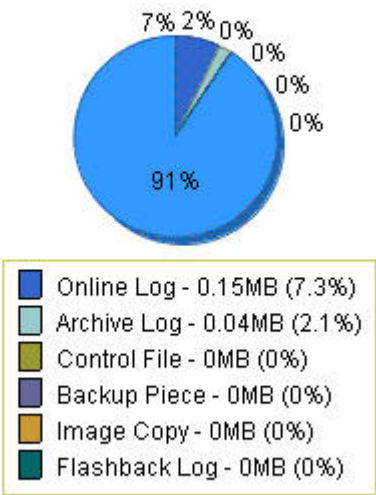
定的目录中了。

Database -> Administration -> Archive Logs

Name	Sequence	Thread	First Change #	First Time	Arch Time
D:\ORACLE\ORADATA\10G\FLASH_RECOVERY_AREA\ORCL10G\ARCHIVELOG\2005_10_28\01_MF_1_11_1P3GFTBW_.ARC	11	1	164786	Oct 26, 2005 1:42:12 PM CST	Oct 26, 2005 1:40: PM CST

同样我们还可以再去查看一下 Flash Recvoery Area 的饼图显示,此时已经包含有 Archive Log 了。

Flash Recovery Area Usage



设置定时备份

Database -> Maintenance -> Schedule Backup

Schedule Backup

Based on your disk and/or tape configuration, Oracle provides an automated backup strategy, or you can develop your own backup strategy with customized options.

Oracle-Suggested Backup

Schedule a backup using Oracle's automated backup strategy.

This option will back up the entire database. The database will be backed up on daily and weekly intervals.

Schedule Oracle-Suggested Backup

Customized Backup

Select the object(s) you want to back up.

Schedule Customized Backup

☒ Whole Database

☐ Tablespaces

☐ Datafiles

☐ Archivelogs

☐ All Recovery Files on Disk

These files include all archivelogs and disk backups that are not already backed up to tape

Backup Strategies

Oracle-suggested:

- Provides an out-of-the-box backup strategy based on the backup destination. Options may vary based on the database version.
- Sets up recovery window for backup management
- Automates backup management
- Schedules recurring backups

Customized:

- Specify the objects to be backed up
- Choose a disk or tape backup destination
- Override the default backup settings
- Schedule the backup

让我们相信 Oracle 给我们提供的方案吧，选择最简单的“Schedule Oracle-Suggested Backup”。

一共 4 步，只管点 “Next” 就行了。

Schedule Oracle-Suggested Backup: Destination

Database **orcl10g**
Backup Strategy **Oracle-Suggested Backup**

[Cancel](#) [Step 1 of 4](#) [Next](#)

Select the destination media for this backup.

☒ **Disk**
Use disk as the only storage for backups

☐ **Tape**
Use tape as the only storage for backups

☐ **Both Disk and Tape**
Use disk to store the most recent database backup and archivelogs for fast complete recovery. Use tape to store older backups for extended recovery window.

[Return to Schedule Backup](#) [Cancel](#) [Step 1 of 4](#) [Next](#)

存储的介质，可以是 Disk 和 Tape 或者同时，作为测试自然选择 Disk。

Schedule Oracle-Suggested Backup: Setup

Database **orcl10g**
Backup Strategy **Oracle-Suggested Backup**

[Cancel](#) [Back](#) [Step 2 of 4](#) [Next](#)

Daily Backup

A full database copy will be performed during the first backup. Subsequently, an incremental backup to disk will be performed everyday. The backups on disk will be retained so that you can always perform a full database recovery or a point-in-time recovery to any time within the past day.


Disk Settings

Flash Recovery Area **D:\oracle\oradata10g\flash_recovery_area**

☒ **TIP** Disk backups that are necessary for a recovery to any time within the past day are retained.

[Return to Schedule Backup](#) [Cancel](#) [Back](#) [Step 2 of 4](#) [Next](#)

这一步没有可供选择的，Oracle 建议的备份策略就是第一次全备，然后每天增量备份。




Schedule Oracle-Suggested Backup: Schedule

Database: **orcl10g**
Backup Strategy: **Oracle-Suggested Backup**


[Cancel](#) [Back](#) [Step 3 of 4](#) [Next](#)



Daily Backup Time

Specify a date to start the backup. The first backup could be time consuming as it is a whole database backup. Consider starting the backup when the database is least active.

