Backup and Recovery

SUPINFO OFFICIAL SOC CURRICULUM

THE INTERNATIONAL INSTITUTE OF SUPINFO INFORMATION TECHNOLOGY

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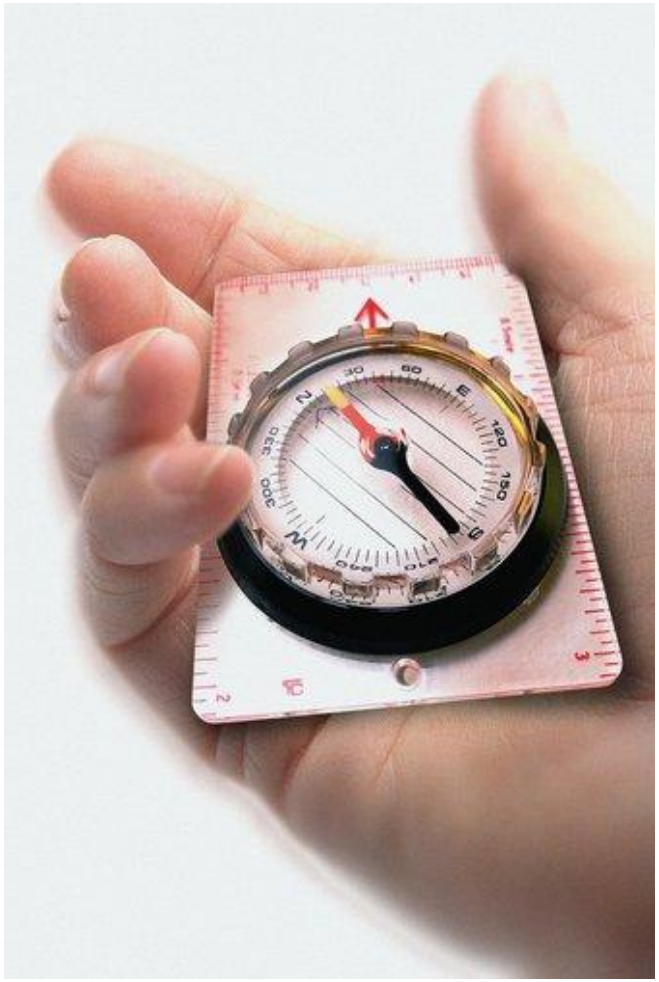
Course objectives

By completing this course, you will be able to:



- Describe the basics of database backups, restore and recovery
- List the types of failure that may occur
- Describe ways to tune instance recovery
- Identify the importance of checkpoints, redo log files, and archived redo log files
- Configure ARCHIVELOG mode

Course topics

Course's plan:

- Concepts
- Instance Recovery
- Configuring for recoverability

Concepts

Preview

- Presentation
- Type of failures

Presentation

The administrator’s duty is:

- Protect the database from failure wherever possible
- Increase the Mean-Time-Between-Failure (MTBF)
- Decrease the Mean-Time-To-Recover (MTTR)
- Minimize the loss of data

Type of failures

- Statement failure

Typical Problems	Possible Solutions
Attempts to enter invalid data into a table	Work with users to validate and correct data.
Attempts to perform operations with insufficient privileges	Provide appropriate object system privileges.
Attempts to allocate space that fail	Enable resumable space allocation. Increase user quota. Add space to tablespace.
Logic errors in application	Work with developers to correct program errors.

Type of failures

- User process failure

Typical Problems	Possible Solutions
User perform an abnormal disconnect	DBA action is not usually needed to resolve user process failure. Instance background processes roll back uncommitted changes and release locks. Watch for trends.
User session was abnormally terminated	
User experienced a program error which terminated the session	

Type of failures

- Network failure

Typical Problems	Possible Solutions
Listener fails	Configure a backup listener and connect-time failover.
Network Card Interface (NIC) fails	Configure multiple network cards.
Network connection fails	Configure a backup network connection.

Type of failures

- User errors

Typical Problems	Possible Solutions
User inadvertently deletes or modifies data.	Roll back or use flashback query to recover.
User drops a table.	Recover table from recycle bin.

