

Lecture 3 notes

1

How does an Oracle Database start a database instance?

1. How does an Oracle database
[A] Oracle database must read either a
a) server parameter file, or b) text initialization parameter file
which is a CREATE DATABASE command.

Then, Oracle will issue
and are Initialization parameters ?
and are Configuration parameters that affect

Q. What are initialization parameters and what are they used for?
[A] Initialization parameters are configuration parameters used to set up the basic operation environment of an instance.

Some of these parameters exist?
+ of initialization parameters

3. what type parameters that can be used as files/directories, or database itself
[A] (such as resource, or database itself parameters)

parameters that can work as files/directories.

What are parameters that name entities such as files/directories.
a) name entities such as files/directories.
b) for a process, database resource, or database itself
size (variable parameters)

a) name entities such as database.
 b) set limits for a process, SGA size (variable parameter)
 c) specify such as characteristics?

- b) set limits, such as
- c) affect capacity, such as parameter set characteristics?

which are the same,
c) DB block size
+ 11 space

c) DB block size

2) undo table space.

[A] a) DB name
Location of control files

a) DB name
location of control files

d) undo [aor-]

६

⑨) sample parameter files ?

1 of 1 are server parameter files

Q) What are server parameter files ?
A) Server parameter files are a repository for initialization of

5
A7 What are server parameter files? Server parameter files are a repository for information.

parameters that are managed by Oracle DB.

6. What are the key characteristics of server parameter files?

[A] a) Only one server parameter file exists for a DB.
This file can reside on DB host.

b) The server parameter is written to or read only by Oracle DB, and not by client applications.

c) Server parameter file is binary and cannot be modified by a text editor.

d) Initialization parameters stored in server parameter file exist for the duration between instance shutdown and instance startup.

7. How is a server parameter file built?

[A] Server parameter file is built from a text initialization statement.
Server parameter file using CREATE SPFILE statement.

8. What are the characteristics of text initialization parameter files?

[A] a) When starting or shutdown takes place, the text initialization parameter files must reside on the same host as the client application connects to DB.

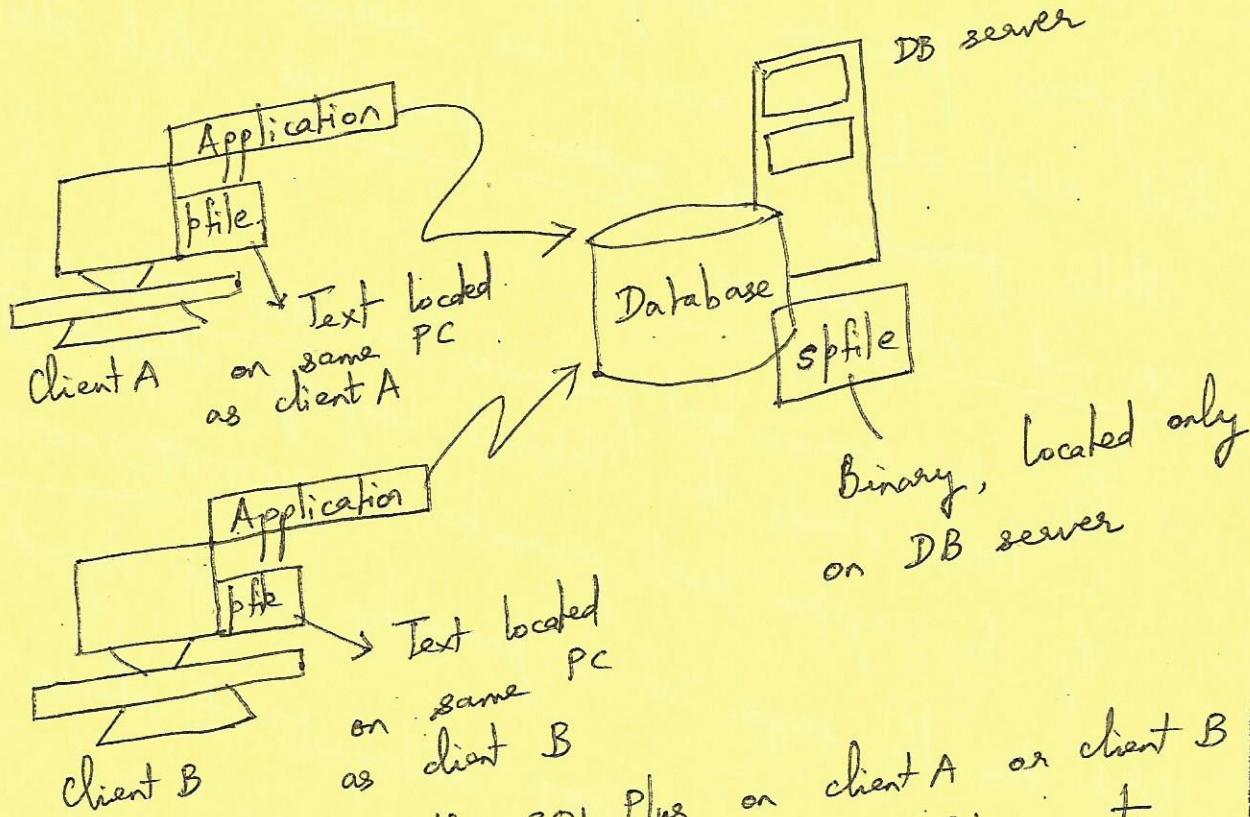
b) A text-initialization parameter file is text-based, and is not binary.