Start Date: 
(example: Oct 28, 2005)


Specify a time to start the backup. Consider starting the backup when the database is least active during the day.

Time Zone: 

Daily Backup Time:   ☒ AM ☐ PM

[Return to Schedule Backup](#) [Cancel](#) [Back](#) [Step 3 of 4](#) [Next](#)

选择每天备份的开始时间，默认是早上 2 点，通常这是一个业务清淡期，作为测试，我在这里改成了下午 3:05。



Schedule Oracle-Suggested Backup: Review

Database: **orcl10g**
Backup Strategy: **Oracle-Suggested Backup**

[Cancel](#) [Back](#) [Step 4 of 4](#) [Submit Job](#)

Settings

Destination	Disk
Daily Backup	A full database copy will be performed during the first backup. Subsequently, an incremental backup to disk will be performed everyday. The backups on disk will be retained so that you can always perform a full database recovery or a point-in-time recovery to any time within the past day.
Flash Recovery Area	D:\oracle\oradata10g\flash_recovery_area
Maximum Backup Piece Size	2 G

RMAN Script


The RMAN script below is generated based on the user input from previous pages.

```
Daily Script:
run {
  allocate channel oem_disk_backup device type disk;
  recover copy of database with tag 'ORA$OEM_LEVEL_0';
  backup incremental level 1 cumulative copies=1 for recover of copy with tag 'ORA$OEM_LEVEL_0' database;
}
```

检查的页面，用语言描述了这个备份策略，并且给出了自动生成的将要用于备份的 RMAN 脚本。

最后，提交任务，显示任务成功提交了。

Database Instance: orcl10g

 **The job has been successfully submitted.**

Status

The job has been successfully submitted.
You can view the status of the job by clicking on the View Job button.

[View Job](#) [OK](#)

我们再来检查一下这个备份 Job。

Database -> Home -> Job Activity

Job Activity

Jobs scheduled to start no more than 7 days ago

Scheduled Executions

1

Running Executions

0

Suspended Executions

0

Problem Executions

0

可以看到已经有一个计划中的任务了，点击数字 1 显示该任务的详细信息。

Job Activity

Page Refreshed Oct 28, 2005 2:55:59 PM

Search

Name

Owner

All

Status

Scheduled

Scheduled Start

Last 7 days

Show jobs scheduled to start at the above time or afterwards

Go

Job Type

All

Target Type

Database Instance

Target Name

"orcl10g"

Show jobs to which I have not been granted view access

Can only be checked if exactly one target is selected. The jobs will be listed, but their results cannot be viewed.

Results

View Runs

Create Job CloneHome Go

View Edit Create Like Suspend Resume Stop Delete

Select	Name	Status (Executions)	Scheduled	Targets	Target Type	Owner	Job Type
<input checked="" type="radio"/>	BACKUP_ORCL10G_000001	1 Scheduled	Oct 28, 2005 3:30:00 PM GMT+08:00	orcl10g	Database Instance	SYS	Database Backup

正是我们刚才设置的自动备份任务，在此处点击“Edit”还可以进一步编辑诸如任务执行间隔等的设置，比如我们可以改成隔 3 天执行一次，或者隔 2 小时执行一次，而不是默认的一天一次。

我们可以查看备份报告来获得备份是否成功进行的信息。

Database -> Maintenance -> Backup Reports

Backup Reports

The following backup jobs are known to the database. The data is retrieved from the database control file.

Filter By

Start Time

Within 1 month

Type

All

Status

All

Go

Result

Total 2 (Completed 2)

Backup Name	Start Time	Time Taken	Status	Type	Output Devices	Input Size	Output Size	Output Rate Per Sec
2005-10-28T15:05:15	Oct 28, 2005 3:05:18 PM	00:02:11	COMPLETED	DB FULL	DISK	631.72M	631.80M	4.82M
2005-10-28T14:12:36	Oct 28, 2005 2:12:40 PM	00:00:06	COMPLETED	CONTROLFILE	DISK	6.72M	1.03M	176.00K

