

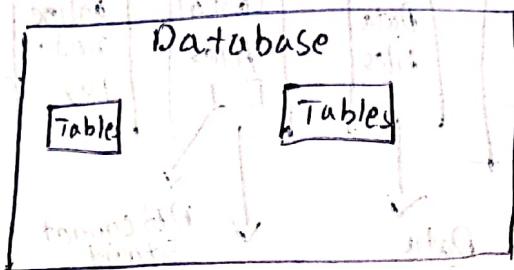
Introduction to Oracle 12C database:

Installing and configuring Oracle Database

Relational Databases:

Rows Column's

Similar to excel



ER Model

Primary key → uniquely identifies a table

Foreign key → relates one table to another

SQL → Structured Query Language

SQL

- Querying
- Insert, update & can be
- Controlling access
- Guaranteeing access

→ Bin

SQLPLUS → Local
SQL Developer

→ Remote

Data retrieval

Select

DML

Insert, update, Delete

DDL

Create, Alter, Drop

Merge

Rename, Truncate

Transaction

commit

DCL

Rollback

Grant

Savepoint

Revoke

SQL

Statement

Sent to

DB

Outputs

SQLPLUS

Command Line

Interface.

Terminal

Error message

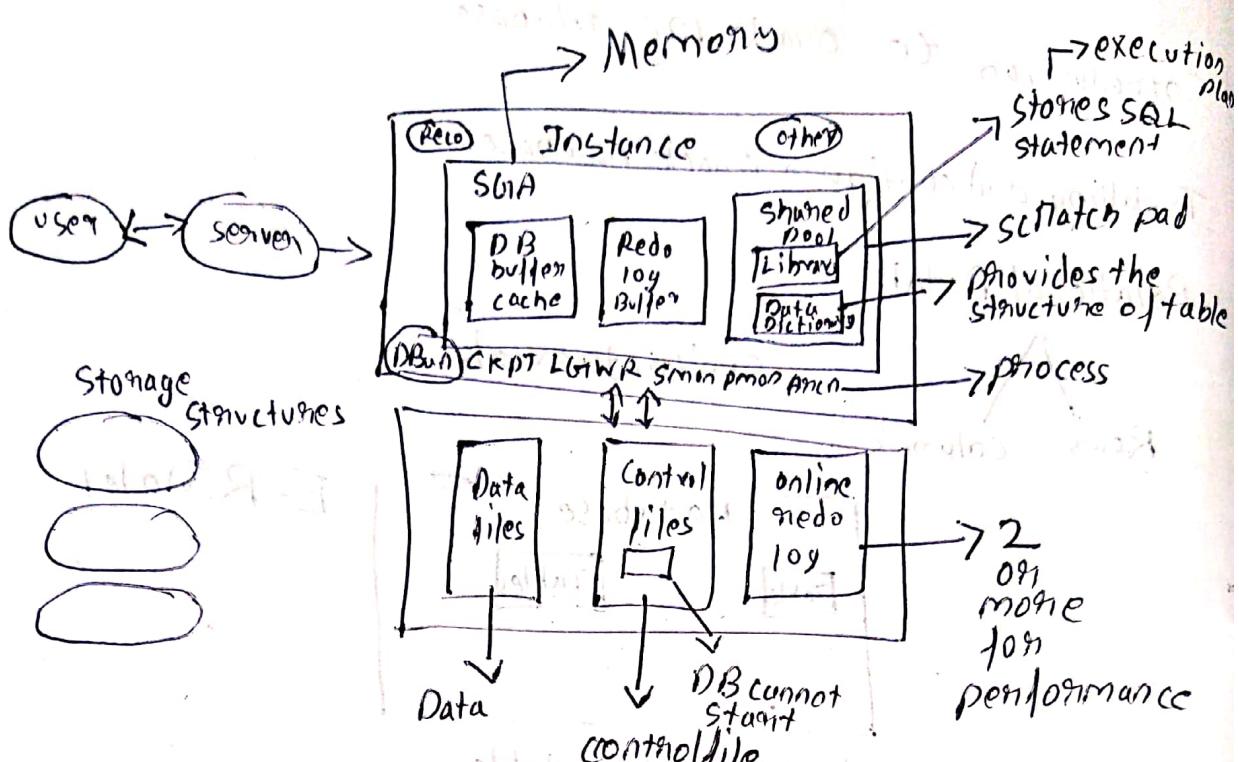
Database view

Applied truth

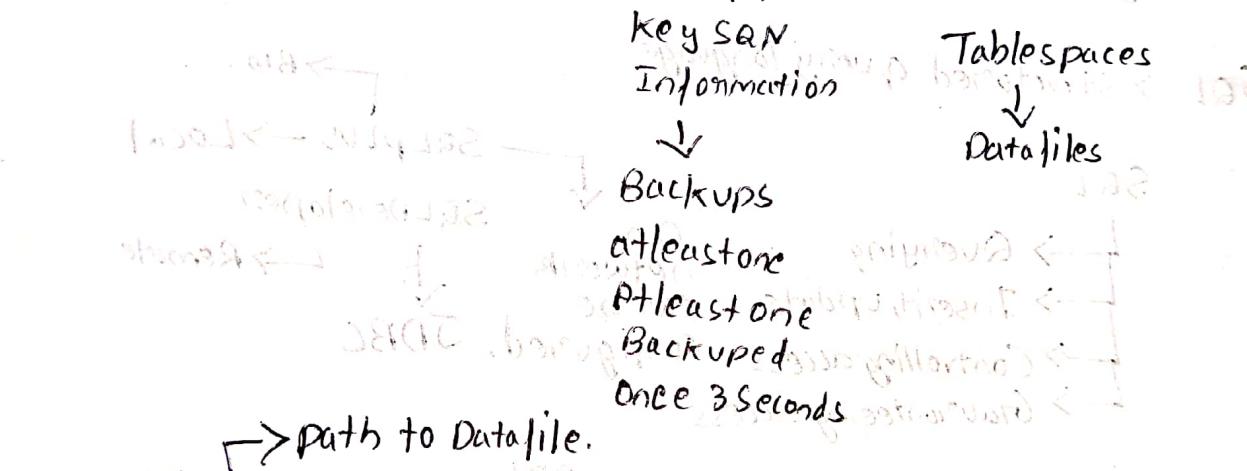
RAC → Real application

Database Administration overview.

Software



Redolog first



Controlfile → always have Backup, Protect it
↳ 2 in two different locations
↳ change Journal

Online Redolog DML → Enable forced logging

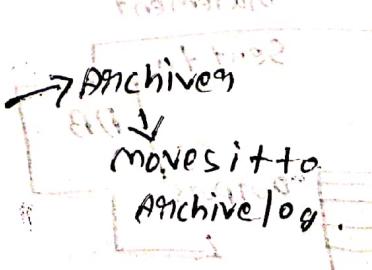
- ↓
 - ↳ stores the changes → must be fast
 - ↳ Metadata changes

Atleast 2 to make the Archiving fast

↳ Instance recovery

LGWR → writes Redolog

Redolog → Must be large.



DBWR

↳ writes from buffer cache → DB.

CKPT

↳ Checkpoint notes of what Data is written yet to write

SMON → System recovery

PMON → cleanup

Archiver → copy of Redolog.

Tasks of a DBA

* Install and upgrade

* Creating DB's

* Upgrades of Database

* Starting and Stopping

* Users and Storage

* Backup and Recovery

* Monitoring

TOOLS FOR DBA

* Oracle Universal Installer * SQL Developer

* Database Configuration Assistant * SQL LOADER

* Database Upgrade Assistant ↳ ASCII

* Oracle Net Manager

* Oracle Net Configuration Assistant

* Oracle Enterprise Manager

* RMAN

Installing a Oracle Database and creating a database

Installation workflow

↓
Pre check (memory, hard disk etc.)

