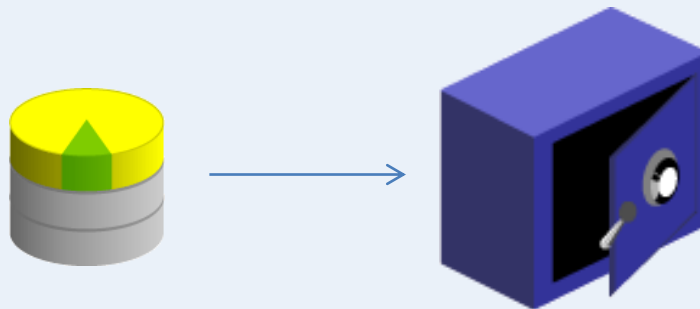


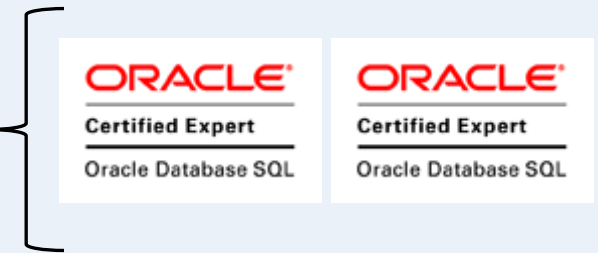
Oracle Database “Backups”



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Douglas Paiva

- DBA Oracle desde 2006.
- Certificações
 - OCE Oracle Database SQL Expert
 - OCA Administration I
- Instrutor Oracle WDP desde jan/2013
 - Introdução SQL
 - Database Administration I
 - Database Administration II

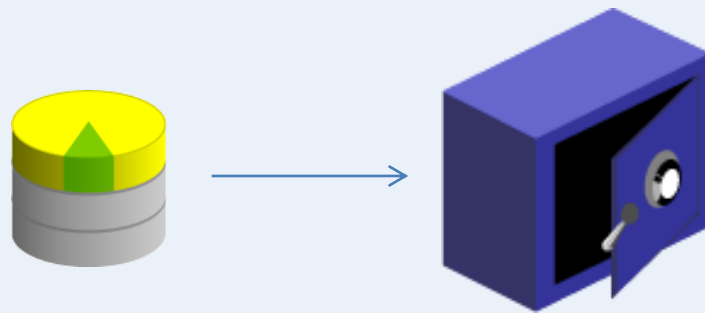


Agenda

- Criação de backups consistentes
- Hot Backup (sem “shutdown” no DB)
- Backup incremental
- Automatização do backup
- Gerenciamento de backups & relatórios
- Monitoramento FRA (fast recovery area)

Soluções de Backup

- RMAN (recovery manager)
- Oracle Secure Backup
- Backups gerenciados pelo usuário.



RMAN & Oracle Secure Backup

- Solução “end-to-end” em ambientes Oracle
 - Gerenciamento centralizado
 - 100% integrados com o DB
 - Acessível em toda sua rede
- Único ponto de contato para suporte
- Confiável proteção de dados, com baixo custo e complexibilidade.

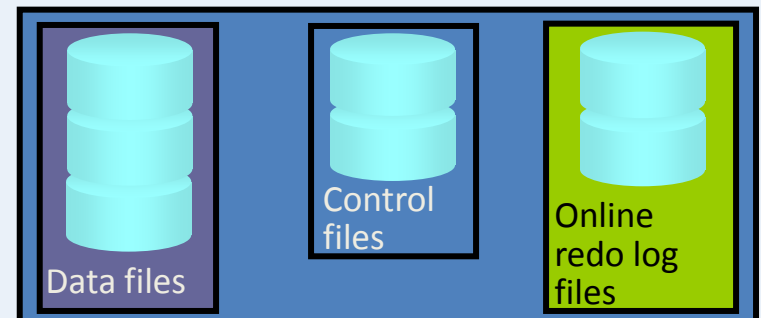
Backups gerenciados por usuários

- Processo manual (necessita de acompanhamento)
- Usuário precisa escrever “seus scripts”
- Necessita que mudança de status no DB
- Depende de comandos do sistema operacional