报告的信息是比较实用的，包括备份的开始时间，花费的时间，当前的状态，备份的类型，读取了多少数据，备份生成了多少数据，每秒钟写磁盘的速率。

同样我们可以再次查看 Job Activity。

Results

View Runs

Create Job CloneHome Go

View Edit Create Like Suspend Resume Stop Delete

Select	Name	Status (Executions)	Scheduled	Targets	Target Type	Owner	Job Type
<input checked="" type="radio"/>	BACKUP_ORCL10G_000001	1 Scheduled	Oct 29, 2005 3:05:00 PM GMT+08:00	orcl10g	Database Instance	SYS	Database Backup
<input type="radio"/>	BACKUP_ORCL10G_000001	1 Succeeded	Oct 28, 2005 3:05:00 PM GMT+08:00	orcl10g	Database Instance	SYS	Database Backup

显示一次成功，并且第二天的任务处于计划中的状态。至此，自动备份设置并测试完毕。

数据库恢复

接下来继续测试恢复，首先创建一个测试用户 USER1，然后我们 DROP 掉这个用户，之后作数据库的不完全恢复，恢复到 DROP USER 之前的一个时间点，这样来完成这个恢复过程。

Database -> Maintenance -> Perform Recovery

Perform Recovery

Whole Database Recovery

☒ Recover to the current time or a previous point-in-time
Datafiles will be restored from the latest usable backup as required.

Perform Whole Database Recovery

☐ Restore all datafiles

Specify Time, SCN or log sequence. The backup taken at or prior to that time will be used. No recovery will be performed in this operation.

☐ Recover from previously restored datafiles

Object Level Recovery

Object Type Datafiles

Perform Object Level Recovery

Operation Type ☒ Recover to current time

Datafile will be restored as required.

☐ Restore datafiles

Specify Time, SCN or log sequence. The backup taken at or prior to that time will be used. No recovery will be performed in this operation.

☐ Recover from previously restored datafiles

☐ Block Recovery

Overview

- Restore and/or recover the entire database or selected objects
- Restore files to a new location
- Recover tablespaces to a point-in-time based on a timestamp, system change number (SCN), or log sequence number
- Recover datafile data blocks that are marked as corrupted, or based on datafile block IDs or tablespace block addresses
- Flashback database or tables to a specific system change number (SCN) or timestamp

由于要做不完全恢复，是“previous point-in-time”，所以直接使用默认的选项，点击“Perform Whole Database Recovery”。

Confirmation

The database is currently in OPEN state and ARCHIVELOG mode. To perform a whole database recovery, the database will first be shut down and brought to the MOUNTED state. Are you sure you want to shut down the database now?

No Yes

提示数据库目前是 Open 状态，要执行恢复必须关闭数据库然后启动数据库到 MOUNTED 状态，点击“yes”之后，这个操作是自动进行的。


Database Instance: orcl10g

Recovery Wizard

The database will be shutdown and started/mounted. Please wait for this operation to complete and click 'Refresh'. You will be redirected to a page to go through the recovery wizard.

Refresh

页面提示数据库正在重新启动中，稍等然后点击“Refresh”然后将会进入下一步骤。实际上这一步 Refresh 之后，只会进入 EM 的初始界面，仍然需要我们从最上面的“Perform Whole Database Recovery”这一步开始重新点击。但是这只是一个小问题，多点几次以后就会进入下面这个正式开始数据库恢复的页面。



Perform Whole Database Recovery: Point-in-time

Database: **orcl10g**
Object Type: **Whole Database**
Operation Type: **Restore and Recover**


[Cancel](#) [Step 1 of 5](#) [Next](#)

Point-in-time

You may recover the entire database to the current time or a prior point-in-time.

☐ Recover to the current time

☒ Recover to a prior point-in-time

☒ Date:  Time: ☐ AM ☒ PM
(example: Oct 28, 2005)


☐ Restore Point:

☐ SCN:

☐ Sequence:

[Return to Perform Recovery](#) [Cancel](#) [Step 1 of 5](#) [Next](#)

由于我们要做不完全恢复，所以必须要选择将数据库恢复到没有 DROP USER 之前的一个时间点或者 SCN 或者某个联机日志的序列号。其中“Restore Point”是 Oracle10g 的新功能，我们以后再测试。这里，先将数据库恢复到当天的下午 4:10，这是我创建 USER1 用户，然后又删除 USER1 用户中间的一个时间点。



Perform Whole Database Recovery: Rename

Database: **orcl10g**
Object Type: **Whole Database**
Operation Type: **Restore and Recover**

[Cancel](#) [Back](#) [Step 3 of 5](#) [Next](#)

Do you want to restore the files to a different location? If so, the control file will be updated to use the new location.