Installer Set environment for variables
ORACLE_HOME <- oracle

↓
Complete Installation through wizard
Installation (DB UNDO) <- oracle

↓
complete Create a database for ORACLE

ORACLE Universal Installer

- Install Oracle Software
- Remove, View

OUI

- Install Oracle Database 11g
- Configuration
- 16GB of RAM
- Swap Space
- OS pack and packs

Setting environment Variables

* Oracle_Home :- Specifies the base of oracle directory path

* Sharename for optimal Flexible Architecture (OFIA) designation

* Oracle_SID :- Specifies the Home directory New York Stock Exchange (NYSE) (CIO -> System 1)

* Oracle_LIBRARY_PATH :- Specifies the location of shared object (Onix)

Install Oracle software. → Root privilege:

• /runInstaller → security updates

Datafile

↳ oradata
oracle/P

partitioning → Enterprise Edition

Trace files → oracle.Sidname

Oracle Inventory

↳ List of all oracle products.

Two scripts

↳ oraInventory.sh → Root privilege

↳ root.sh → oracleInstallSys

↳ root.sh → protection System sysdba DBAGROUP DBAOPR DBABACKUP DBAGDATA DBAGUARD

Inside oraInventory

password management → Lock unlock
→ New password

root.sh → will copy

↳ dbhome
oraenv
coraenv
sid
oratab

dbhome
coraenv
oraenv
sid

/usr/local/bin

Create a Database → DBCA → Inside oraenv

SET UP ORACLE ENVIRONMENT

• oraenv

GLOBAL Database

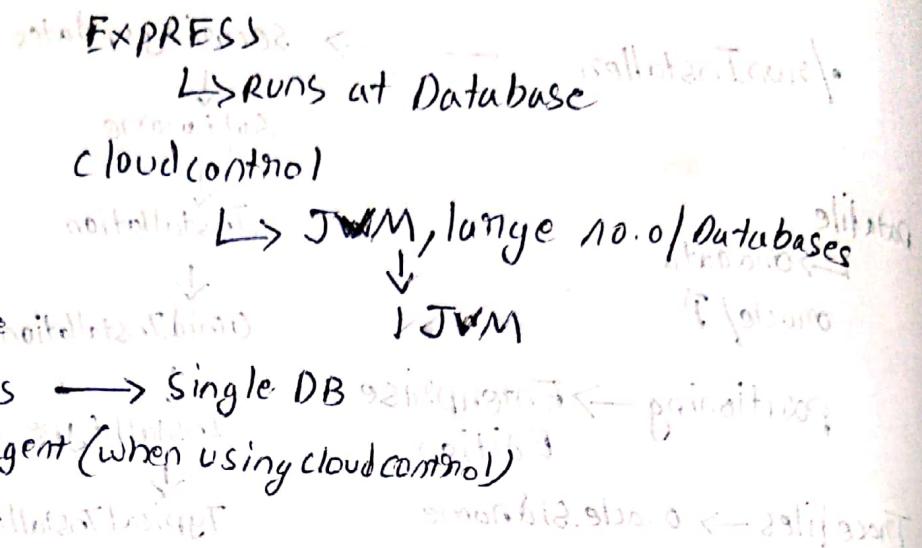
number

ORCL.US.UPS.COM

Silent mode → Record GUI
and it will

Default portno → 152

ORACLE ENTERPRISE MANAGER



OEM express

- Monitors
- Administration
- Maintenance Features

Configure an HTTPS listener port:
* Verify Dispatcher settings

* `EXEC DBMS_XDB_CONFIG.SETHTTPSPORT(5500);`

* Launch `https://hostname:5500/em` → Important when browser2grid

First step add exception

Default → System
password → oracle

Show → I/O process
CPU

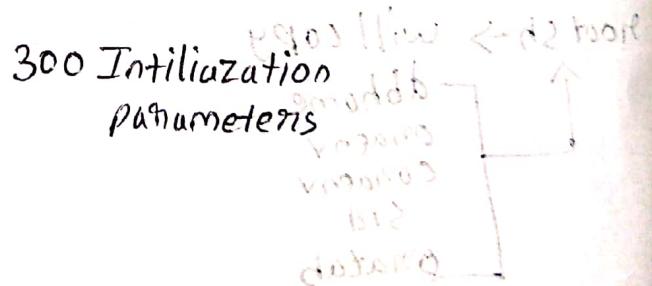
Variables object → Features

Storage configuration → Security → Performance

Roles

EM-EXPRESS-BASIC → Monitor

EM-EXPRESS-ALL → ADMINISTRATOR



views

SQL PLUS and SQL Developer



Inside BI directory

SQL Developer → ADMINISTRATION

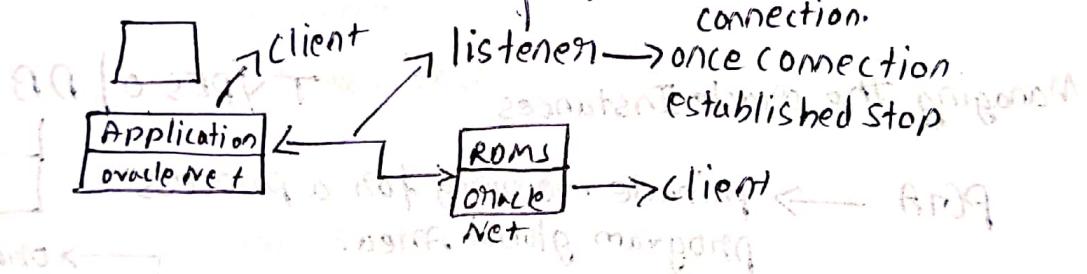
↳ GUI tool → SYSDBA

connectas Sysdba

Installing ORACLE ENTERPRISE MANAGER

lsmnctl → status

Configuring the Listener



Tools

→ oracle Net Manager

→ OUT → NetCA

sqlnet.ora → Advanced network / encryption

listener.ora

Tnsnames.ora → Should not provide to all.

listener.ora	:1521
lsmnctl Start Name	
lsmnctl Stop Name	
lsmnctl Status	
lsmnctl Services	

Default Listener Parameter

1) Protocol = TCP/IP

2) Name = Listener

3) Port = 1521

Client connects to Database

Service name → TNS Names

connection with DB object

→ no space

FinFlowers = (Description = ADDress = (Protocol = (TCP) (Host = flowers-server) (Port = 1521))

(Connect_Data = (service-name = finance.us.flowers.com)))

or sid = name = orcl (DBNAME)

Oracle Net Services

* Local naming

LDAP server

* Directory names

→ where all the
tns-names are stored.

* Easy connect naming

Managing the Oracle Instances

PGA → private memory for a process
Program Global Area.

Initialization parameters

→ init.ora.