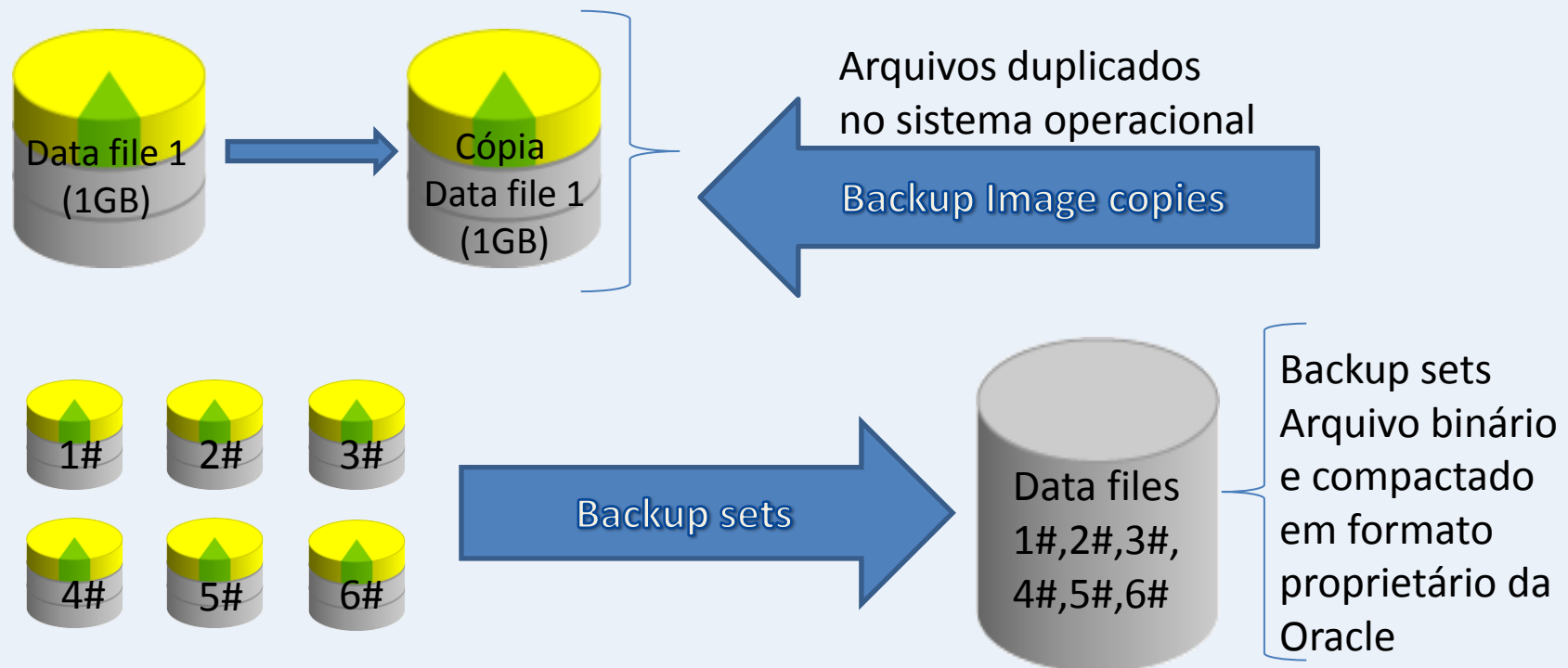
Conceitos

- Uma estratégia de backup pode incluir:
 - Todo o banco de dados (whole backup)
 - Uma parte do banco de dados (parcial)
- Tipos de Backup:
 - Todos os blocos de dados preenchidos (full)
 - Apenas os blocos de dados modificados desde o último backup full (incremental)
 - Cumulativo (modificações desde o ultimo backup level 0)
 - Diferencial (modificações desde o ultimo backup incremental)
- Um backup pode ser:
 - Offline (cold, consistente)
 - Online (Hot, inconsistente)



Conceitos

- Backups podem ser armazenados como:
 - Cópias de imagem (image copies)
 - Backup sets



Recovery Manager (RMAN)

- Ferramenta oficial de backup da Oracle (linguagem de script)
- 100% Integrada com o Enterprise Manager
- API que oferece interface com softwares de terceiros
- Backup: Datafiles, controlfile, archivelog e spfile
- Backups em disco e/ou fita

The screenshot displays the Oracle Enterprise Manager interface. At the top, there is a navigation bar with tabs for Home, Performance, Availability, Server, Schema, Data Movement, and Software and Support. Below this, the 'High Availability Console' is visible. The main section is titled 'Backup/Recovery' and is divided into three columns: 'Setup', 'Manage', and 'Oracle Secure Backup'. The 'Setup' column contains links for Backup Settings, Recovery Settings, and Recovery Catalog Settings. The 'Manage' column contains links for Schedule Backup, Manage Current Backups, Backup Reports, Manage Restore Points, Perform Recovery, and View and Manage Transactions. The 'Oracle Secure Backup' column contains a link for Assign and Manage.