☒ No. Restore the files to the default location.

☐ Yes. Restore the files to a new, common location.


☒ **TIP** This option will execute an RMAN 'rename' operation.

Location:

☐ Yes. Restore the files as Oracle Managed Files.
Oracle Managed Files Location: **D:\oracle\oradata10g**

[Return to Perform Recovery](#) [Cancel](#) [Back](#) [Step 3 of 5](#) [Next](#)

允许我们将数据文件恢复到不同的位置，此处的功能主要是为了如果原来存储位置的磁盘发生了硬件错误或者位置更改，可以将数据库文件恢复到其它位置。作为测试，我们只将备份恢复到原来的位置即可。



Perform Whole Database Recovery: Review

Database: **orcl10g**
Object Type: **Whole Database**
Operation Type: **Restore and Recover**

[Cancel](#) [Edit RMAN Script](#) [Back](#) [Step 5 of 5](#) [Submit](#)

Click on the Edit RMAN Script button to view or edit the RMAN script before submitting the operation.

Options

Point-in-time: **Recover to a prior point-in-time**
Time: **Oct 28, 2005 4:10:00 PM CST**

[Return to Perform Recovery](#) [Cancel](#) [Edit RMAN Script](#) [Back](#) [Step 5 of 5](#) [Submit](#)

Schedule 这步在正常的恢复数据库中将被跳过，直接进入最后的“Review”确认页面。

“Submit”之后就会进入提心吊胆的恢复阶段了。

Processing: Perform Whole Database Recovery

Perform Whole Database Recovery



Step: Perform Whole Database Recovery

 **TIP** This operation cannot be canceled. It will continue even if the browser window is closed.

这个页面会不断的刷新，我们所要做的只是祈祷+等待，在磁盘吱吱嘎嘎一阵之后，终于，EM 提示我们操作成功了。查看整个 Log 的输出，我们可以看到 Oracle 每一步都做了什么，其实就是 RMAN 的恢复过程。

Operation Succeeded

The output of the operation is shown below. You can continue to open the database with resetlogs option.

```
SQL*Plus: Release 10.2.0.1.0 - Production on Fri Oct 28 18:33:42 2005
```

```
Copyright (c) 1982, 2005, Oracle. All rights reserved.
```

```
SQL> SQL> Connected.
```

```
SQL> SQL> SQL> ORA-01109: database not open
```

```
Database dismounted.
```

```
ORACLE instance shut down.
```

```
SQL> SQL> Disconnected from Oracle Database 10g Enterprise Edition Release 10.2.0.1.0 - Production  
With the Partitioning, OLAP and Data Mining options
```

```
SQL*Plus: Release 10.2.0.1.0 - Production on Fri Oct 28 18:33:59 2005
```

```
Copyright (c) 1982, 2005, Oracle. All rights reserved.
```

Open Database OK

最后，点击“Open Database”，数据库将 resetlogs 方式打开数据库。显示数据库打开成功以后，整个恢复过程就结束了。在 Oracle10g 中，resetlogs 不再需要重新作数据库的备份了，因为新功能允许穿越 resetlogs 点进行数据库恢复。

Perform Recovery: Result

The database has been opened successfully.

```
SQL*Plus: Release 10.2.0.1.0 - Production on Fri Oct 28 18:40:05 2005
```

```
Copyright (c) 1982, 2005, Oracle. All rights reserved.
```

```
SQL> SQL> Connected.
```

```
SQL> SQL>
```

```
Database altered.
```

```
SQL> Disconnected from Oracle Database 10g Enterprise Edition Release 10.2.0.1.0 - Production  
With the Partitioning, OLAP and Data Mining options
```

虽然，整个恢复过程看上去是简单而且流畅的，实际上在我的测试过程中仍然是出现过问题

的，关于出现的问题和解决方法参看后面的“后记”部分。

自定义备份的设置

首先我们可以设置一些备份的参数

Database -> Maintenance -> Backup Settings -> Device

The screenshot shows a success message at the top: "Disk Backup Test Successful!". Below it is the "Disk Settings" configuration page. The "Parallelism" is set to 1. The "Disk Backup Location" is empty. The "Disk Backup Type" is set to "Compressed Backup Set".