TYPES of DB

LTP

DB Warehouse

oracle

70/30

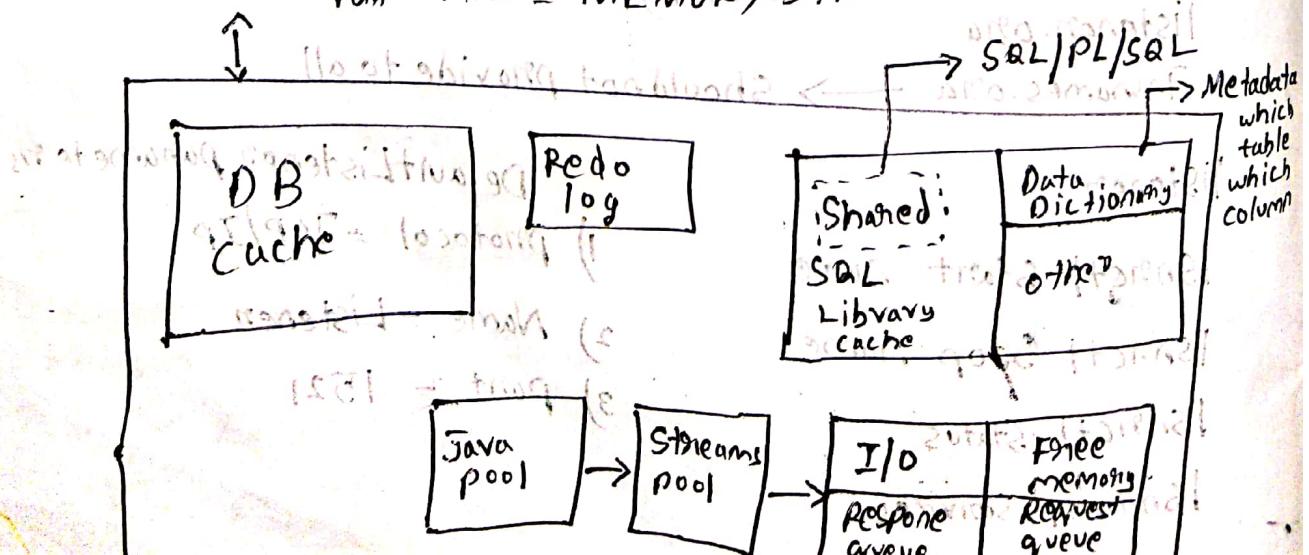
200T

system

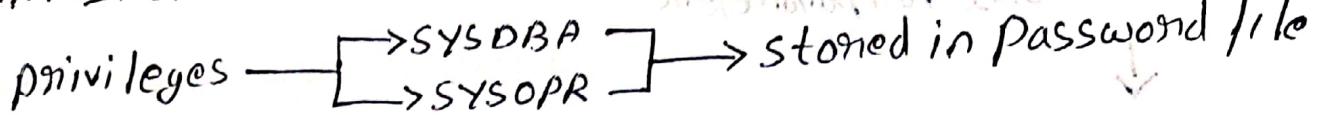
6.3TB → I/O

I) not specified → all parameters take default value

Server ↔ PGA ORACLE MEMORY STRUCTURES

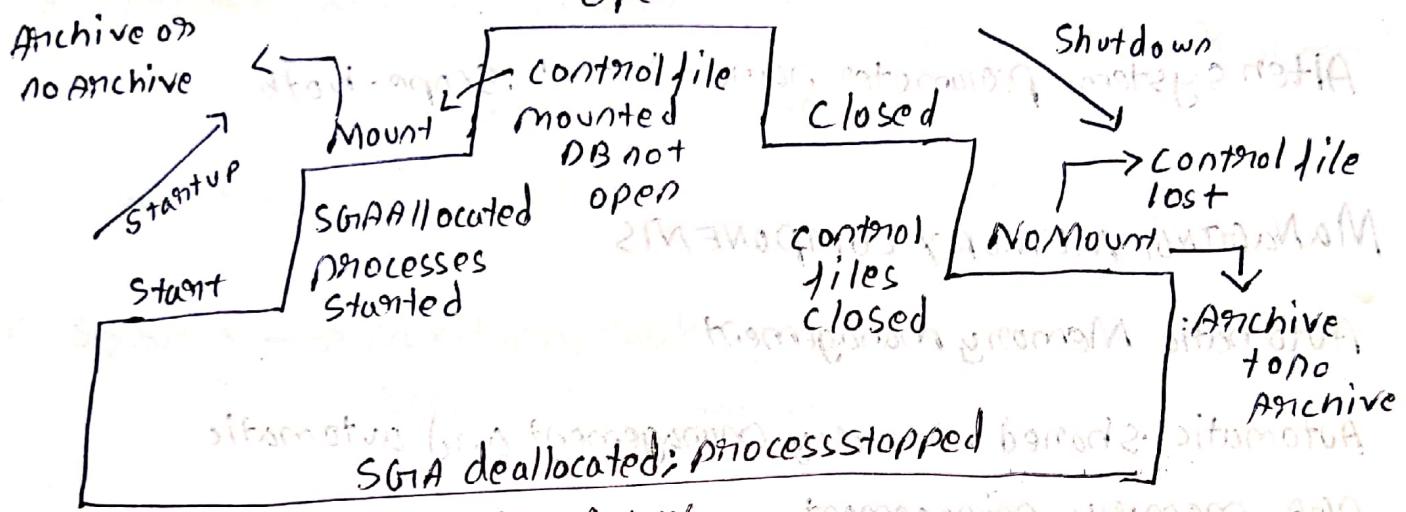


STARTING AND SHUTTING OF ORACLE DATABASE.



Data Dictionary resides in SYSTEM tablespace.

States of an Instance.



SCN → stored as a part of Timestamp.

SHUTDOWN → Issues

SHUT IMMEDIATE → Normal Shutdown

NORMAL → ALL Transactions complete

TRANSACTIONAL → Complete Next Transactions

WINDOWS

- SID
- TNS Listener

Methods:

- Start menu
- Administrative Tools
- Services
- Service start or stop
- Actions start onstop

GUI BASED GUI For parameters

↓

OEM Express

open cursors → control a number of SQL process.

Show parameter [Name of the parameter]

Alter system parameter name = faststart; Scope = both

MANAGING MEMORY COMPONENTS

Automatic Memory management

Automatic shared memory management and automatic PGA memory management

Manual shared memory management

Configuration

↳ Memory

↳ SGA, PGA

STORAGE STRUCTURES:

CHECKPOINT → every 3 seconds

Control FILE

* Physical Database structure

* Should be multiplexed to protect against loss

* Read at mount stage.

↳ two copies

Redolog files

* Records changes to the DB

↳ Minimum 2

Tablespace and Datafiles

* Tablespace comprise of one or more Datafiles

↳ only one Tablespace

DB → multiple Tablespace.

* SYSTEM → Data Dictionary only DD basic

block size 8KB-9KB pages

* SYSAUX → Auxiliary tablespace → keep system tablespace clear

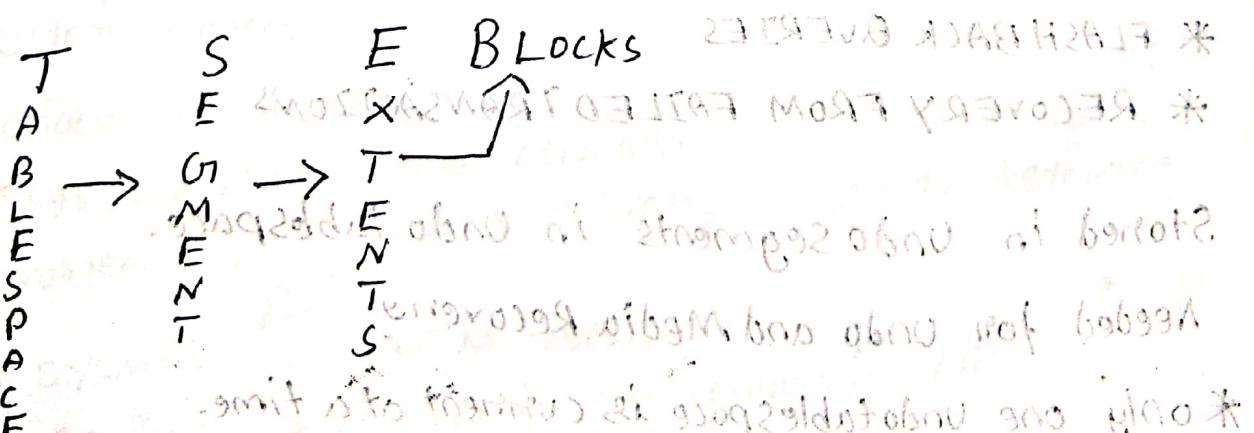
* UNDO → changes for the transaction
stone Flashback queries.