Home	Performance	Availability	Server	Schema	Data Movement	Software and Support
High Availability Console						
Backup/Recovery						
Setup		Manage		Oracle Secure Backup		
Backup Settings		Schedule Backup		Assign and Manage		
Recovery Settings		Manage Current Backups				
Recovery Catalog Settings		Backup Reports				
		Manage Restore Points				
		Perform Recovery				
		View and Manage Transactions				

Configurando o RMAN

Backup Settings

Device Backup Set Policy

Disk Settings Test Disk Backup

Parallelism Concurrent streams to disk drives

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

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.

Device Backup Set Policy

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

Compression Algorithm

Specify the compression algorithm that will be used for both disk and tape compressed backup sets.

- BZIP2**
Optimized for maximum compression. Consumes more CPU resources, but will usually produce more compact backups.
- ZLIB**
Optimized for CPU efficiency. Requires the Oracle Advanced Compression option.

Tape Settings

The following parameters require additional configuration on different media pools.

Copies of Datafile Backups Specify the number of identical copies for datafile backups.

Copies of Archivelog Backups Specify the number of identical copies for archivelog backups.

Host Credentials

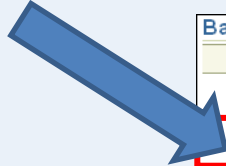
To save the backup settings, supply operating system login credentials to access the target database.

* Username

* Password

Save as Preferred Credential

Configurando o RMAN



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
Redundancy

Archived Redo Log Deletion Policy

Specify the deletion policy for archived redo log files. The archived redo log files will be eligible for deletion if the flash recovery area becomes full.

None
If a flash recovery area is set, archived redo log files that have been backed up to a tertiary device and are obsolete based on the retention policy will be deleted.

Delete archived redo log files after they have been backed up the specified number of times Backups

Host Credentials

To save the backup settings, supply operating system login credentials to access the target database.

* Username

* Password

Save as Preferred Credential

Agendando Backups: Estratégia

Schedule Backup

Oracle provides an automated backup strategy based on your disk and/or tape configuration. Alternatively, you can implement your own customized backup strategy.

Oracle-Suggested Backup

Schedule a backup using Oracle's automated backup strategy.

Schedule Oracle-Suggested Backup

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

Customized Backup

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

Schedule Customized Backup

Whole Database

Tablespaces

Datafiles

Archived Logs

All Recovery Files on Disk

Includes all archived logs 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
- Sets up recovery window for backup management
- Schedules recurring and immediate backups
- Automates backup management

Customized:

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

Host Credentials


To perform a backup, supply operating system login credentials to access the target database.

* Username

* Password

Save as Preferred Credential

Agendando Backups: Opções


Options Settings Schedule Review

Schedule Customized Backup: Options

Database **orcl.oracle.com** Cancel Step 1 of 4 Next
Backup Strategy **Customized Backup**
Object Type **Whole Database**

Backup Type

Full Backup
 Use as the base of an incremental backup strategy

Incremental Backup
A level 1 cumulative incremental backup includes all blocks changed since the most recent level 0 backup.
 Refresh the latest datafile copy on disk to the current time using the incremental backup

Backup Mode

Online Backup
Can be performed when the database is open.

Offline Backup
If the database is open at the time of backup, it will be shut down and mounted before the backup, then re-opened after the backup.

Advanced

Also back up all archived logs on disk
 Delete all archived logs from disk after they are successfully backed up


Delete obsolete backups
Delete backups that are no longer required to satisfy the retention policy.

Use proxy copy supported by media management software to perform a backup
If proxy copy of the selected files is not supported, a conventional backup will be performed.


Maximum Files per Backup Set

Section Size KB

Backs up large files in parallel, using sections of the specified size. (This parameter overrides Maximum Backup Piece Size in Backup Settings.)

 Encryption

Agendando Backups: Configurações



Options Settings Schedule Review

Schedule Customized Backup: Settings

Database **orcl.oracle.com** Cancel Back Step 2 of 4 Next

Backup Strategy **Customized Backup**

Object Type **Whole Database**

Select the destination media for this backup. You can also override the default backup settings.