Disk Settings

Parallelism: 1
Concurrent streams to disk drives

Disk Backup Location:
Flash recovery area is your current the disk backup location. If you would like to override the disk backup location, specify an existing directory or diskgroup name.

Disk Backup Type: ☐ Backup Set
An Oracle backup file format that allows for more efficient backups by interleaving multiple backup files into one output file.
☒ Compressed Backup Set
An Oracle backup set in which the data is compressed to reduce its size.
☐ Image Copy
A bit-by-bit copy of database files that can be used as-is to perform recovery.

Test Disk Backup

Disk Backup Location 中如果留空，则表示使用 Flash Recovery Area 作为备份文件的存储路径。

Compressed Backup Set 是 Oracle10g 的新功能，如果备份文件占用空间过多可以使用这个选项。

点击“Test Disk Backup”将作硬盘测试，具体测试细节没有研究，测试成功之后将会显示如上图上方的“Disk Backup Test Successful!”。

Database -> Maintenance -> Backup Settings -> Backup Set

The screenshot shows the "Backup Settings" page with tabs for "Device", "Backup Set", and "Policy". The "Maximum Backup Piece (File) Size" is set to 2 GB.

Backup Settings

Device Backup Set Policy

Maximum Backup Piece (File) Size: 2 GB
Specify a value to restrict the size of each backup piece.

设置备份文件的最大尺寸，按照惯例我通常设置为 2G，这个主要是以前 32bit 系统留下的习惯，并且 2G 大小的文件也比较适合管理。

Database -> Maintenance -> Backup Settings -> Policy

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 files will be backed up to 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.

Tablespaces Excluded From Whole Database Backup

Populate this table with the tablespaces you want to exclude from a whole database backup. Use the Add button to add tablespaces to this table.

Select Tablespace Name	Tablespace Number	Status	Contents
No Items Selected			

☒ **TIP** These tablespaces can be backed up separately using tablespace backup.

Retention Policy

☐ Retain All Backups
You must manually delete any backups

☐ Retain backups that are necessary for a recovery to any time within the specified number of days (point-in-time recovery) Days
Recovery Window

☒ Retain at least the specified number of full backups for each datafile Backups

自动备份控制文件和 spfile，打勾。

对于没有改变的文件（只读或者 offline 的）不备份，打勾。

激活块变更记录，实现更有效更快速的增量备份，Oracle10g 新功能，打勾。

至于 Retention Policy，不多做介绍了，选择合适的方案吧，保留窗口期或者备份数量。

设置完备份参数，可以继续设置是使用控制文件保存备份信息还是使用 Catalog。

Database -> Maintenance -> Recovery Catalog Settings

Recovery Catalog Settings

The Recovery Manager (RMAN) repository is a collection of metadata about the target database that is used by backup and recovery operations. The information can be stored in the control file or in a recovery catalog - a schema in a separate database that can hold information for one or more databases.

If you select a recovery catalog for which this database is not registered, the database will automatically be registered when you click OK.

☒ Use Control File

Keep RMAN Records (days)
Specify how long to keep RMAN records in the control file before they can be reused.

☐ Use Recovery Catalog

Recovery Catalog

Host username and password is required if your database is not registered with the selected catalog.

