

# 16

## Performing Database Recovery

# Objectives

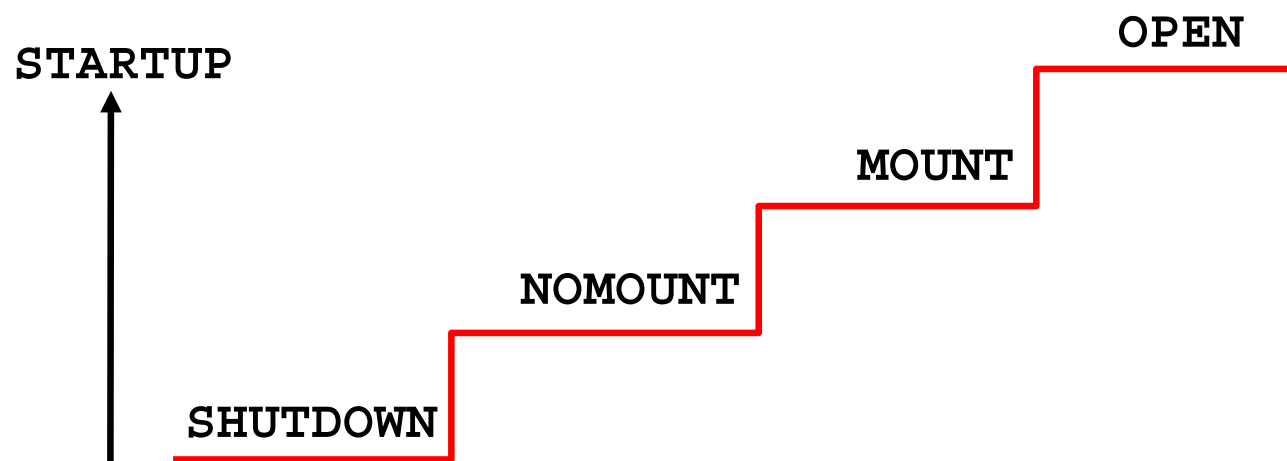
After completing this lesson, you should be able to:

- Determine the need for performing recovery
- Access different interfaces (such as Enterprise Manager and command line)
- Describe and use available options, such as Recovery Manager (RMAN) and the Data Recovery Advisor
- Perform recovery:
  - Control file
  - Redo log file
  - Data file

# Opening a Database

To open a database:

- All control files must be present and synchronized
- All online data files must be present and synchronized
- At least one member of each redo log group must be present



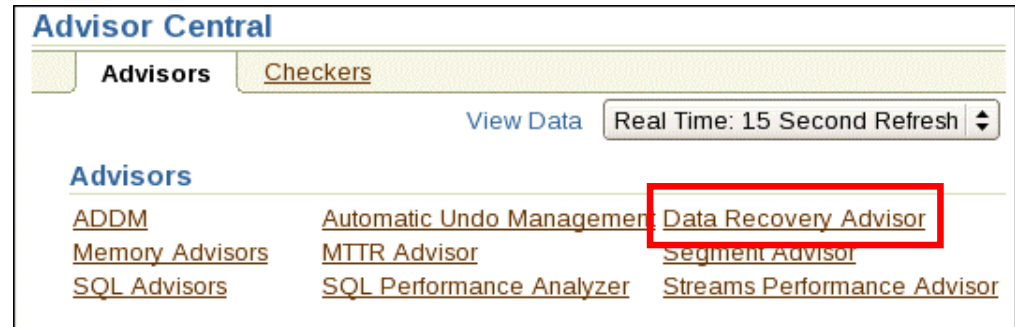
# Keeping a Database Open

After the database is open, it fails in the case of the loss of:

- Any control file
- A data file belonging to the system or undo tablespaces
- An entire redo log group  
(As long as at least one member of the group is available, the instance remains open.)

# Data Recovery Advisor

- Fast detection, analysis, and repair of failures
- Down-time and run-time failures
- Minimizing disruptions for users
- User interfaces:
  - Enterprise Manager GUI (several paths)
  - RMAN command line
- Supported database configurations:
  - Single instance
  - Not RAC
  - Supporting failover to standby, but not analysis and repair of standby databases



# Loss of a Control File

If a control file is lost or corrupted, the instance normally aborts.