Type of failures

- Instance failure

Typical Problems	Possible Solutions
Power outage	Restart the instance using the "startup" command. Recovery from instance failure is automatic including rolling forward changes in the redo logs then rolling back any uncommitted transactions. Investigate causes of failure using the alert log, trace files, and Enterprise Manager.
Hardware failure	
Failure of one of the background processes	
Emergency shutdown procedures	

Type of failures

- Media failure

Typical Problems	Possible Solutions
Failure of disk drive	1. Restore the affected files from backup. 2. If necessary, inform the database of a new file location. 3. If necessary, recover the file by applying redo information.
Failure of disk controller	
Deletion or corruption of database file	

Part 1 Summary

Presentation

Type of failures

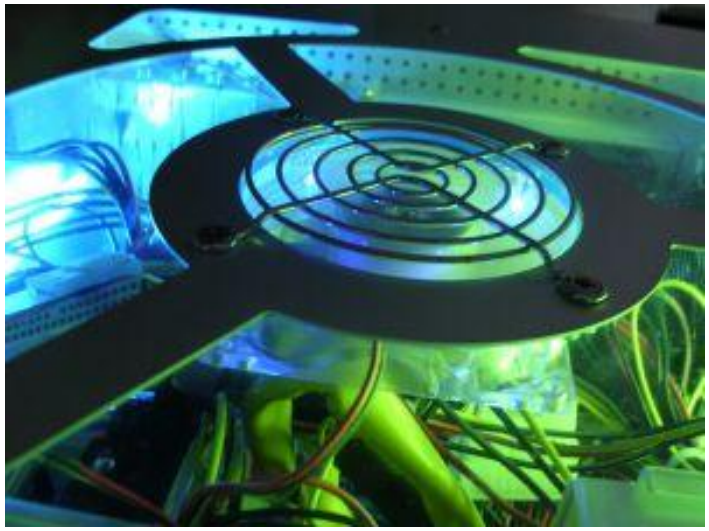
Part 1 Stop-and-think

Do you have any questions ?

Instance Recovery

Preview

- Recovery concepts
- Tuning



Recovery concepts

Instance or crash recovery:

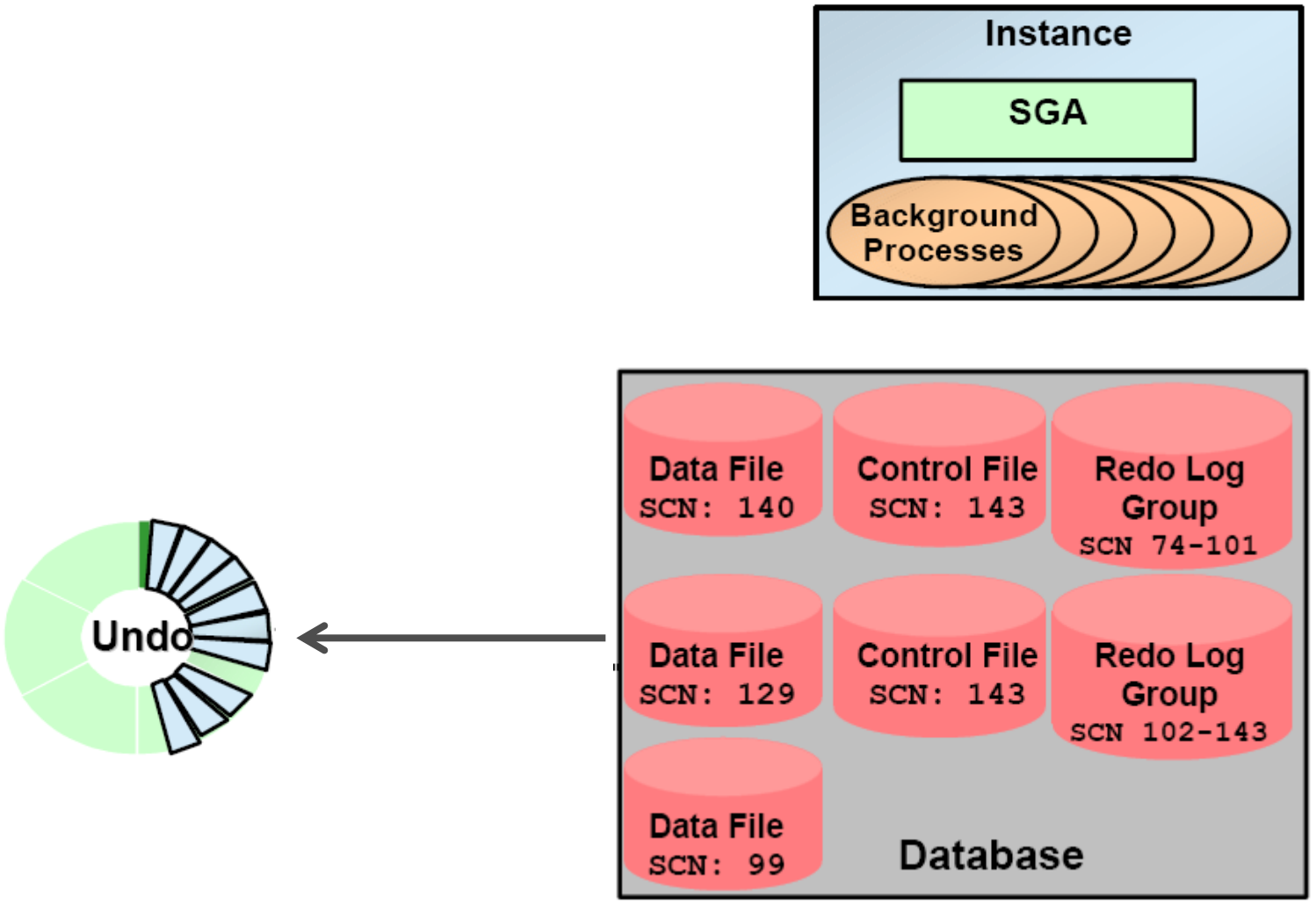
- Is caused by attempts to open a database whose files were not synchronized on shutdown
- Is automatic
- Uses information stored in the redo log groups to synchronize files
- Involves two distinct operations:
  - Rolling forward: Data files are restored to their state before the instance failed.
  - Rolling back: Changes made but not committed are returned to their original state.