* Username

* Password

☐ Save as Preferred Credential

如果作为生产系统，那么强烈推荐使用 Recovery Catalog，本文用于测试，所以简单些就使用数据库自身的控制文件了。

在这里我们可以修改控制文件中保存 RMAN 信息的天数，默认为 7 天。

最后测试一下 Compressed Backup Set 的效果，库是新创建的数据库，作一次全库备份。
然后看 Backup Report

Result

Total 3 (Completed 3)


Backup Name	Start Time	Time Taken	Status	Type	Output Devices	Input Size	Output Size	Output Rate Per Sec
2005-10-28T16:27:38	Oct 28, 2005 4:59:01 PM	00:01:16	COMPLETED	DB FULL	DISK	631.72M	62.69M	844.63K
2005-10-28T15:05:15	Oct 28, 2005 3:05:18 PM	00:02:11	COMPLETED	DB FULL	DISK	631.72M	631.80M	4.82M
2005-10-28T14:12:36	Oct 28, 2005 2:12:40 PM	00:00:06	COMPLETED	CONTROLFILE	DISK	6.72M	1.03M	176.00K

查看最上面一条，可见压缩的效果是明显的，读入的数据是 631.72M，生成的备份集只有 62.69M。

后记

在测试使用图形化界面恢复数据库的过程中，开始的恢复并没有成功，报错如下。

Perform Recovery: Result

 **Operation Failed**

The output of the operation is shown below.

```
2> restore database until time "to_date('2005-10-28 16:10:22', 'YYYY-MM-DD HH24:MI:SS')";
3> recover database until time "to_date('2005-10-28 16:10:22', 'YYYY-MM-DD HH24:MI:SS')";
4> }
```

启动 restore 于 28-10月-05
分配的通道: ORA_DISK_1
通道 ORA_DISK_1: sid=156 devtype=DISK
释放的通道: ORA_DISK_1

连续测试几次，均是这种没有意义的报错信息，分配通道然后就是释放通道，很明显 `allocate channel` 的某一步出现了问题，但是图形化的界面却没有给我们任何有价值的信息。无奈，只有尝试使用命令行方式再次测试恢复。

```
RMAN> restore database;
```

```
Starting restore at 28-OCT-05
using target database control file instead of recovery catalog
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=157 devtype=DISK
released channel: ORA_DISK_1
RMAN-00571: =====
RMAN-00569: ===== ERROR MESSAGE STACK FOLLOWS =====
RMAN-00571: =====
RMAN-03002: failure of restore command at 10/28/2005 17:50:28
ORA-19554: error allocating device, device type: SBT_TAPE, device name:
ORA-27211: Failed to load Media Management Library
```

同样报错，但是命令行中给出了错误的原因。RMAN 尝试去寻找磁带上的备份信息，由于

找不到磁带设备，然后就报错。现在问题就是为什么 RMAN 会去寻找磁带设备？
先检查 RMAN 的参数设置。

```
RMAN> show all;
```

RMAN configuration parameters are:

```
CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default
CONFIGURE BACKUP OPTIMIZATION ON;
CONFIGURE DEFAULT DEVICE TYPE TO DISK;
CONFIGURE CONTROLFILE AUTOBACKUP ON;
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE SBT_TAPE TO '%F'; # default
CONFIGURE DEVICE TYPE DISK BACKUP TYPE TO COMPRESSED BACKUPSET PARALLELISM 1;
CONFIGURE DEVICE TYPE SBT_TAPE PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default

CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE SBT_TAPE TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE SBT_TAPE TO 1; # default
CONFIGURE CHANNEL DEVICE TYPE DISK MAXPIECESIZE 2 G;
CONFIGURE CHANNEL DEVICE TYPE 'SBT_TAPE' MAXPIECESIZE 2 G;
CONFIGURE MAXSETSIZE TO UNLIMITED; # default
CONFIGURE ENCRYPTION FOR DATABASE OFF; # default
CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default
CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default
CONFIGURE SNAPSHOT CONTROLFILE NAME TO
'C:\ORACLE\10.2.0\DB_1\DATABASE\SNCFORCL1
OG.ORA'; # default
```

```
RMAN> show default device type;
```

RMAN configuration parameters are:

```
CONFIGURE DEFAULT DEVICE TYPE TO DISK;
```

这些显示都表明已经设置 RMAN 的默认设备使用磁盘而不是磁带了，但是我们同时也发现在显示所有默认参数的时候，RMAN 列出了比以往多的参数，按照以往的经验 SBT_TAPE 设备是没有默认参数的，那么是不是可能是这个原因导致 RMAN 去尝试寻找磁带设备了呢？