- If control files are stored in ASM disk groups, recovery options are as follows:
  - Perform guided recovery using Enterprise Manager.
  - Put database in `NOMOUNT` mode and use an RMAN command to restore control file from existing control file.

```
RMAN> restore controlfile from  
      '+DATA/orcl/controlfile/current.260.695209463';
```

- If control files are stored as regular file system files then:
  - Shut down the database
  - Copy existing control file to replace lost control file

After control file is successfully restored, open the database.

# Loss of a Redo Log File

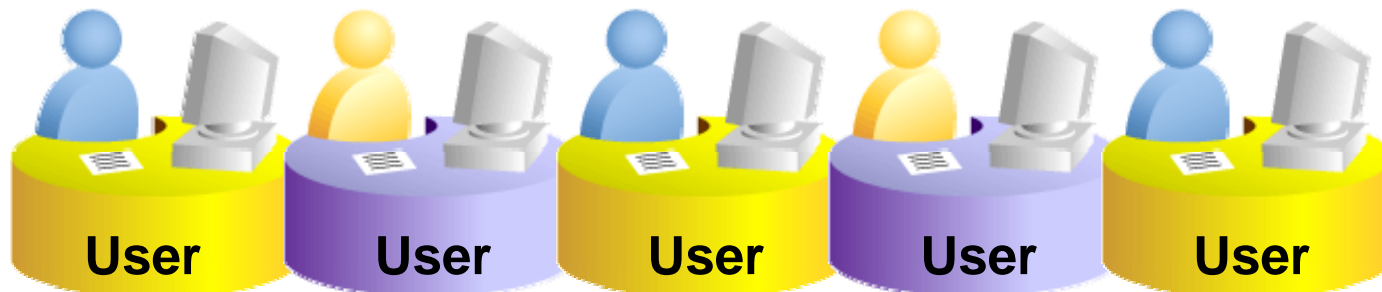
If a member of a redo log file group is lost and if the group still has at least one member, note the following results:

- Normal operation of the instance is not affected.
- You receive a message in the alert log notifying you that a member cannot be found.
- You can restore the missing log file by dropping the lost redo log member and adding a new member.
- If the group with the missing log file has been archived you can clear the log group to re-create the missing file.

# Loss of a Data File in NOARCHIVELOG Mode

If the database is in NOARCHIVELOG mode and if any data file is lost, perform the following tasks:

1. Shut down the instance if it is not already down.
2. Restore the entire database—including all data and control files—from the backup.
3. Open the database.
4. Have users reenter all changes that were made since the last backup.





# Loss of a Noncritical Data File in ARCHIVELOG Mode

If a data file is lost or corrupted, and if that file does not belong to the SYSTEM or UNDO tablespace, you restore and recover the missing data file.

**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



**Users**

# Loss of a System-Critical Data File in ARCHIVELOG Mode

If a data file is lost or corrupted, and if that file belongs to the `SYSTEM` or `UNDO` tablespace, perform the following tasks:

1. The instance may or may not shut down automatically. If it does not, use `SHUTDOWN ABORT` to bring the instance down.
2. Mount the database.
3. Restore and recover the missing data file.
4. Open the database.