Disk

Disk Backup Location **+FRA**

Tape

Media Management Vendor (MMV) Library Parameters **Not specified**

View Default Settings Override Default Settings

Changed settings will only apply to the current backup.

Agendando Backups: Período

Options Settings **Schedule** Review

Schedule Customized Backup: Schedule

Database **orcl.oracle.com** Cancel Back Step 3 of 4 Next

Backup Strategy **Customized Backup**

Object Type **Whole Database**

Job

* Job Name

Job Description

Schedule

Type One Time (Immediately) One Time (Later) Repeating

Frequency Type

Repeat Every Minutes

Time Zone

Start Date


Start Time : AM PM

Repeat Until Indefinite Specified Date

Date
(example: Jun 18, 2009)

Time : AM PM

Agendando Backups: Revisão



Options Settings Schedule **Review**

Schedule Customized Backup: Review

Database	orcl.oracle.com	<input type="button" value="Cancel"/>	<input type="button" value="Edit RMAN Script"/>	<input type="button" value="Back"/>	Step 4 of 4	<input type="button" value="Submit Job"/>
Backup Strategy	Customized Backup					
Object Type	Whole Database					

Settings

Destination	Disk
Backup Type	Full Backup
Backup Mode	Online Backup
Flash Recovery Area	+FRA

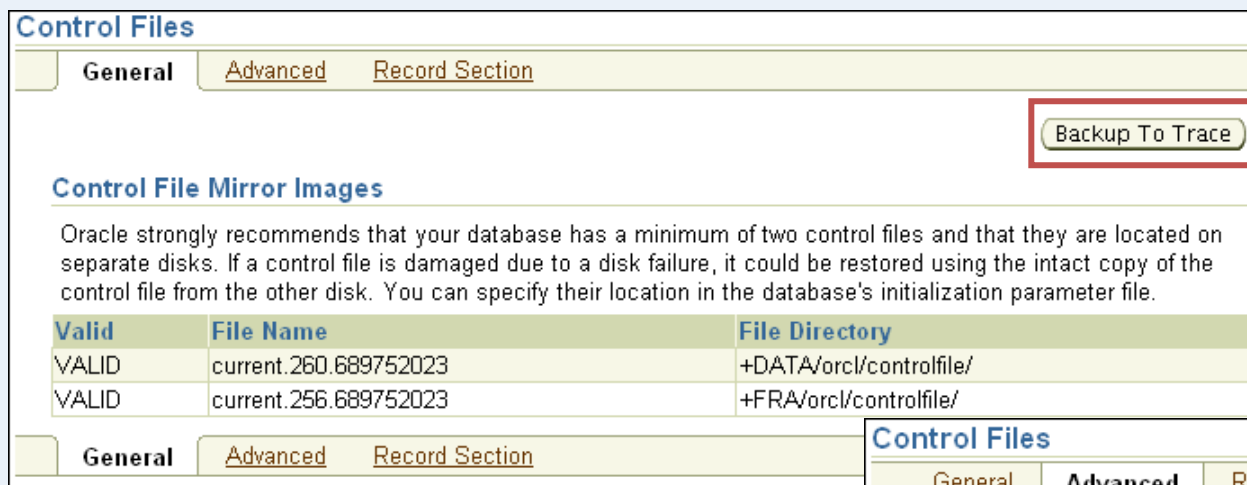
RMAN Script

The RMAN script below is generated based on previous input.

```
backup device type disk tag '%TAG' database;  
backup device type disk tag '%TAG' archivelog all not backed up;
```


Control File Backup “to trace”