接下来我们尝试删除所有 SBT_TYPE 设备的默认参数。

```
RMAN> CONFIGURE CHANNEL DEVICE TYPE 'SBT_TAPE' CLEAR;
```

old RMAN configuration parameters:

```
CONFIGURE CHANNEL DEVICE TYPE 'SBT_TAPE' MAXPIECESIZE 2 G;  
old RMAN configuration parameters are successfully deleted
```

```
RMAN> show all;
```

```
RMAN configuration parameters are:
```

```
CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default  
CONFIGURE BACKUP OPTIMIZATION ON;  
CONFIGURE DEFAULT DEVICE TYPE TO DISK;  
CONFIGURE CONTROLFILE AUTOBACKUP ON;  
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default  
CONFIGURE DEVICE TYPE DISK BACKUP TYPE TO COMPRESSED BACKUPSET PARALLELISM 1;  
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default  
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default  
CONFIGURE CHANNEL DEVICE TYPE DISK MAXPIECESIZE 2 G;  
CONFIGURE MAXSETSIZE TO UNLIMITED; # default  
CONFIGURE ENCRYPTION FOR DATABASE OFF; # default  
CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default  
CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default  
CONFIGURE SNAPSHOT CONTROLFILE NAME TO  
'C:\ORACLE\10.2.0\DB_1\DATABASE\SNCFORCL1  
0G.ORA'; # default
```

删除磁带设备的默认参数成功，然后再次尝试restore数据库。

```
RMAN> restore database;
```

```
Starting restore at 28-OCT-05
```

```
allocated channel: ORA_DISK_1
```

```
channel ORA_DISK_1: sid=157 devtype=DISK
```

```
channel ORA_DISK_1: starting datafile backupset restore
```

```
channel ORA_DISK_1: specifying datafile(s) to restore from backup set
```

```
restoring datafile 00001 to
```

```
D:\ORACLE\ORADATA10G\ORCL10G\DATAFILE\O1_MF_SYSTEM_10Y26BJQ_.DBF
```

```
restoring datafile 00002 to
```

```
D:\ORACLE\ORADATA10G\ORCL10G\DATAFILE\O1_MF_UNDOTBS1_10Y27DTQ_.DBF
```

```
restoring datafile 00003 to
```

```
D:\ORACLE\ORADATA10G\ORCL10G\DATAFILE\O1_MF_SYSAUX_10Y27ZBO_.DBF
```

```
restoring datafile 00004 to
```

```
D:\ORACLE\ORADATA10G\ORCL10G\DATAFILE\O1_MF_USERS_10Y28P7Y_.DBF
```

```
channel ORA_DISK_1: reading from backup piece D:\ORACLE\ORADATA10G\FLASH_RECOVER  
Y_AREA\ORCL10G\BACKUPSET\2005_10_28\O1_MF_NNNDNF_TAG20051028T165902_1P3T2QTT_  
.BKP
```

```
channel ORA_DISK_1: restored backup piece 1
piece
handle=D:\ORACLE\ORADATA10G\FLASH_RECOVERY_AREA\ORCL10G\BACKUPSET\2005_10_
28\O1_MF_NNNDP_TAG20051028T165902_1P3T2QTT_.BKP tag=TAG20051028T165902
channel ORA_DISK_1: restore complete, elapsed time: 00:00:55
Finished restore at 28-OCT-05
```

成功Restore，可见错误已经解决。

```
RMAN> recover database;
```

```
Starting recover at 28-OCT-05
using channel ORA_DISK_1
```

```
starting media recovery
media recovery complete, elapsed time: 00:00:05
```

```
Finished recover at 28-OCT-05
```

最后一步，恢复数据库，将数据库前滚到最新状态，之后就是继续我们上面的图形化恢复测试了。

结论

Oracle10g中抛弃命令行是有希望的，但是图形化的目标就是操作简单，所以负面的作用就是调试信息不足，当图形化界面出现问题的时候往往不如命令行方式容易定位问题，这在以前作高级复制时使用图形化界面得到的感想是一样的。

Oracle数据库的管理以后会越来越简单，但是拥有扎实的数据库基础仍然是必不可少的。图形化的界面只是减少了一些繁琐的命令输入，但是会操作是容易的事情，而如何解决问题才是一个DBA需要长时间去钻研的事情。