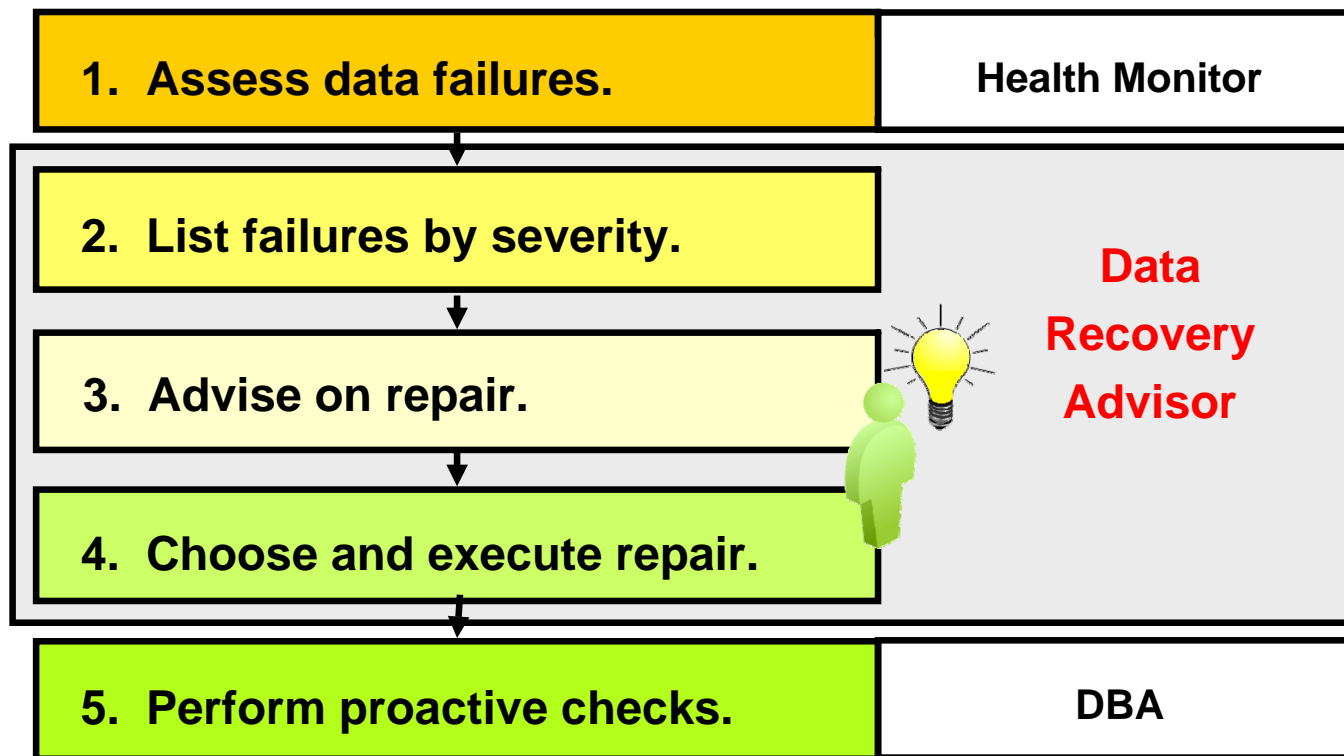
**Users**

# Data Failure: Examples



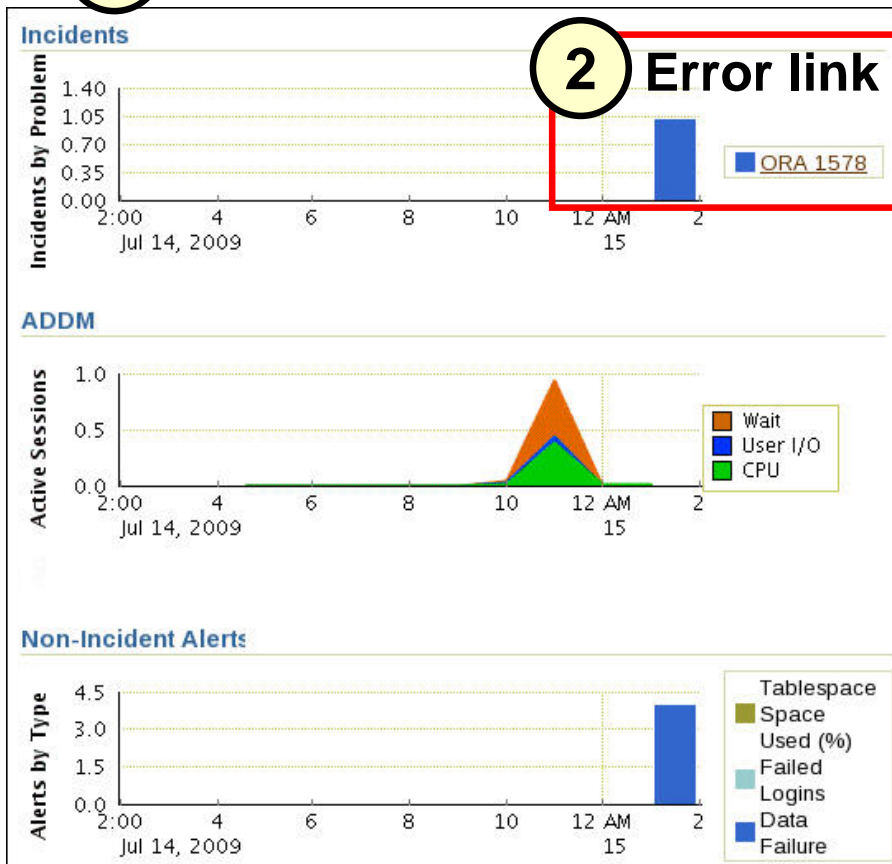
- Inaccessible components: Missing data files at the OS level, incorrect access permissions, offline tablespace
- Physical corruptions: Block checksum failures, invalid block header field values
- Logical corruptions: Inconsistent dictionary; corrupt row piece, index entry, or transaction
- Inconsistencies: Control file older or newer than the data files and online redo logs
- I/O failures: Limit on the number of open files exceeded, inaccessible channels, network or I/O error