c) Oracle DB can read, but not write to the text initialization parameter files. You can manually alter the file only with a text editor.

d) Changes to initialization parameter values are possible by the command `ALTER SYSTEM` and it is possible to do it only for the current instance. After altering the system, you can restart the instance for changes to be known.

8 Draw the architecture of multiple initialization parameter files.

[A]



- Start the database with SQL Plus on client A or client B
- Two separate text initialization parameter files must exist, one on each computer.

• Server solves the problem of proliferation (increasing) the parameter files.

What are the two broad categories of initialization parameters?

a) Static

Eg. DB_BLOCK_SIZE

DB_NAME

COMPATIBLE

MEMORY_TARGET

what are the differences between static and dynamic parameters?

b) Dynamic

NLS_DATE_FORMAT

DB_CACHE_SIZE

SHARED_SERVERS

REMOTE_LISTENER

static and dynamic

Dynamic parameters are grouped into session-level parameters, which affect only the current user session.

Static parameters are system parameters which affect the DB and all sessions.

Eg. for session level parameter is NLS_DATE_FORMAT
(NLS stands for National Language Support)

Eg. for system level parameter is MEMORY_TARGET.

What does the scope of a parameter change depend on?

Use ALTER SYSTEM SET

system-level parameters

a) SCOPE = MEMORY

Meaning: Changes apply to the DB instance only. The changes will not persist if DB is shutdown and restarted.

b) SCOPE = SPFILE

Meaning: Changes are written to server parameter file, but do not affect the current instance. Thus, the changes do not effect until the instance is restarted.

c) SCOPE = BOTH

Meaning: Changes are written to server parameter file.

both to memory and to the

fault diagnosis infrastructure?

12.

[A]

What are the goals of fault diagnosis infrastructure?

- Detecting problems proactively.
- Limiting damage and interruptions after a problem is detected.
- Reducing issues & resolution time.
- Simplifying customer interaction with Oracle support.

13.

What are the activities of Automatic Diagnostic

Repository (ADR)?

ADR is a file-based repository that stores database

[A]

(b)

diagnostic data such as

- trace files
- alert log
- health monitor reports.

Activities: ADR proactively tracks critical issues in the database.

- ADR creates a time stamped incident for each occurrence.
- An incident ID is created when an incident occurs.