↳ always ordered

* TEMP → Sorting (ALWAYS permanent Temporary)

* USERS → Default user tablespace.

* EXAMPLE → Set of sample Schemas.



Increasing Size of DB.

* Create a new tablespace * Enabling Dynamic growth.

* Increase the size of Tablespace(Datafile)

* Add Datafile to the tablespace

Tablespace creation:

Always unique.

online or offline

Indexing → No Logging.

Modify a tablespace

→ Add a Datafile

→ Autoextend

→ size of Datafile

→ changing space-usage threshold

→ offline → moving Datafiles

↓
when performing Recovery

Munging UNDO:-

* copy of Datablock Before Change Made.

* copies every transaction

Used to

* Roll back

* Read consistency

* FLASHBACK QUERIES

* RECOVERY FROM FAILED TRANSACTIONS

Stored in Undo Segments in Undo Tablespace.

Needed for Undo and Media Recovery

* only one undotablespace is current at a time.

undo

How to BACK

Rollback,
Flashback

undo segments

Inconsistent Reads

Not needed for
Archive

Managing Undo

→ dedicated tablespace

→ Autoextend

→ Self-tuning.

DBA tasks to support FLashback

→ configuring Undo retention

→ Avoiding space and snapshot too old errors.

CREATING USERS:-

* privileges



System object

Rules → system privileges.

Oracle Defined user

* sys → DBA and Data Dictionary

* system → FULLDBA, No privilege to start and stop the DB

DB

* SYSMAN → OEM user

* DBSMON → Monitoring user collect performance.

First lock & Expire and then Drop the user.

Take Expdp

Redo

How to reproduce

a change

Recovery, forward info

Redolog files

protect against Data loss

is crucial for recovery.

start at first

Setting password policy

→ First Default.

→ Default → 180 days

→ locked after 7 days after 70 days.

→ create additional profiles to customize the password policy.

privileges and Roles

→ APPSDBA → Create session
Create table

Administrative privileges

→ SYSDBA and sysopr

→ OS → high precedence

→ password file

Database Roles

to system, sysman.

Managing Schema objects

What is a schema

* User of the table → all objects owned by the user.

SYS Schema → Data Dictionary
System → no shutdown and start

Datatypes in tables:

CHAR	DATE	NUMBER	VARCHAR2
size	114712	precision	65
in bytes	31,4999	and	bytes

Maximum → 1000 columns

Data Integrity:-

reduce the number of rows.

Rownum

Purge → not recoverable

Indexes

- * Faster access to row's in the table
- * automatically used for Data Access

Unique, Non-unique, Bitmap

↳ for Datawarehouse

Views → Stored queries → table Dependent

→ Are customized presentation of Data

→ Do not contain Data

PL/SQL

- Packages
- Procedures
- Functions
- Databases & Triggers

Schema Objects

- Views
- Indexes
- Packages

JAVA

- Source code
- Compiled classes.

Objects

Load data only from csv file

Right click on table

↳ Import data.

performing Backup and Recovery:

Oracle Recovery features

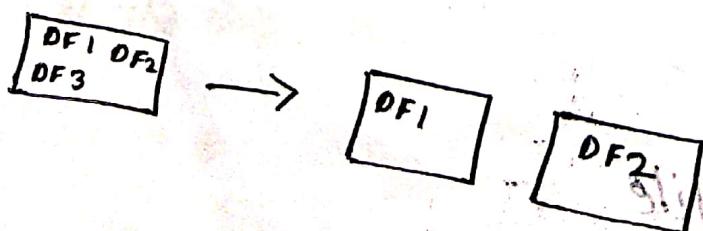
- * Automatic recovery after Instance failure
- * Datafile media
- * Flashback Technologies → Undo table
- Flashback Query
- Flashback Version Query → Row wise
- Flashback Transaction Query
- Flashback Table
- Flashback Drop
- Flashback Database

Audit Vault
↳ keeps undo in separate structure

Backup File types

Image copy → Similar to copying a file.

Backup Set



Types of BACKUP's:-

- * Full Backups of Datafile
- * Incremental backup's of Datafile
- * Whole Backups.

Consistent Backup: → offline, cold

- Shutdown
- open database after restore
- transfers all the changes in Redolog's to datatiles

Inconsistent Backup → online, hot

- Open
- apply the Archivelog and Redologs
- media recovery must be performed
- Redolog's Not applied to the Datatiles

Media Recovery

* complete Recovery → apply Redolog and Archive

* point in time Recovery → recovered upto a specific

Point of time.

Media Recovery Steps.

1) Restore Datatiles

2) Redolog Applied

3) Database containing committed and uncommitted

4) Undo Applied

5) Recovered database.

Configuring the Database for Backup and Recovery.

- * Configure the fast recovery area
 - ↳ disk to disk
 - 1/2 → 500 GB
 - size of contain two complete Backups
 - placed on separate disk
- * Configure Archivelog mode
- * Use fast recovery for archived redo logs.

Configuring the FRA:

- Separate disk
 - Location specified by DB_recovery_File-Dest
 - Size specified by DB_recovery-File-Dest_size
 - Large enough for Backups, Flashback logs, multiplexed control files
 - Specify the location, size and retention
- Privileges
- ↳ SYSDBA
 - ↳ SYS BACKUP → new in 12c
 - ↳ no select.

Connecting to the Database:

Rman target ''/ as sysbackup''

DBID → Unique for each

Configuring Backups

Rman

→ Configure Default Device Type to Disk;

Not specified FRA

Rman

→ Show all → Shows the parameters

Stored in control file

Rman

→ Configure Backup Optimization On;

Backup →

Rman

→ Configure Retention Policy to Recovery Window of 31 days.

oldfiles →

Whole Database Backup

* Datafiles

* Controlfile

* Archived Redolog

* SPFILE

RMAN > Backup Database plus Archivelog;

Catalog → Separate Database for storing information

from multiple databases.

No catalog → Controlfile stores all information.

Suggested Backup Strategies:

* Create an Imagecopy

* Day 1 → Incremental level 0 Datafile Backup

* Day 2 → Create a Incremental level 1 Backup

* Day 3 →

→ Apply all level 1 to level 0

→ Create a new level 1

Managing Your Backups:-

→ Backup on disk or tape

→ Managing the backup records

Backups in any one state:-

- Available

- Expired

- Unavailable

→ Crosscheck

↳ Whether Backup is

still present.

→ Expired Backup's Delete.

→ Deleting obsolete Backup.

* Recovery Data Recovery Advisor

Oracle Advised Recovery

* Automatically diagnoses data failures

* Determines and presents appropriate repair options

* Executes repair Based on user request.

Steps to Run the Data Recovery Advisor

* Define target

* List failure

* Validate Database

* Advice Failure

* Repair Failure

Flashback Table

- Recover a table
- applies the undo
- Flashback Table privilege required
- Row movement

Row movement

Alter table enable row movement.

Performing Flashback

→ Connect RMAN

→ Dependencies

→ Enable Row movement

→ Identify the SCN

→ enough undo data

→ Flashback.