Recovery concepts

Phase of instance recovery:

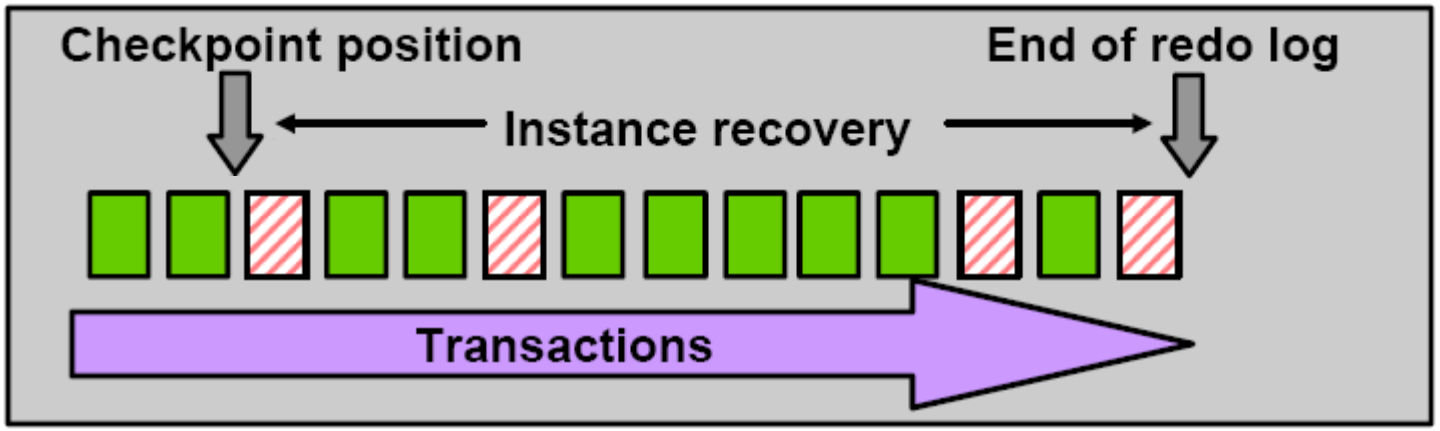
- Data files out-of-sync
- Roll forward (redo)
- Committed and non-committed data in files
- Roll back (undo)
- Committed data in files

