**­­­Oracle critical informations:**

Starting up database instance:(SGA Database buffer cache:**DKR**, Redolog Buffers cache + Backgrnd Proc

SQL> **STARTUP NOMOUNT**:It is used for creating new database or creating new control file. At this state, Oracle allocates SGA and starts background processes. It read init.ora file. SQL> **STARTUP MOUNT**

This state is used for performing specific maintenance operations like renaming data files, enabling/disabling archive log mode, adding/dropping/renaming redolog files, recovering database etc. Control file is read at this stage but the datafiles are not open. **nomount , mount, open**

SQL> **STARTUP OPEN** or simply SQL>STARTUP Database is available for normal operations.

SQL>**SHUTDOWN NORMAL** / simply SHUTDOWN Waits for all database users to disconnect then closDB

SQL> **SHUTDOWN IMMEDIATE**: **Alter database backup controlfile to trace; :: V$database**

Terminates all user connections, rolls back uncommitted transactions, closes database.

SQL> **SHUTDOWN TRANSACTIONAL** Waits for all transactions to commit or roll back, then closes DB

SQL> **SHUTDOWN ABORT** immediately closes database leaving it in inconsistent state. SMON Process automatically performs instance recovery during next startup. :: db\_recycle\_cache\_size

**Control file:** It is a small binary file that records the physical structure of the database. (dbname, location of datafiles & redolog files, log sequen,& ckpt info, Begin-end of undo segmts) v$cntrolfile , v$parameter

**Redo log files:** It contains record made changes to Database. LGWR Process write at commit, when it 1/3 full, in every 3 sec and before DBWR Process. When an online redolog files fills (logSwitch occur Then ckpt occur :V$log ,v$logfile:

**SQL stmt Processing**: Parse>Bind>Execute proce stmt>Fetch return row

**Datafiles :** Datafiles are physical files stored on Disk. Only DBWR Process writes on it. It is associated with Tablespaces which are logical containers for Tables & Indexes. V$datafile, dba\_data\_file .

**Checkpoint:**It is an event that flushes modified data from buffer cache to Disk &update controlf, datafile

The **checkpoint Process** update header of datafiles & controlfiles and DBWR Process writes actual blocks to file. It occurs automatically when an online redolog files fills. (LogSwitch occur): checkpoint occurs.

**Oracle Background Processes**: (DBWn, LGWR, CKPT, SMON, PMON, ARCn , RECO, LOCK)

**DBWR Process**: Oracle marks buffer in memory as dirty when the data they contains is changed. DBWR writes contents of dirty buffers to data files. When a server process can’t find a clean buffer after searching set threshold of buffers, a check point occurs. ::**PGA** sort area,session info, cursor stat, stacksp

**LGWR Process**: It is responsible to redo log buffer management. All most all activities against database are tracked in the online redo log files. As transactions are initiated and eventually committed or rolled back,a record of this activities is written to these log files. LGWR Process writes to redo logs sequentially.

|  |  |  |
| --- | --- | --- |
| new | old | Redbuf |
| Dave | Chris | y |

It records all changes made to database and hence it is used for recovery.

|  |  |
| --- | --- |
| Database buffers: Dave | Roll Back Buffers: Chris |

Data buffers in the cache are organized in two lists: The write List and LRU

The write list holds dirty buffers but have not been written to disk. The LRU List holds **free buffers**, **pinned buffers**, and **Dirty buffers** that have not yet been moved to the Write Lists. **Pinned buffers** are currently being accessed. If the data row is already in the buffer cache (**a cache Hit**), the process reads the data from memory; otherwise **a cache miss** occurs and data must be read from hard disk into the database buffer cache. The block size for a database is set when a Database is created and is determined by the init.ora parameter file DB\_BLOCK\_SIZE : It may be 2k, 4k, 8k, 16k, 32k; DB\_KEEP\_CACHE\_SIZE Alter system set DB\_CACHE\_SIZE = 96M; V$DB\_CACHE\_ADVICE view ;>SHOW SGA; V$SGA,V$SGAINFO

**SMON Process:**Ensure that all the database file are consistent: Instance Recovery, Rolls forward changes in redo logs , Rolls back uncommitted transaction, Coalesces free space, Deallocate temporary segments

**PMON Process:**Cleans up failed User Proc,Rolling back the transaction, releasing Locks,Freeing resources

**Logical Structure:** Tablespace > Segments >Extents >Blocks; Block is the smallest unit for read,write oper

**Physical Structure of DB :** Control files, online redo log files and datafiles that make up the database

CREATE TABLESPACE "ACCOUNTING" LOGGING :: pctused, pctfree parameter use to tune oracle block