Flashback Table

TO TIMESTAMP TO_TIMESTAMP('_____,_____)')

2023-07-01 00:00:00 YYYY-MM-DD

Flashback Drop

→ recycle bin → Set on; → default.

Flashback Table < → to Before Drop;

→ extent — should not be reused.

Monitoring the Database:-

→ DB State and workload

→ Using Performance Hub

→ Automatic Database Diagnostic tool (ADDM)

Performance problems

→ ADDM

↳ performs top down monitor

→ updates to OEM

→ Focuses on operations

→

EM → 3 types of ADDM

* ADDM

* Real-Time ADDM

* Current ADDM

Advisors

→ provide advice for the issues

→ performance Advisors

→ ADDM

→ SQL Tuning

→ Memory Advisors

→ SGA

→ PGA

→ Buffer Cache

* Other Advisor

→ Undo Advisor

SQL tuning Advisor:-

* analyze SQL

* Top activity

* Historical SQL

* SQL tuning Sets

every night
takes expensive.

Patches & Upgrade

* patches → fix a problem

* Interim patches → one off patches → patch one problem

* patch set → Opatch utility → DUIS

DBUA

↳ Database Upgrade Assistant

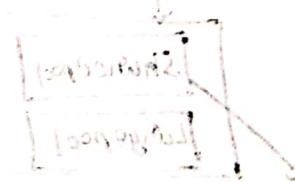
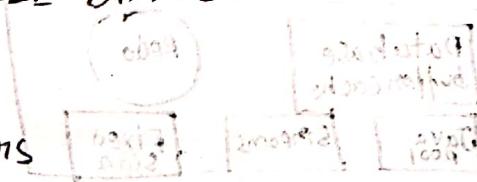
Remove Software

↳ cd \$ORACLE_HOME

deinstall

ORACLE DATABASE

grid log cluster



11g → Information Lifecycle

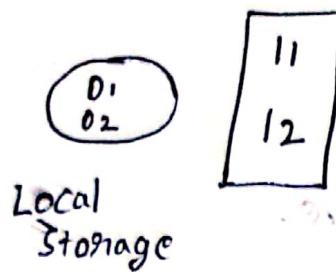
11g → birth

12c → private DB

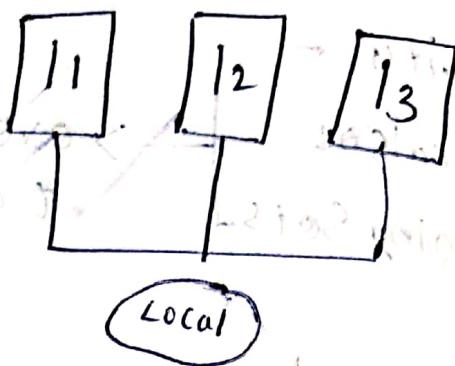
9i → RAC 11g → Managing the Change across

log → grid 12c → OEM

Nonclustered system:-

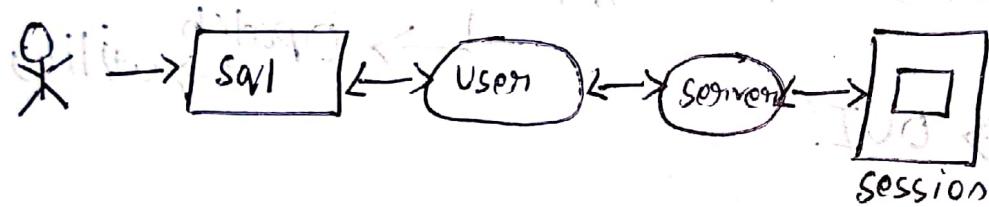


Clustered

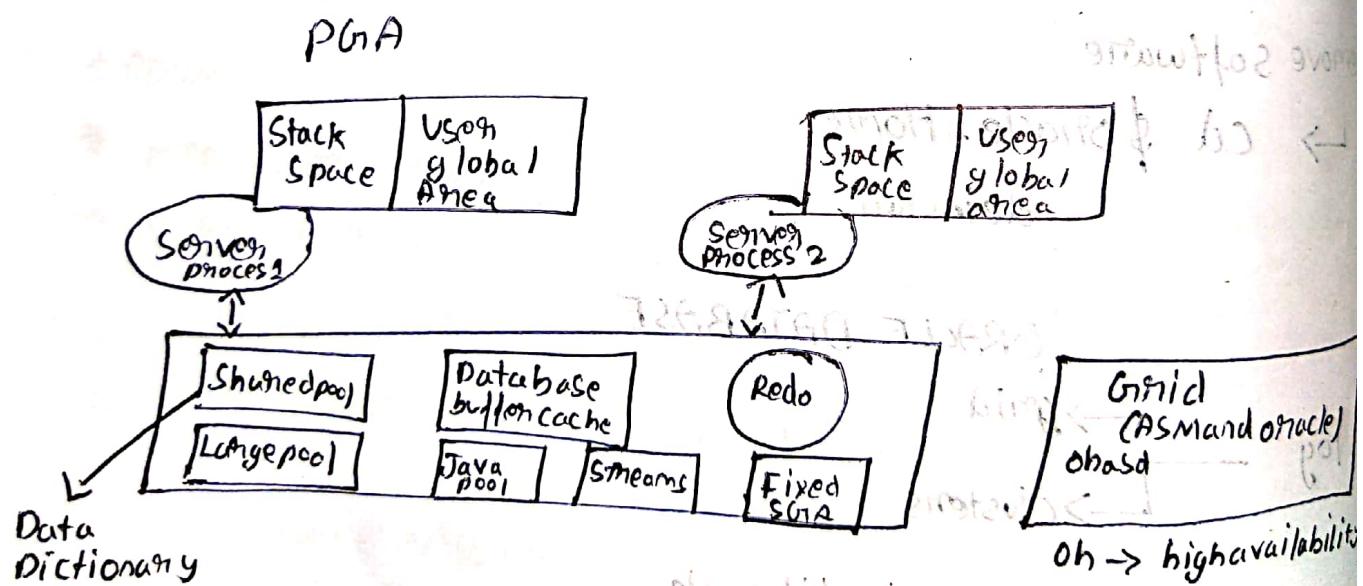


* connection

* Session



Oracle memory structures

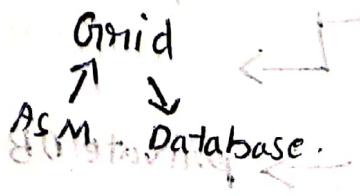


* User process → tool

* Database process → Server process

Background process
Listener, Grid.

* Daemon



SMON → tracks of SCN

PMON → Process Fails.

RECOVERY FROM FAIL.

RECOVITATION = RMAN & RMAN

LOGITBKG ← RMAN ← RMAN

Files Important

→ CPU

→ Control File → Datafile, RMAN, SCN, Archive log

→ Datafile → Data stored

→ Redolog files →

→ Archived Redolog →

→ Backup files →

→ Pfile → Memory, Control size,

→ password file

→ trace file → when process fails

→ Alert log → when changes occurs,ckpt

Logical

DB

Tablespace → Datafile

Segments

Extents

Blocks

tablespace
creation

Storage Space

* SAN * NFS

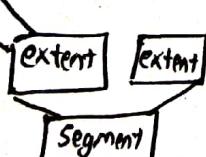
* ASM * FILESYSTEM

* EXADATA

TB-1

DF1

DF-2



TB-2

Bigfile

→ Datafile
 $L=128TB$

SYSTEM and SYSAUX

- SYSTEM → Data Dictionary
- SYSAUX → Additional AWR, OEM
- No application Data.