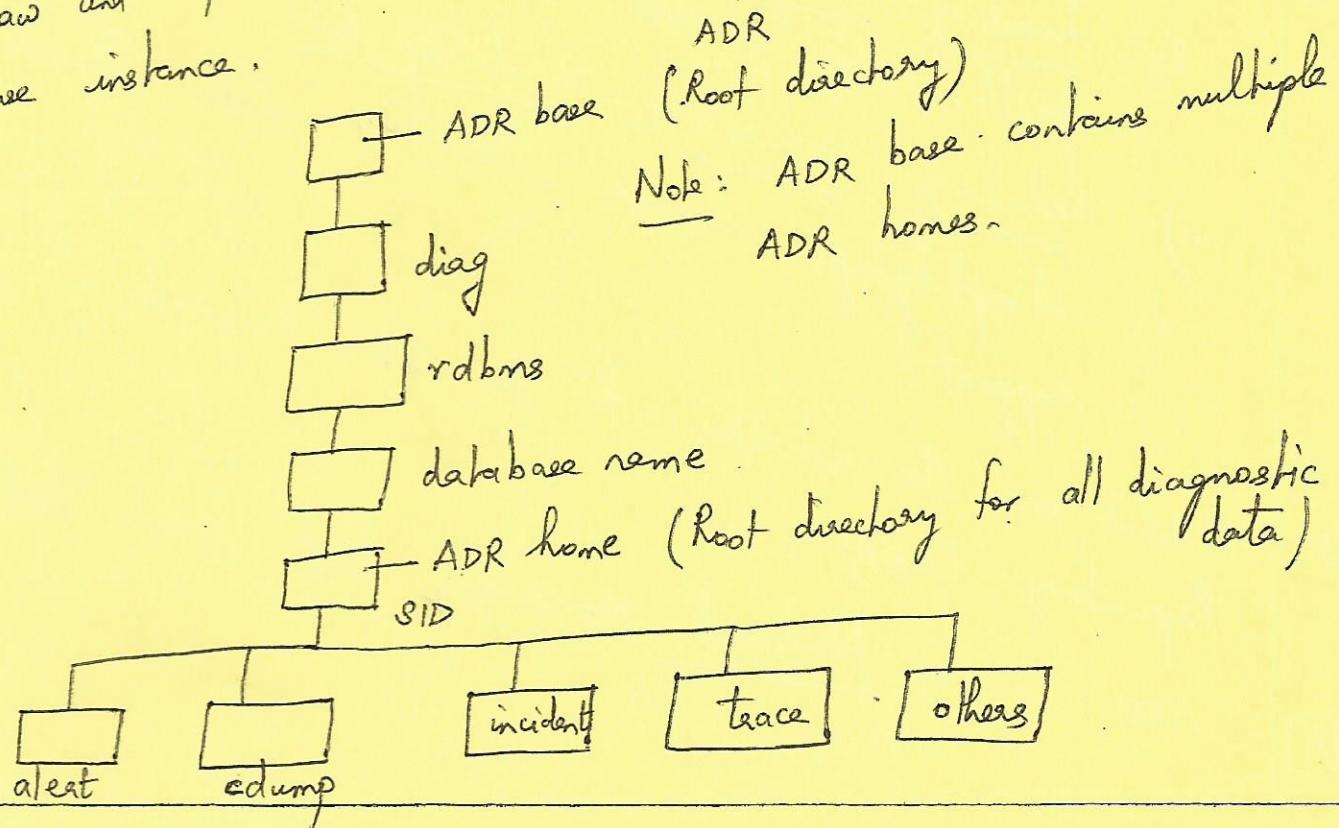
An incident alert is sent to Enterprise manager.

An flood controlled incident generates an alert-log entry.

A flood controlled incident

Draw and explain the ADR

Database instance.



15) Provide an example set of statements to create an ADR.