O controlfile tem uma opção adicional de backup



Control Files

General Advanced Record Section

Backup To Trace

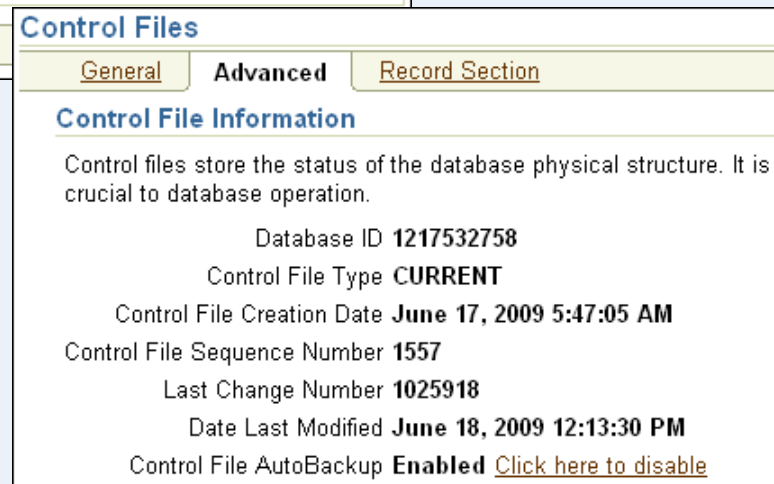
Control File Mirror Images

Oracle strongly recommends that your database has a minimum of two control files and that they are located on separate disks. If a control file is damaged due to a disk failure, it could be restored using the intact copy of the control file from the other disk. You can specify their location in the database's initialization parameter file.

Valid	File Name	File Directory
VALID	current.260.689752023	+DATA/orcl/controlfile/
VALID	current.256.689752023	+FRA/orcl/controlfile/

General Advanced Record Section

Esta opção de backup, você pode utilizar para fazer uma recuperação caso perca todos os controlfiles



Control Files

General **Advanced** Record Section

Control File Information

Control files store the status of the database physical structure. It is crucial to database operation.

Database ID **1217532758**

Control File Type **CURRENT**

Control File Creation Date **June 17, 2009 5:47:05 AM**

Control File Sequence Number **1557**

Last Change Number **1025918**

Date Last Modified **June 18, 2009 12:13:30 PM**

Control File AutoBackup **Enabled** [Click here to disable](#)

Gerenciando Backups

Manage Current Backups

[Catalog Additional Files](#)[Crosscheck All](#)[Delete All Obsolete](#)[Delete All Expired](#)

This backup data was retrieved from the database control file.

[Backup Sets](#)[Image Copies](#)

Search

Status Contents Datafile Archived Redo Log SPFILE Control FileCompletion Time

Results

[Crosscheck](#) [Change to Unavailable](#) [Delete](#) [Validate](#)[Select All](#) | [Select None](#)

Select	Key	Tag	Completion Time	Contents	Device Type	Status	Keep	Pieces
<input type="checkbox"/>	4	TAG20090618T121325	Jun 18, 2009 12:13:27 PM	CONTROLFILE, SPFILE	DISK	AVAILABLE	NO	1
<input type="checkbox"/>	3	BACKUP_ORCL.ORACLE_061809120854	Jun 18, 2009 12:13:21 PM	ARCHIVED LOG	DISK	AVAILABLE	NO	1
<input type="checkbox"/>	2	TAG20090618T121228	Jun 18, 2009 12:12:56 PM	CONTROLFILE, SPFILE	DISK	AVAILABLE	NO	1
<input type="checkbox"/>	1	BACKUP_ORCL.ORACLE_061809120854	Jun 18, 2009 12:12:20 PM	DATAFILE	DISK	AVAILABLE	NO	1

Relatórios de Backups

View Backup Report

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

Search

Status Start Time Type

Results

Total 1 (Completed 1)

Backup Name	Status	Start Time	Time Taken	Type	Output Devices	Input Size	Output Size	Output Rate (Per Sec)
BACKUP_ORCL_ORACLE_061809120854	COMPLETED	Jun 18, 2009 12:09:16 PM GMT+07:00	00:04:14	DB FULL	DISK	1.64G	1.34G	5.42M

TIP * in Output

Related Links

[Manage Current](#)

Inputs

Datfiles

Datafile Number	Output Type	Output Key	File Size	Tablespace	Checkpoint Time	Incremental Level	Compression Ratio	Corrupted Blocks	File Creation Time	File Checkpoint SCN	Resetlogs SCN
1	BACKUPSET	1	750.01M	SYSTEM	Jun 18, 2009 12:09:18 PM GMT+07:00		1.158		0 Apr 24, 2009 10:31:11 AM GMT+07:00	1025302	740137
2	BACKUPSET	1	651.26M	SYSAUX	Jun 18, 2009 12:09:18 PM GMT+07:00		1.43		0 Apr 24, 2009 10:31:17 AM GMT+07:00	1025302	740137
3	BACKUPSET	1	100.01M	UNDOTBS1	Jun 18, 2009 12:09:18 PM GMT+07:00		11.595		0 Apr 24, 2009 11:29:42 AM GMT+07:00	1025302	740137
4	BACKUPSET	1	148.20M	USERS	Jun 18, 2009 12:09:18 PM GMT+07:00		1.102		0 Apr 24, 2009 10:31:30 AM GMT+07:00	1025302	740137
5	BACKUPSET	1	100.01M	EXAMPLE	Jun 18, 2009 12:09:18 PM GMT+07:00		1.442		0 Jun 17, 2009 5:49:29 AM GMT+07:00	1025302	740137