# Data Recovery Advisor



# Assessing Data Failures

## 1 Database instance health



## 3 Problem details

**Problem Details: ORA 1578**

Page Refreshed July 15, 2009 1:36:09 AM GMT+07:00 [Refresh](#)

**Summary**

SR# -- [Edit](#)

Bug# -- [Edit](#)

Active **Yes**

Packaged **No**

Number of Incidents **1**

**Last Dumped Incident**

Timestamp [July 15, 2009 1:30:50 AM GMT+07:00](#)

Incident Source **System Generated**

Impact

Checkers Run [1](#)

Checker Findings [1](#)

**Investigate and Resolve**

[Go to My Oracle Support](#) [Quick Package](#)

[Self Service](#) [Oracle Support](#)

**Assess Damage**

[Checker Findings](#)

[Run Checkers](#)

[Database Instance Health](#)

**Diagnose**

[Alert Log](#)

[Related Problems Across Topology](#)

[Diagnostics for Last Dumped Incident](#)

[Go to My Oracle Support and Research](#)

**Resolve**

[SQL Repair Advisor](#)

[Data Recovery Advisor](#)

**Incidents** [Activity Log](#)

Status [Open Incidents](#) Data Dumped [Yes](#) [Go](#)

[View](#) [Close](#)

[Select All](#) [Select None](#) [Show All Details](#) [Hide All Details](#)

Select	Details	ID	Description	Data Dumped	Active	Status	Timestamp
<input type="checkbox"/>	<a href="#">Show</a>	18345	ORA-1578 [9] [129]	Yes	Yes	Ready	July 15, 2009 1:30:50 AM GMT+07:00

# Data Failures

**ORACLE** Enterprise Manager 11g Database Control

HelpDatabase

Database Instance: orcl.oracle.com >

**i Information**

- [Database Failures](#) - 1
- [Current Status](#) - MOUNTED

**Perform Recovery**

**Oracle Advised Recovery**

The Data Recovery Advisor has detected failures. Click on "Advise and Recover" to have Oracle analyze and produce recovery advice.

Advise and Recover

Failures Detected	<b>Critical: 1 High: 0 Low: 0</b>
Failure	<b>System datafile 1: '+DATA/orcl/datafile</b>
Description	<b>/system.256.692202091' is missing</b>

**User Directed Recovery**

Recovery Scope **Whole Database** **Recover**

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

☐ 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

**▶ Decrypt Backups**

**i Overview**

- Recover database failures as advised by Oracle
- 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

# Listing Data Failures

**ORACLE** Enterprise Manager 11g Database Control Help

Database Instance: orcl.oracle.com >

## View and Manage Failures

Last Refresh July 15, 2009 2:38:38 AM GMT+07:00

Select dropdown values and optionally enter failure description and impact strings to filter the data that is displayed in your results set.