[A]

```
% setenv ORACLE_SID osi
% echo "DB_NAME=dbn" > init.ora
% sqlplus / as sysdba
```

System Identifier
OSI
init.ora
privilege as DBA

LINUX commands

Connected to an idle instance

NOMOUNT PFILE = ".\init.ora"

SQL > STARTUP NOMOUNT

ORACLE instance started.

static parameter file

SQL > SELECT NAME, VALUE FROM V\$DIAG_INFO

<u>NAME</u>	<u>VALUE</u>
Diag Enabled	/u01/oracle/log
ADR Base	/u01/oracle/log/diag/rdbms/dbn/osi
ADR Home	/u01/oracle/log/diag/rdbms/dbn/osi/trace
Diag Trace	/u01/oracle/log/diag/rdbms/dbn/osi/akrat
Diag Alert	/u01/oracle/log/diag/rdbms/dbn/osi/incident
Diag Incident	/u01/oracle/log/diag/rdbms/dbn/osi/cdump
Diag CDump	/u01/oracle/log/diag/rdbms/dbn/osi/hm
Health Monitor	
Default trace file	/u01/oracle/log/diag/rdbms/dbn/osi-ora-10533.trc

Active Problem Count = 0

Active Incident Count 0

What does an Alert log contain?

Alert log is an XML file containing a chronological log of database messages and errors.

The alert log contents include the following:

- All Internal errors, block corruption errors, deadlock errors
- Admin operations such as DDL statements and SQL Plus commands such as
 - START UP
 - SHUTDOWN
 - ARCHIVE LOG.
 - RECOVER
- Several messages & errors relating to functions of shared server and dispatcher process.
- Errors during auto refresh.

d) Errors during auto refresh.

What is a trace file? Give example.

A trace file is an administrative file that contains diagnostic data used to investigate problems.

E.g. DUMP - It is a one-time output of diagnostic data in response to an event (such as incident)

18) Where are trace files found?

[A] ADR stores trace files in trace subdirectory. Trace file names are platform dependent and use the extension .trc.

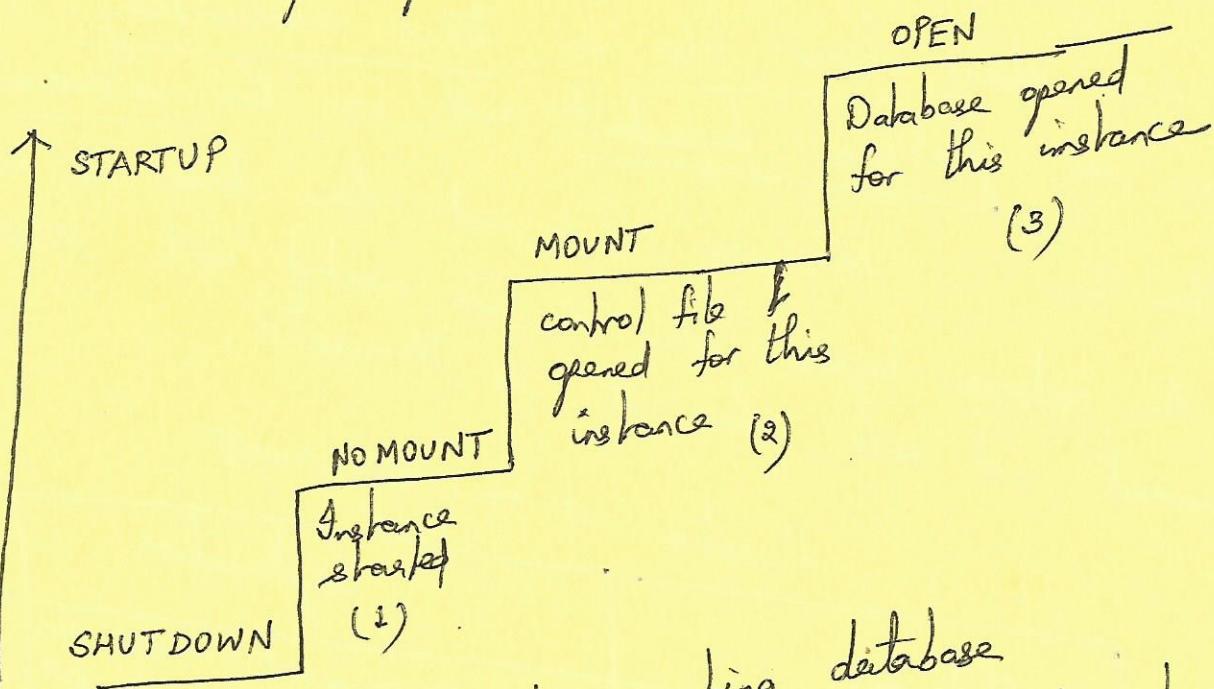
19) How does an INSTANCE start and how does it end?