Each user must have

- Username
- Authentication
- default tablespace
- temporary → extend of same size

Accounts

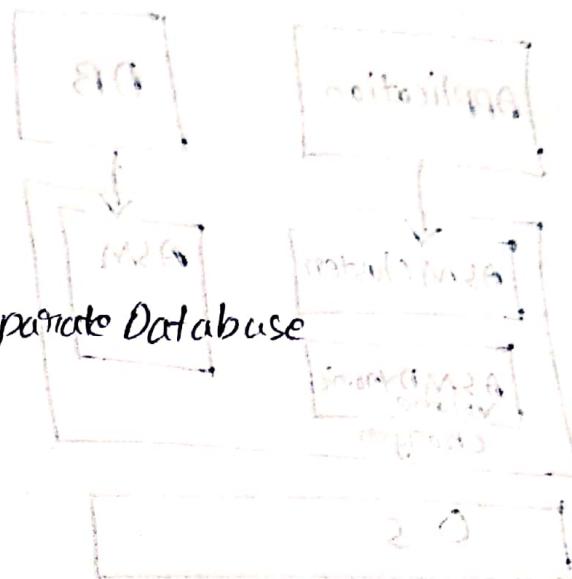
- SYS →
 - SYSDBA
 - AWR, Startup, Stop
- System → Additional tablespaces
- SYSBACKUP → only Backup, Shut, Startup
- SYSDBA → Datagaurd
- SYSKM → Transparent Data Encryption Wallet operations

privileges

- SYSDBA → all
- SYSOPER → no data

Multitenant Container Database

- Oracle Database 12C
- db files at physical level

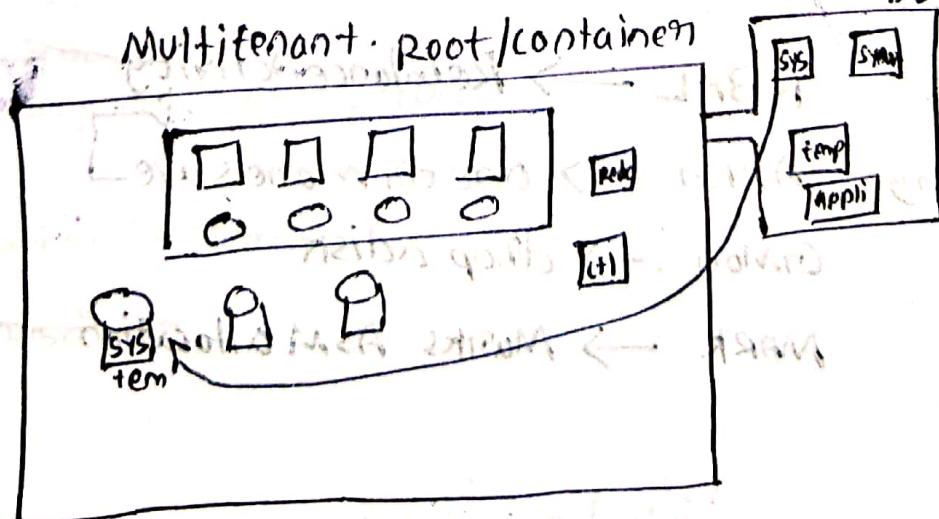
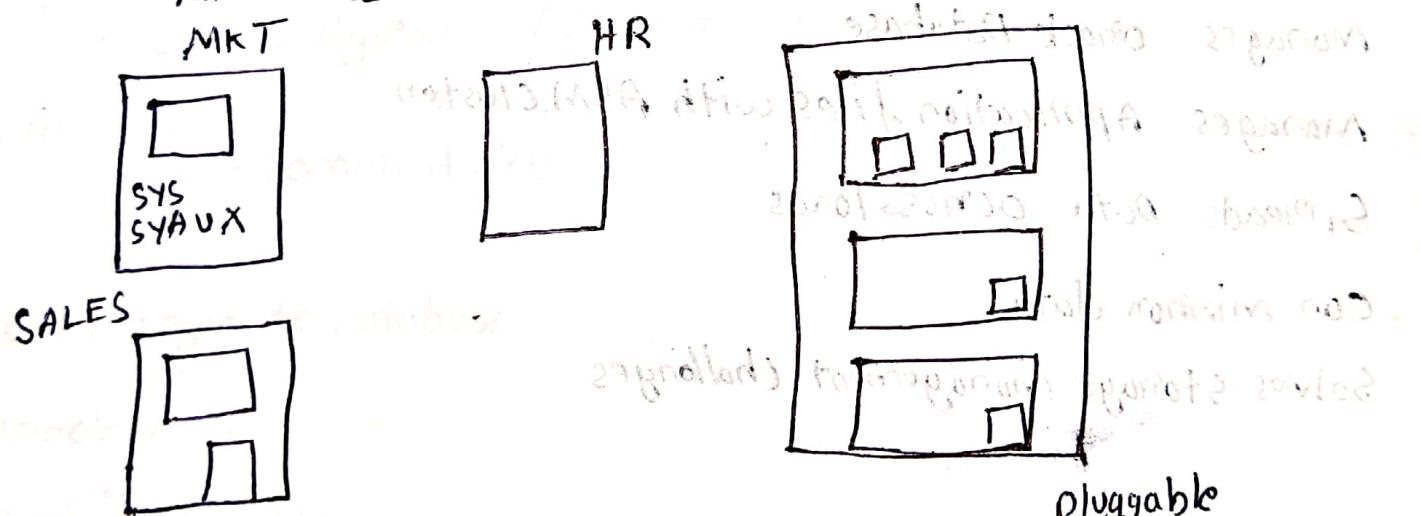


Pluggable Database

- CDB, applications as separate Database

All pluggable databases share

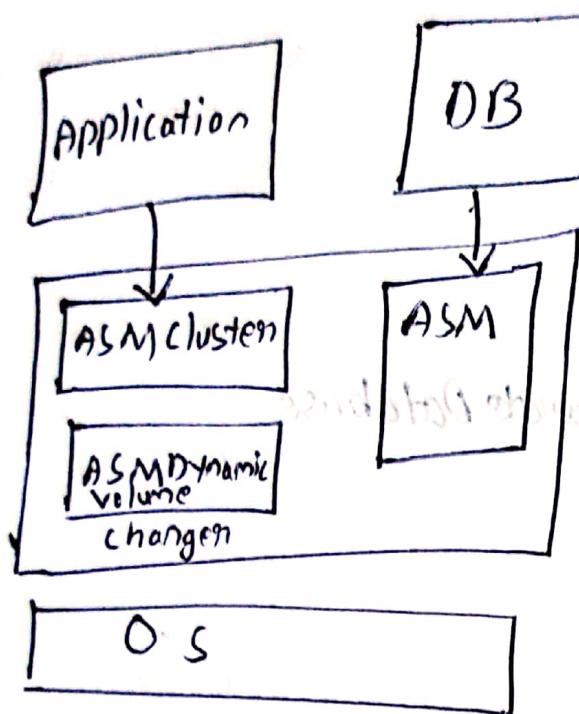
- BG process
- Oracle metadata
- Shared / process



ContainerID → pluggable Database.