Recovery concepts



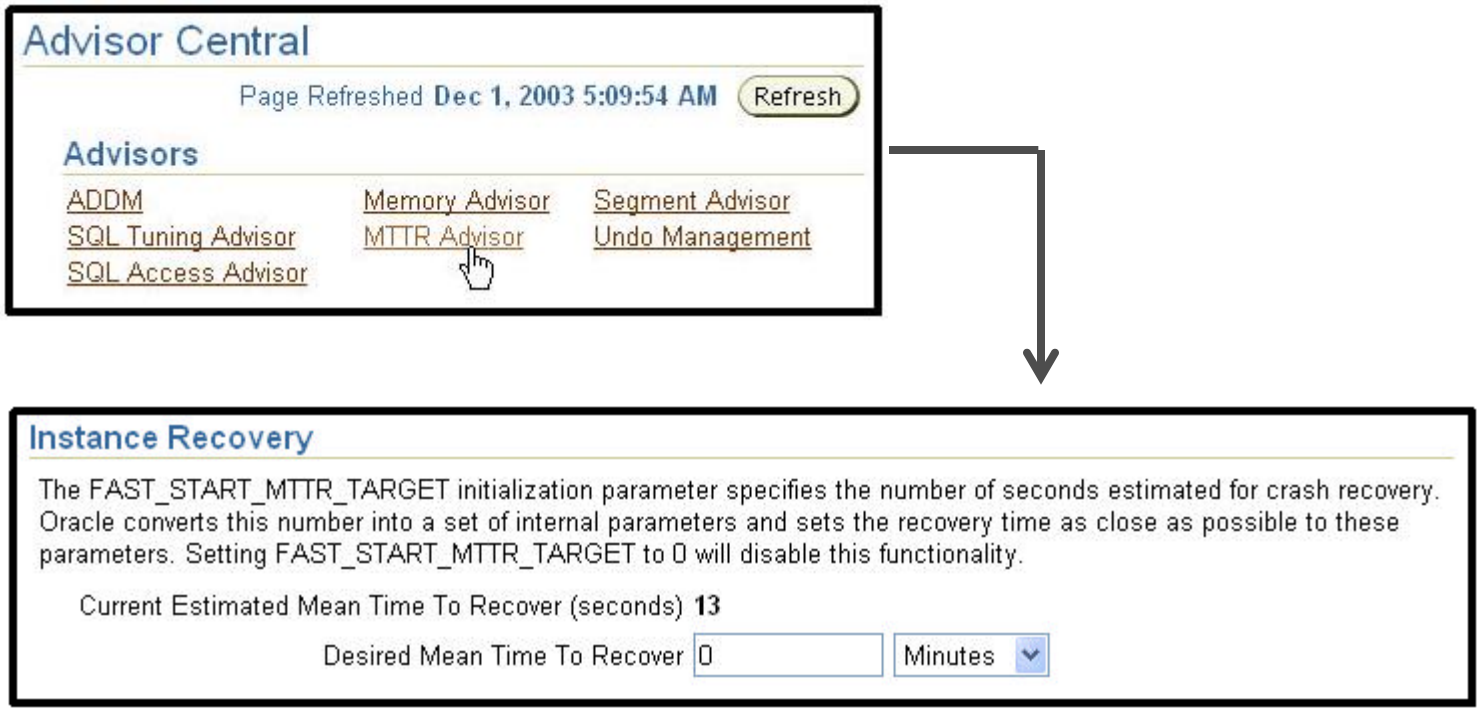
Tuning

- During instance recovery the transactions between the checkpoint position and end of redo log must be applied to the data files
- Tune instance recovery by controlling the difference between the checkpoint position and the end of redo log files



Tuning

- Specify the desired value in seconds or minutes
- Default value is 0 (disabled)
- Maximum value is 3600 seconds (one hour)



Part 2 Summary

Recovery concepts

Tuning

Part 2 Stop-and-think

Do you have any questions ?