[A] An instance begins when it is created with STARTUP command and ends when it is terminated.

Duration of an INSTANCE

Statement	Explanation
SQL > STARTUP Oracle instance started Total SGA ~ 469 MB fixed size ~ 1.3 MB Variable size ~ 440 MB Database buffers ~ 16 MB Redo buffers ~ 10 MB Database mounted Database opened	STARTUP command creates an instance, which mounts & opens the database
SQL > SELECT Instance START TIME JUN-18-11 13:14:48	This query shows the time when current instance has started.
SQL > SHUTDOWN IMMEDIATE	The instance closes the DB and shuts down, ending the life of this instance.

20) Draw the Startup sequence for Instance & Database.



1. Instance started without mounting database (Read the control file to start DB)
2. Database mounted. (Instance has started and is associated with an open DB)
3. Database open (connection be made to Oracle DB with admin privileges)

21)

How can connection be made to Oracle DB with admin privileges?

[A]

- The user connects using admin privileges of the user enable him/her to connect using sysdba or sysoper privileges.
- The user is granted the sysdba or sysoper privileges and DB user password files to system administrators. authenticate DB administrators.

- (11)
- 22) How is a DB mounted?
- [A] The instance mounts a DB to associate the DB with this instance.
- To mount the DB, the instance obtains the names of DB control files specified in the CONTROL FILES initialization parameters and opens the file.
- Can multiple instances be allowed to mount the same DB concurrently?
- CLUSTER-DATABASE initialization
- [A] Yes, using the parameter.
- If CLUSTER-DATABASE instance, then only this instance can mount the DB, if cluster_database is FALSE. (default) for the first instance, for the first instance, if their settings are set to TRUE.
- If CLUSTER-DATABASE then other instances can mount the DB if cluster_database is TRUE.
- CLUSTER-DATABASE parameter
- 23) How is a DB opened?
- [A] Opening a mounted DB makes it available for normal DB operations, and any valid user can connect to the open database and access its information.
- 24) What are the actions performed by Oracle DB when you open the DB?

[A]

- a) Opens the online data files in tablespaces other than undo tablespaces. Tablespaces once remain offline during shutdown will remain offline during DB startup.
- b) Acquire an undo tablespace exist, then the undo tablespace initialization parameter designates the undo tablespace to use.

[B]

- c) Opens the online redo log files. What is the default mode in which a DB opens?

Database open in R/W mode. Users can make changes to data, generating redo in online redo log.

- What is the alternative mode in which a DB can be made to open? You cannot write to data files or to online redo log files.

You can open in Read-Only mode. What other operations can be done in Read only mode?