Container ID → Oracle Database Identifier

AS M:-



Is portable, High performance cluster system

Manages Oracle Database

Manages Application files with ASM cluster

Spreads Data across loads

Can mirror data

Solves storage management challenges

ASM Instance

ASM Cache

Free memory

RBAL → Rebalance Activity

ARBN

GIMON

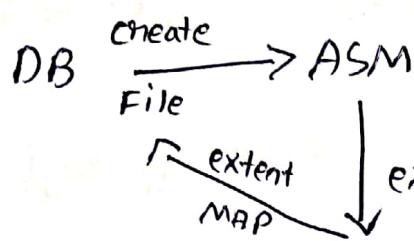
MARK

→ One or more slave

→ drop a disk

→ Marks ASM allocation

DB and ASM



mandata set for oracle

pendata for most common tool is

listdata for most common tool is

MAP + MDA + MAF + BFR + BFRG + BFRB

internal functioning word is

LSNRCTL → Listener Utility. Listener is MAF module

Oracle ASM tools:-

→ ASMC A
↳ configuration Assistant.

→ ASMC D
↳ Command line.

STEPS to Login to Database

- Oracle user → Oracle Database → Oracle Grid Infrastructure → Root
- ps -ef | grep smon
 ↳ smon
- /etc/oratab → root user, dbca.

To check ASM and Restart

- pgrep -f ohasd
- su - grid
- crsctl config has → status of grid.

Oranenv → sets

↳ SID, Base, Home.

SID → +ASM

→ crsctl config has

Name of the Database:-

* Select name from v\$database;

* Select name from v\$datafile;

su-grid → to go into ASM +ASM

* Show parameter instance-type.

* connect ASM as sqlplus / as sysasm

* V\$asm_diskgroup; V\$asm_disk; V\$asm_file;
Col name format a4
Set pagesize 30

* ASMCMD

* ASMCA

↳ 2 diskgroups

Root → oracleasm listdisks.

* whoami → oracle

* .oraenv

* NLS_Database_parameters → Unicode database
Character Set

* PS-elfignep tns

Installing ORACLE:-

* plan the Installation by selecting Software.

Configuring Oracle Linux with oracle RDBMS pre-Install RPM.

1) Install oracle Linux

2) Register and configure yum repository for your system.

3) Install the RPM

— Oracle RDBMS pre-Install RPM for OEL 5-6

— Oracle validated RPM for OEL 5

Operating System groups and users

* oracleUser

* oinstall → oracle Inventory group

* DBA.

Environment Variables

* oracle_Base → Base of oracle Directory structure

* oracle_Home → oracle grid infrastructure home directory

Configuring the Oracle Software Owner

* set the default file mode creation mask (umask) to 022 in the shell

* unset the oracle_Home, oracle_Base, oracle_sid

Remove

* \$oracle_Home/bin from your path.

→ Run ./runInstaller

Installation: silent Mode

1) prepare a response file

→ using one of the template file

→ Recording a response file during the OUI by clicking Save response file

1) ./runInstaller -silent -responsefile <filename>

→ A text file that can be edited

Installing ASM

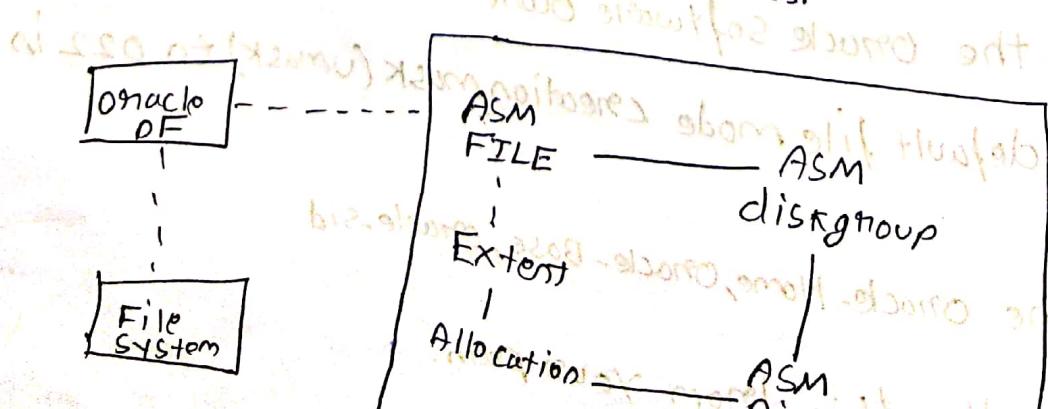
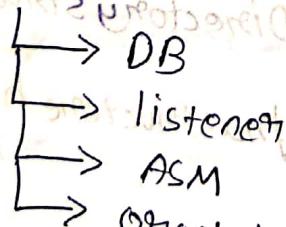
ORACLE RESTART

→ process fails restarts Again.

→ Oracle Grid Should be Installed Before Creating a DB.

DISK GROUPS → one for DB area & others →
one for fast Recovery Area.

Oracle Restart



Configuring ASM

→ number of Devices

→ 3 to 5 years growth

→ Create Disk Space on SAN for ASM

→ configure storage device path

→ Oracle ASMLIB

→ OS-specific

Minimum Requirements

→ 4 GB → ASM

→ 16 GB → Swap Space

Disk

→ 6.9 GB for Linux

→ 16 GB for /temp.

Creating groups and users

→ oinstall

→ OSDBA

→ OSASM

→ OSOPER

Installation

→ Manual

→ OUI

ASMCA

→ to upgrade

M2A edit config

M2A edit bin

breath bin

ab edit bin

b1eg - m2

collation config

collation config

collation config

collation config for zoneout

B1G edit config area

C1G edit config

collation config

Setting the ASM

→ .sid +ASM

→ .sid dbugrid

→ Shut the dB.

→ su -grid

→ ./runInstaller

Select instance_name, status from v\$instance;

→ two types of Software Installation

DataVault → prevent the dba to view the data.

Before creating the DB.

→ type of information

→ DB Design

→ DB Backup.

General template

xinitrate → 8K

Datawarehouse

→ 32K

TYPES OF DATABASES.

→ OLTP → online transaction processing.

→ Custom → Multipurpose

→ Data warehouse →

Appropriate character set.

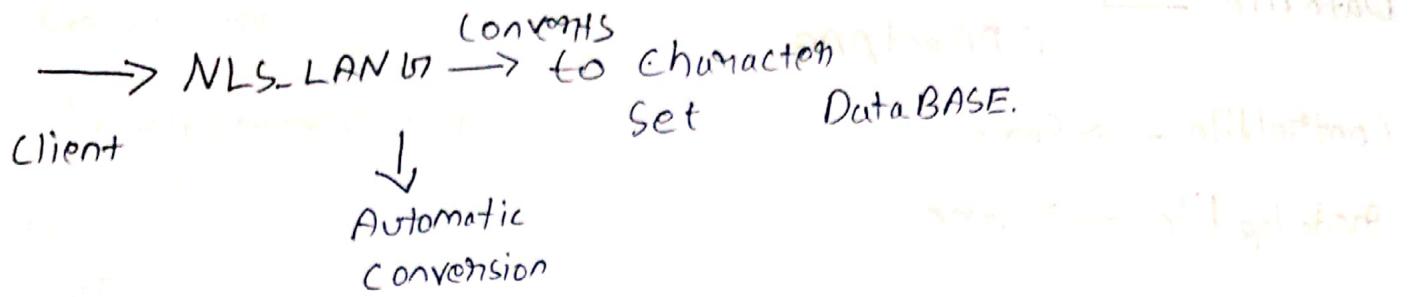
encoding

→ single Bit

→ Unicode

→ Unicode

↳ is the most used.



CREATE DATABASE STEPS:-

→ create pfile from spfile; → always spfile by default

→ Startup spfile = 'pfile'

→ ADRCI
↳ Automatic Diagnostic Repository Command interface.

→ v\$diag_info → select name, value from v\$diag_info;

↳ set up the ADRCI

→ ADRCI

Set homepath

cd \$ORACLE_HOME

before using the ADRCLI commands use the SetHomepath.

v\$logfile, v\$controlfile, v\$log

→ alter database add logfile member

1 to group1;
2;

Show con-name v\$Pdbs → Pluggable

Show con-id.