Configuring recoverability

Preview

- Guidelines
- Control files
- Redo log files
- Multiplexing the redo log
- Archived redo log files

Guidelines

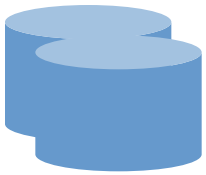
To configure your database for maximum recoverability:

- Schedule regular backups
- Multiplex control files
- Multiplex redo log groups
- Retain archived copies of redo logs

Control files

Protect against database failure by multiplexing:

- At least two copies (Oracle suggests three)
- Each copy on separate disk
- At least one copy on a separate disk controller

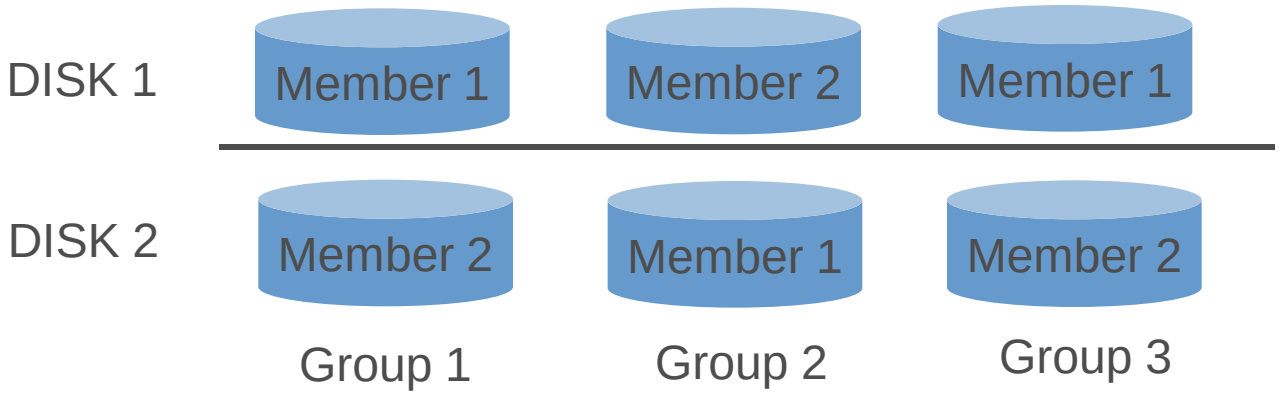


Control files

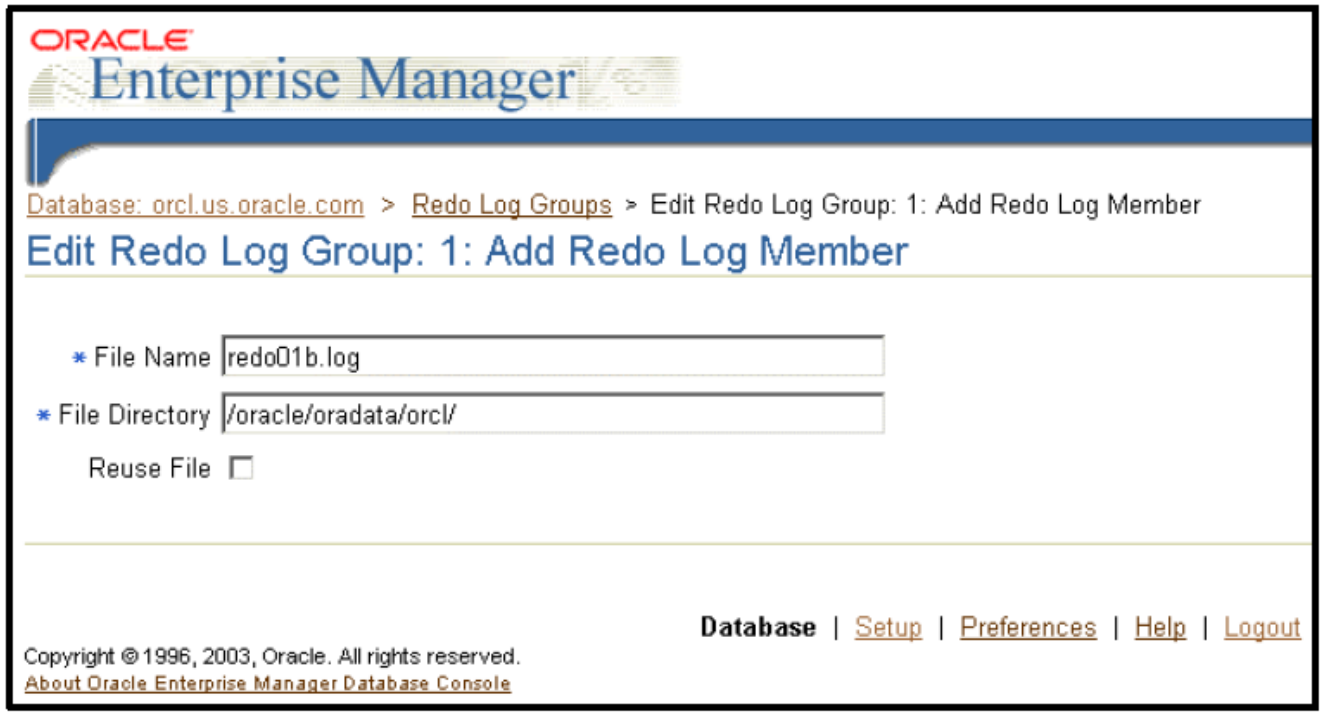
Redo log files

Multiplexing redo log groups to protect against media failure and loss of data:

- At least two members (files) per group
- Each member on a separate disk drive
- Each member on a separate disk controller
- Redo logs heavily influence performance



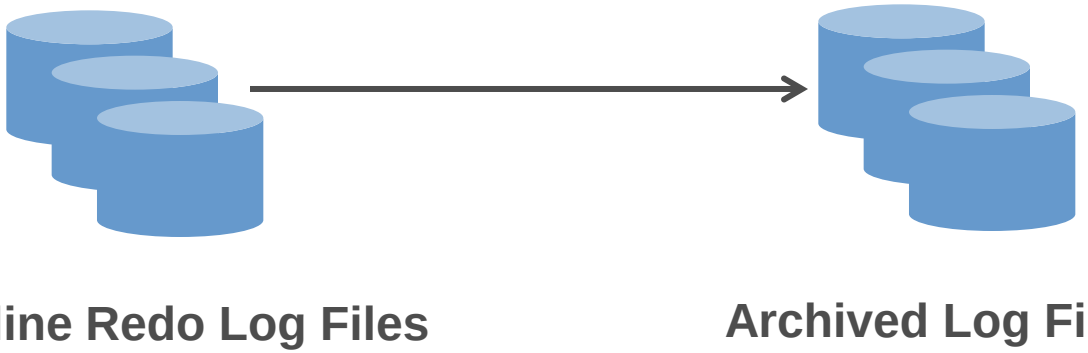
Multiplexing the redo log



Archived redo log files

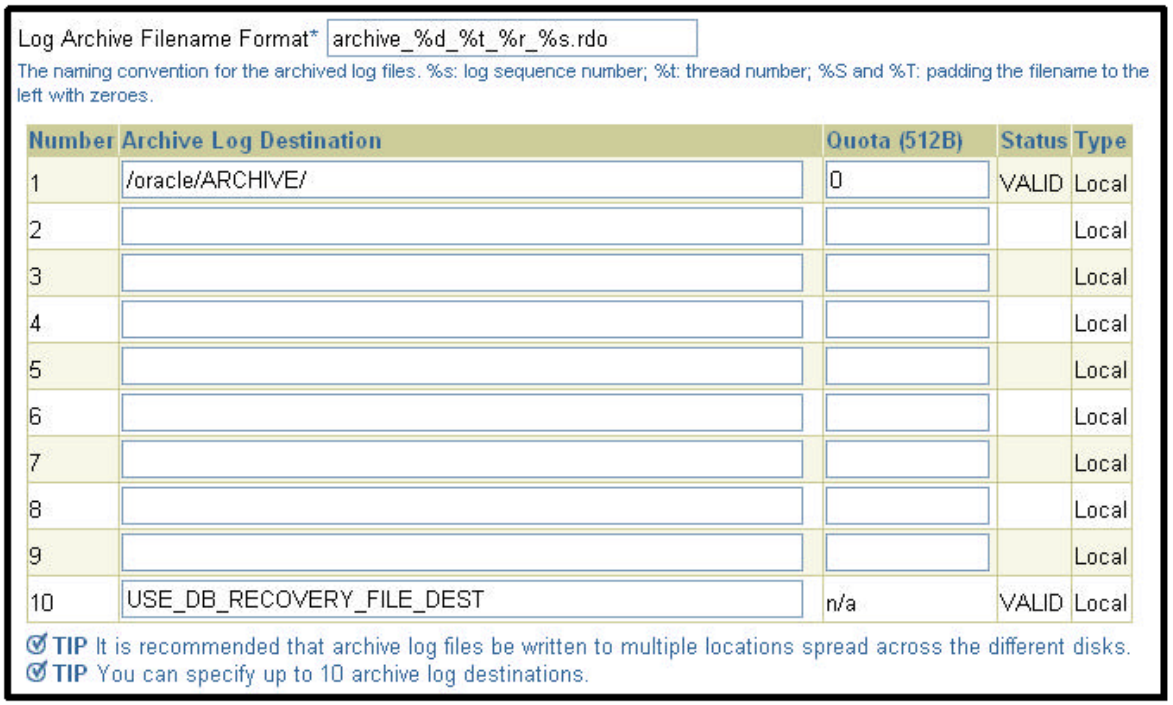
To preserve redo information, create archived copies of redo log files:

- Specify archived log files naming convention
- Specify one or more locations to archive logs to switch the database to ARCHIVELOG mode



Archived redo log files

- Specify archived log file name and destinations



Log Archive Filename Format* archive_%d_%t_%r_%s.rdo

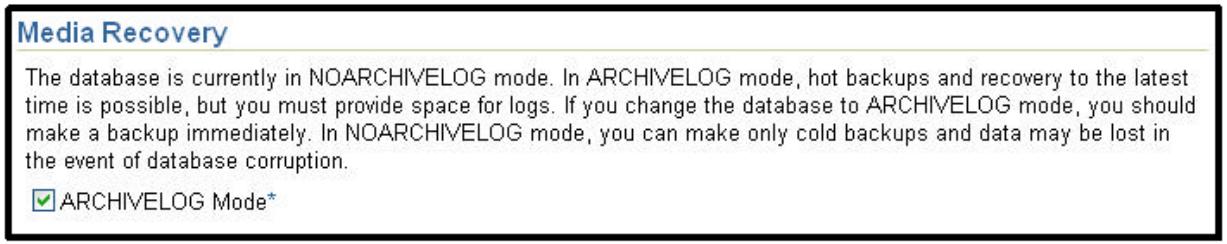
The naming convention for the archived log files. %s: log sequence number; %t: thread number; %S and %T: padding the filename to the left with zeroes.

Number	Archive Log Destination	Quota (512B)	Status	Type
1	/oracle/ARCHIVE/	0	VALID	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.

Archived redo log files

- Place the database in ARCHIVELOG mode
  - Click the ARCHIVELOG mode checkbox
  - Click Apply. The database can only be set ARCHIVELOG mode from the MOUNT state. Click Yes when asked if you want to restart the database.



Part 3 Summary

Redo log files

Guide Lines

Archived redo log files

Control files

Multiplexing the redo log

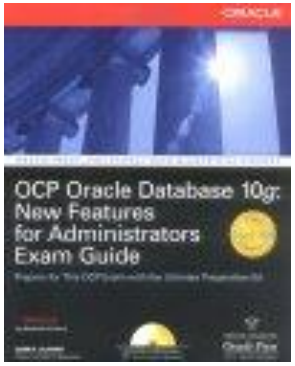
Part 3 Stop-and-think

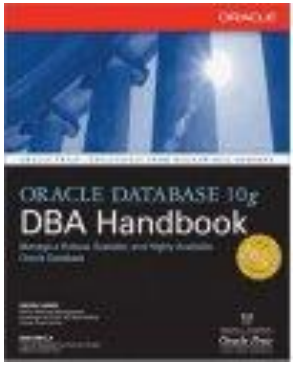
Do you have any questions ?

For more

If you want to go into these subjects more deeply, …

Publications





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Cursus: DBA1 & DBA2

Cursus: DWH, OAS & BIS

Web sites

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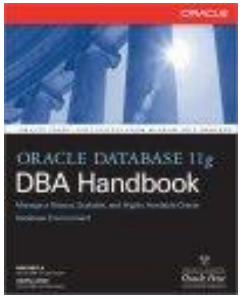
http://otn.oracle.com

Certifications

1Z0-042

1Z0-043



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Congratulations

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The end


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