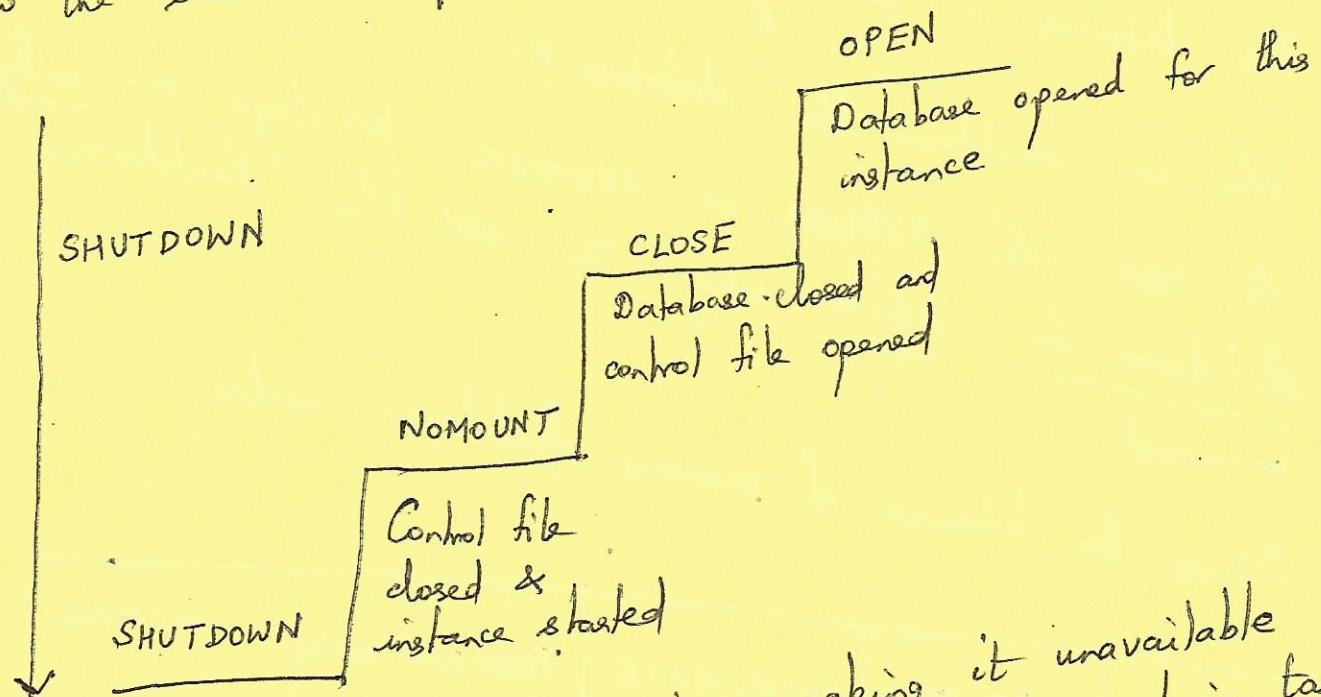
What other operations can be taken offline and online. You cannot take permanent tablespaces offline.

- a) Data files can take permanent tablespaces & tablespaces can be recovered.
- b) Offline data files & tablespaces can be updated about the control file remains available for updates about state of DB.

- d) Temporary tablespaces created with CREATE TEMPORARY TABLESPACE statement are read / write.
 Waiters to OS, trace files & alert logs can continue.
- e)

27) Draw the shutdown sequence for Instance & Database.

[A]



- You need to shutdown the database, making it unavailable for users while you perform maintenance or other admin tasks
- Use the SQL Plus shutdown command

Steps involved:

Step 1: Database is closed
 Database is mounted, but online data files and redo log files are closed.

Step 2: Database unmounted

The instance is started, but is no longer associated with the control file of the database.

Step 3: Database instance shutdown

The database is no longer started.

Who can shutdown the database?

A DBA with SYSDBA or SYSOPER privilege can only shutdown the database using the SQL Plus command.

Discuss the behavior of various shutdown modes.

28)

[A]

29)

[A]

Database behavior	ABORT	IMMEDIATE	TRANSACTIONAL	NORMAL
Permits new user connections	No	No	No	No
Wait until current session ends	No	No	No	YES
Wait until current transaction ends	No	No	YES	YES
Perform ckpt & close open files	No	YES	YES	YES

30)

Discuss the various shutdown statements:

[A]

a) shutdown Abort: This mode is intended for an emergency situation, where no other form of shutdown is successful. This is the fastest way to shutdown. However, while opening the DB, it takes longer than usual, because instance recovery must be performed to make the datafiles consistent.

b) shutdown Immediate: Next fastest way to SHUTDOWN.

All executing SQL statements are terminated.

All users are terminated.

c) shutdown Transactional: This mode prevents users from starting new transactions, but waits for all current transactions to complete before shutting down. This mode takes a significant amount of time depending on current transactions.

d) shutdown Normal: The database waits for all connected users to disconnect before shutting down.

31) What is a check point?

[A] Checkpoint point is where instance recovery must begin.

32) What is the purpose of a checkpoint?