Control Files

Output Type	Output Key	Checkpoint Time	File Size	File Checkpoint SCN	Resetlogs SCN
BACKUPSET	2	Jun 18, 2009 12:12:28 PM GMT+07:00	9.30M	1025706	740137
BACKUPSET	4	Jun 18, 2009 12:13:25 PM GMT+07:00	9.30M	1025894	740137

SPFile

Backup Set	Modification Time	File Size
4	Jun 18, 2009 11:21:10 AM GMT+07:00	0.00K
2	Jun 18, 2009 11:21:10 AM GMT+07:00	0.00K

Archived Logs

Output Type	Output Key	Thread Number	Sequence Number	File Size	Low Time	High Time	Compression Ratio	Resetlogs SCN
BACKUPSET	3	1	14	42.14M	Jun 18, 2009 6:41:27 AM GMT+07:00	Jun 18, 2009 12:13:04 PM GMT+07:00	1	740137

Monitoramento: fast recovery area

Flash Recovery

This database is using a flash recovery area. The chart shows space used by each file type that is not reclaimable by Oracle. Performing backups to 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

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

Non-reclaimable Flash Recovery Area (GB) **1.5**
Reclaimable Flash Recovery Area (MB) **53**
Free Flash Recovery Area (GB) **2.8**

Enable Flashback Database*

Flashback database can be used for fast database point-in-time recovery, as it returns the 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. The flash recovery area must be set to enable flashback database.

Flashback Retention Time

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

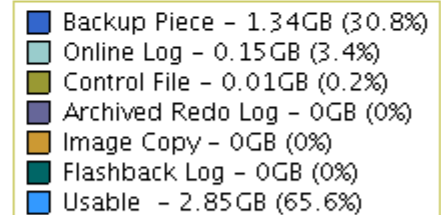
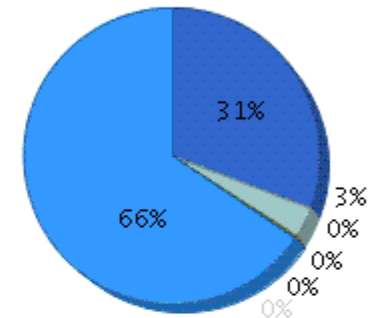
Lowest SCN in the flashback data **n/a**

Flashback Time **n/a**

Apply initialization parameter changes to SPFILE only. If not checked, parameter changes will be made to both the SPFILE and the running instance.

* Changes to this setting or parameter require a database restart.

Flash Recovery Area Usage

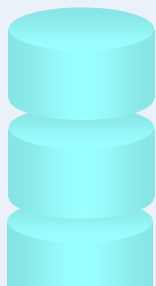


RMAN (linha de comando)

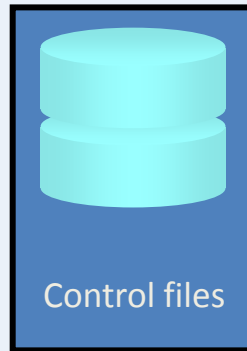
```
1 $ rman target /  
2 RMAN> CONFIGURE ...  
3 RMAN> BACKUP DATABASE PLUS ARCHIVELOG;
```



Data file



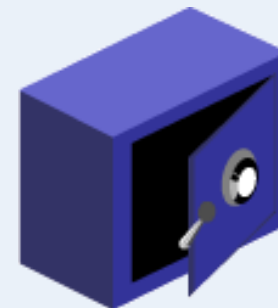
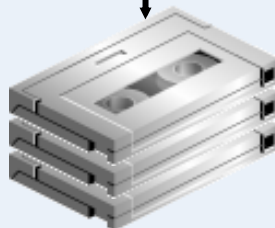
Redo log









Control files



SPFILE



Resumo

- Criação de backups consistentes 
- Hot Backup (sem “shutdown” no DB) 
- Backup incremental 
- Automatização do backup 
- Gerenciamento de backups & relatórios 
- Monitoramento FRA (fast recovery area) 

Perguntas