DATAFILE 'RAC\_ACCOUNTING1.dbf' SIZE 100M EXTENT MANAGEMENT LOCAL

SEGMENT SPACE MANAGEMENT AUTO;:Alter database add logfile group3 ‘/uo1/oracle/ops/log3.ora’

|  |  |
| --- | --- |
| C:\webtech\memory_structure_11.jpg | Init.ora controlfile 1  Scn+chkp  Datafile scn+chk 3  Scn+chRedologfile |

Databas Buffer Cache: **DKR** (**Default:**Default buffer cache that always exist **,Keep**:used to retain blk that are likely to be reused, **Recycle:** little chance of being reused,),db\_cache\_size ,db\_keep\_cache\_size, db\_r

Pfile: It is the parameter file for Oracle Instance (Text File & can be edited) From Oracle 9i Spfile was born. Server parameter file and it is a binary file. Three different ways to create Spfile . > Create spfile from memory. > Create Spfile from Pfile = ‘/home/oracle/app/product/11.2.0/dbhome\_1/dbs/init.ora

>Create pfile from Spfile;(Oracle-Home/dbs : pfile located here.) >Show parameter spfile;

Oracle Tools: SQL\*Plus, SQL-Developer, OEM, TOAD, GoldenGate 🡪 Used to handle replication of DB

**SQL, DML** : Select, Insert, Update, Delete, Merge I DDL: Create, Alter Drop, Rename, Truncate, Comment

**DDL :** Grant, Revoke **I TCL:** Commit, Rollback, Savepoint

**Functions:** Char, Number, Date, Conversion & **Group Functions** (**Avg, count, max, min, sum, stddev, variance )**

CHAR\_Functions: Lower, Upper, concat , Lpad, Rpad, Instr , substr , Length, Translate, Replace

**NumberFunctions**: Length, (Round, Truncate: Date Function), Floor, Power, sqrt, ABS, MOD

**Date functions**: Months\_Between, Add\_Months, Next\_day, Last\_day, New\_time

**Conversion Functin**:To\_Char, To\_Number, To\_Date,(Decode: accpt any datatype as input),NVL (com, 0 )

**SQL-Evaluations**: Where (1) Then Group by (2) then having (3) and lastly order by (4) Clause

**Where ---> Group by ---> Having clause ---> order by clause**

**SQL Operators**: **Between … AND, IN (List of Values), LIKE, IS NULL**

**SET Operators**: Union, Intersection, Minus # Equi join /Non Equi Join/ Outer Join:

select e.ename, d.deptno from emp e, dept d where e.deptno (+) = d.deptno AND d.deptno IN (30,40);

**Indexes**: Speedup the retrieval of rows. It enforces uniqueness on values in a column.

When an Index is used depends on the **Oracle optimizer** being used at the time. Rule-based and

Cost-based optimization of SQL execution. It is the query optimizer to choose the best execution plan for each sql stmts. Create Index index\_name on emp (deptno); The index column must be referen in where

**NextVal**: It is a pseudo col, select dept\_seq.nextval from sys;

create sequence dept\_seq increment by 10, start with 10, maxvalue 10,000;

**ROWID**: It is a pseudo col that has a value for every row into table. 8-bit Blk + 4-bit row + 4-bit dbfile

Constraints Type: NULL/NOT NULL, UNIQUE, PRIMARY K, FOREIGEN K, CHECK, Default; %type attribute

**PL/SQL:** Declare v-empno number(4) := 7788 opt

Begin

Update emp set sal = 900 where empno = v-empno; (Action, execute)

Exception opt

End; :: SQL%ROWCOUNT, SQL%FOUND, SQL%NOTFOUND: implicit cursor SQLCODE, SQLERRM

**Records in PL/SQL:** %RowType 🡪 emp\_rec emp%rowtype Begin selct into emp\_rec from emp where e

**Users & Security: Roles / Profile:** Role is named collection of system privileges such as DBA, Create Table, create session, create user. **Table Privl**: select, insert, update, delete, alter, index, reference.

**Performance Tuning Tools:** Explain plan, SQL\_Trace, TK Proof, UtlBstat, Utlest, statpacks--->to monitor Oracle performance. It provide database statistics, library cache activity, rollback segment usage, I/O datafile usage # Explain plan for select \* from emp e, dept d where e.deptno = d.deptno AND e.ename = ‘SMITH’; next we use DBMS\_XPLAN. Display function to display the execution plan. Set line size =130;

Select \* from table (DBMS\_XPLAN. DISPLAY); SQL\_Trace --->It provide performance inform on sql stmt.

**TKPROOF**: It format the contents of SQL\_Trace file into readable output form.

**Parse Execute Fetch**

Alter Tablespace app\_data offline immediate :: A cursor is pl/sql construct allows you name work areas

Alter Tablespace offline for recover; :: implicit cursor, explicit cursor

Tablespace: system, sysaux, temp, undo, users: View dba\_free\_space, dba\_data\_files, user\_constraints, user\_objects, dba\_users, dba\_tables, all\_constraints,all\_catalog, all\_tab\_privs, pctused, pctfree :tune blk