[A] Use checkpoints to reduce the time required for recovery in the case of an instance or media failure.

33) What are the functions of a checkpoint process?

[A] The checkpoint process (CKPT) is responsible for writing checkpoints to a data file, header file & control file.

34) In which situations does CKPT arise?

[A] Oracle database uses the following types of checkpoints:

a) Thread checkpoint: Database writes to all buffers modified before a certain target.
by redo in a specific thread
The set of thread checkpoints
is a database checkpoint.

The following situations:

Thread CKPT occurs in the following shutdown

(i) Consistent database CHECKPOINT statement

(ii) ALTER SYSTEM CHECKPOINT

(iii) Online redo log switch

(iv) ALTER DATABASE BEGIN BACKUP

b) Tablefile & datafile CKPTs: A tablespace CKPT is a set of datafile CKPTs, one for each data file in the tablespace. You can make a tablespace read only or take it offline normal, shrink a datafile, or execute ALTER TABLESPACE

BEGIN BACKUP.

c) Incremental checkpoints: This avoids writing large number of blocks at online redo log switches. DBW_n checks every 3 seconds to determine if it has work to do. After writing dirty buffers, DBW_n advances the checkpoint position.

35) What are the purposes of instance recovery?

[A] When an instance failure occurs, instance recovery ensures that the database is in a consistent state.

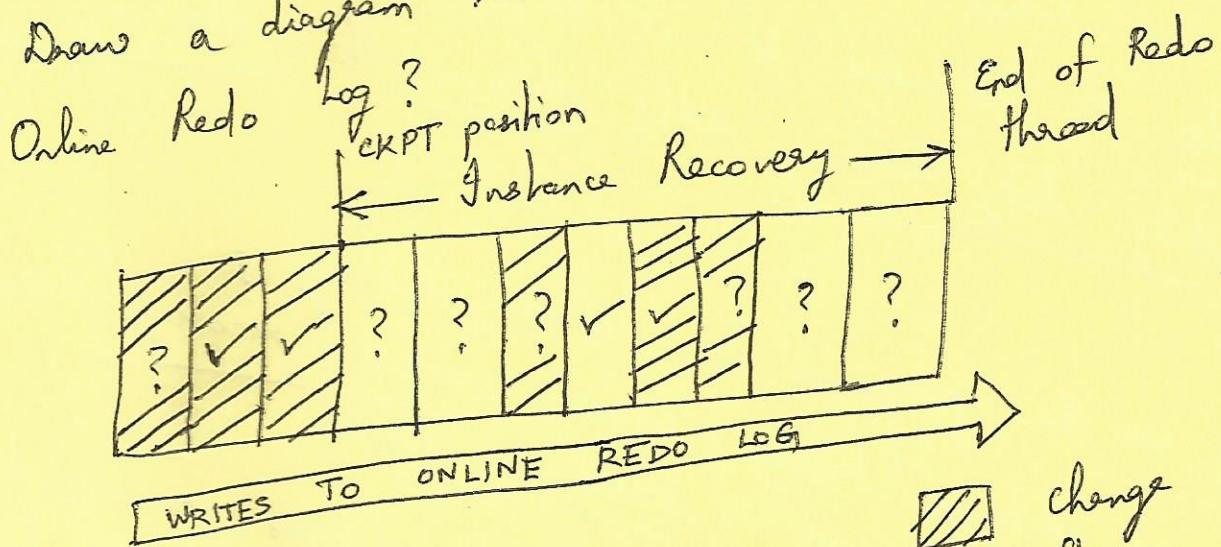
A redo thread is a record of all changes generated by an instance. A single-instance database has one thread of redo, whereas an Oracle RAC database has multiple redo threads, one for each database instance. When a transaction is committed, logwriter (LGWR) writes both the remaining redo entries in memory & transactional SCN to online redo log.

The database writer (DBW) process writes modified datablocks to the data files

36) what happens when an instance of an open database fails?

[A] Datablocks committed by the transaction are not written to the datatiles and appear only in online redo log.