Failure Description Impact Priority Status Time Detected

CRITICAL or HIGH OPEN All

**Select failures and ...**

[Select All](#) | [Select None](#) | [Expand All](#) | [Collapse All](#)

Select	Failure Description	Impact	Priority	Status	Time Detected
<input type="checkbox"/>	▼ Data Failures				
<input checked="" type="checkbox"/>	System datafile 1: '+DATA/orcl/datafile/system.256.692202091' is missing	Database cannot be opened	CRITICAL	OPEN	2009-07-15 02:36:06.0

**TIP** All CRITICAL failures must be selected before "Advise". All CRITICAL failures must be unselected before "Set Priority High" or "Set Priority Low".

☐ Use a Recovery Catalog

Recovery Catalog Database **Not specified**



# Advising on Repair

- (1) After manual repair
- (2) Automatic repair

**Manual Actions**

1 Re-assess Failures 2a Continue with Advise

The following user actions may provide a faster recovery path for certain simple failures. Click "Re-assess Failures" if user actions are performed. Otherwise, click "Continue with Advise" to use the recovery advice generated for the failures selected.

**Manual Action Details**

If file +DATA/orcl/datafile/system.256.692202091 was unintentionally renamed or moved, restore it

**Recovery Advice**

Cancel Continue 2b

The repair includes complete media recovery with no data loss

RMAN Script

```
# restore and recover datafile
restore datafile 1;
recover datafile 1;
```

**Review**

Cancel Execute Recovery

The repair includes complete media recovery with no data loss

**Failures That Will Be Resolved**

Expand All Collapse All

Failure Description	Impact	Priority
Failures That Will Be Resolved		
System datafile 1: '+DATA/orcl/datafile/system.256.692202091' is missing	Database cannot be opened	CRITICAL

RMAN Script

```
# restore and recover datafile
restore datafile 1;
recover datafile 1;
```



# Executing Repairs

Database Instance: orcl.oracle.com >

**Recovery Succeeded**  
Recovery succeeded. See Recovery Results below.

**Recovery Results**

Open Database OK

Recovery Results

Recovery Manager: Release 11.2.0.1.0 - Production on Wed Jul 15 02:47:57 2009

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RMAN>  
connected to target database: ORCL (DBID=1219972082, not open)  
using target database control file instead of recovery catalog

RMAN>  
echo set on

media recovery complete, elapsed time 00:00:40  
Finished recover at 15-JUL-09  
repair failure complete

RMAN> exit;

Recovery Manager complete.

Open Database OK

**The database has been opened successfully.**

# Data Recovery Advisor Views

## Querying dynamic data dictionary views

- V\$IR\_FAILURE: Listing of all failures, including closed ones (result of the LIST FAILURE command)
- V\$IR\_MANUAL\_CHECKLIST: Listing of manual advice (result of the ADVISE FAILURE command)
- V\$IR\_REPAIR: Listing of repairs (result of the ADVISE FAILURE command)
- V\$IR\_FAILURE\_SET: Cross-reference of failure and advise identifiers



# Quiz

An Instance will not fail if the following event occurs:

1. Loss of a control file if there is a remaining multiplexed control file
2. Loss of the `SYSTEM` tablespace
3. Loss of one redo log member if there is a remaining multiplexed redo log member from the same group of the lost member
4. Loss of the active undo tablespace

# Quiz

The information used by the Data Recovery Advisor is only available via the Enterprise Manager interface.

1. True
2. False

# Summary

In this lesson, you should have learned how to:

- Determine the need for performing recovery
- Access different interfaces (such as Enterprise Manager and command line)
- Describe and use available options, such as Recovery Manager (RMAN) and the Data Recovery Advisor
- Perform recovery:
  - Control file
  - Redo log file
  - Data file

# Practice 16 Overview: Performing Database Recovery

This practice covers recovering from the loss of a:

- Control file
- Noncritical data file
- System-critical data file