37) Draw a diagram related to Checkpoint Position in



- change in data file
- change not in data file
- Committed change
- Uncommitted change

During instance recovery, database must apply changes that occur between CKPT position and end of redo thread.

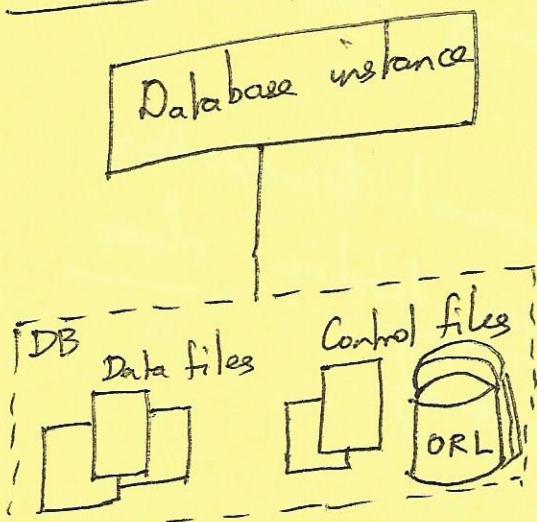
38) Define : Rolling forward.

[A] The first phase of instance recovery is called cache recovery (or) rolling forward, and involves reapplying all changes recorded in online redo log to data files.

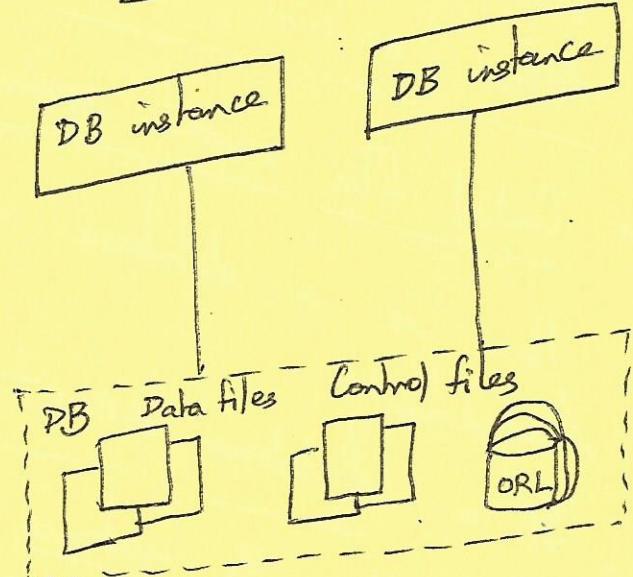
What are the possible database instance configurations?

[A] Single instance configuration
A one-to-one relationship exists between DB and an instance.

Single Instance Database



Oracle RAC database



ORL: Online Redo Log

(40) When is a database closed?

[A] Database close operation is implicit in a DB shutdown. The nature of the operation depends on whether the DB shutdown is normal or abnormal.

(41)

How is a database closed during normal shutdown?

[A] When a DB is closed as a part of shutdown with any option other than ABORT, Oracle DB writes data in SGA to datafiles and online redo log files.

Next database closes online data files & offline log files.

Next database closes online data files & offline log files.

Next database closes online data files & offline log files.

Next database closes online data files & offline log files.

(42)

How is a database closed during abnormal shutdown?

[A] If a shutdown ABORT or abnormal termination occurs, then the instance of an open database closes instantaneously.

and shuts down

- Oracle DB does not write data in the buffers of SGA to data & redo log files.

(43) How is a DB unmounted?

- After the DB is closed, it unmounts the DB to dissociate it from the instance. After a DB is unmounted, it closes the control files of the database.
- At this point, the instance remains in memory.

(44) How is an instance shutdown?

- SGA is removed from memory.
- Background processes are terminated.
- Shutdown of an instance may not occur clearly.
- Memory structures may not be removed from memory.
- Background processes may not be terminated.

(45) What happens when remnants of a previous instance exist?

- A subsequent instance startup may fail.
- Remove the remnants of previous instance by issuing a shutdown SQL plus.
- Start a new instance by issuing a shutdown SQL plus.