↳ Connect to PDB

connect sys/ — as sysdba

→ Select table_name from user_tables;

↳ tables only by user

→ Create a PL/SQL procedure to startup all PDB's.

Datafile → different for CDB and PDB
 Controlfile → Same
 Redolog file → Same

Show parameter Dispatch → Access DB through web

exec .DBMS_XDB_Config.setHTTPPort(5501)

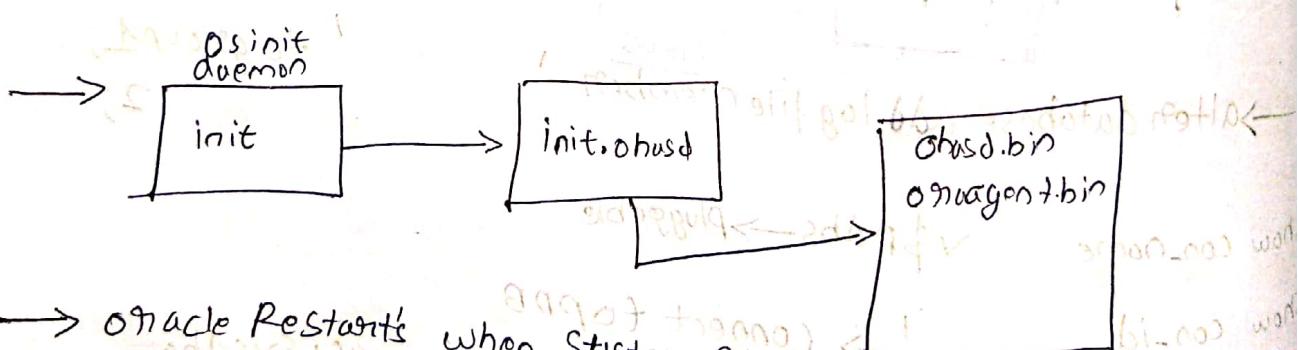
Select dbms_xdb_config.getHTTPPort FromDual;

getHTTP

ORACLE RESTART:-

- monitor Database instances
- oracle Net Listener
- ASM
- ASM disk utilities

Oracle Restart process



→ Oracle Restart's when System Starts.

Controlling Oracle Restart.

\$ crsctl config has Oracle clusterware control

\$ crsctl [enable/disable] has

\$ crsctl [enable/disable]

Service control:-

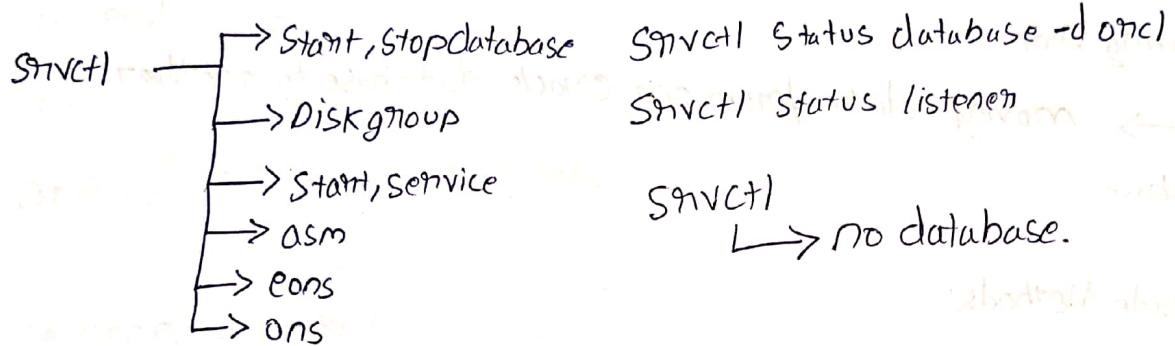
\$ svrctl command component Services

help

Srvctl -h

Srvctl command -h

Srvctl command component -h



To start all components in a particular home

Srvctl start home → Oracle_home -s state-file -f

adding components to service control

Srvctl add listener -l MYLISTENER -P TCP:1525 -o

RESTART → Inside ASM

ORACLE LISTENER:-

CRSCTL → Cluster Control

Srvctl → Service Control

pgrep -l | grep

crsctl config has

(crsctl) start has

↳ startup the components.

Srvctl status ASM

Srvctl diskgroup -g DATA

Srvctl status Listener

Srvctl config

↳ shutdown or kill the

lgwr

↳ It automatically

Starts the lgwr.

Srvctl config database -d orcl

Srvctl remove database -d orcl

[] → default option

Srvctl add database -d orcl -o

Srvctl modify database -d orcl -o

UPGRADE DATABASE

Upgrading :-

- Transforms an existing Oracle Database environment into Oracle 12c
- Does not affect user data

Migrating Data

- moving data from one Oracle database to another database.

* Upgrade Methods:-

* Database Upgrade Assistant (DBUA)

* Manual method using SQL Scripts and utilities

* Advantages:

- Automate all tasks
- RAC, ASM and single
- Automatically reports errors found in the database
- Complete Report of HTML process.
- Command-line interface

Manual Upgrade

→ DBA, Control

12c is supported on 10.2.0.5, 11.1.0.7, 11.2.0.2

Limitations

The migration methods are

- * Oracle Data Pump
- * Create table as SQL statement.

Preparing for Upgrade

- * Features of 12c
- * Upgrade path
- * Choose a method
- * OFA \rightarrow Oracle home directory

Developing a Test Plan

Upgrade

Minimal

Functional

High availability

Integration

Performance

Volume/Load

Performance Testing:-

- * Database Replay : perform Realworld testing of a database using a production workload. before actually upgrading the production Database.
- * SQL performance Analyzer :- Forecast the Impact of changes.

Requirements Using Database Vault

→ Run OLSprepupgrade.SQL

remove \$AUD table from system to SYS.

Requirement for Datawarehouses Builder

→ Oracle WB is not installed as a part of 12c
need to install separately.

Pre-upgrade Information to O/P

→ Execute preupgrade.sql

→ Review preupgrade.log

Resolve Issues

→ Preupgrade_fixups.sql → to fix issues
before upgrade

→ postupgrade_fixups.sql → to fix issues
after upgrade

Before Upgrade Backup the DB.

Run RMAN online

{

Allocate channel 'Chun-name' type disk;

Backup database format 'Some-backup-directory/oruTAG'

before-upgrade;

Backup current control file format 'controlfile location'
and name;

3

Preparing the Oracle Database upgrade

→ No relocation of Datafile, control file.

Check the DataVault

Select * from v\$option

where parameter in ('oracle LabelSecurity', 'oracle DatabaseVault');

upgrade will fail if SYSTEM, SYSAUX, HTMLDB,CTXSYS, XDB are offline.

Select tablespace-name, status from dba_tablespaces;

Remove user AUDSYS cascade;

Drop ROLE Audit-ADMIN;

First run preupgrade.sql

utluppkg.sql

mkdir for logfiles to be placed.

Recycle Bin must be empty.

Select * from dba_recyclebin;

dropremove.sql

→ for removing enterprise manager

exec dbms_stats.gather_dictionary_stats

Prerequisite steps

• fluidobj.sql removes
 ↳ invalid objects before upgrade

Select * from REGISTRY\$sys-inv-objs.

Confirm materialized views refreshed.

Select * from v\$recover-file
 ↳ says whether Datafiles
 to be recovered.

Check the DG setup must be in SYNC.

alter database archivelog → mount mode.

→ rman target /

Show all; →

RMAN

→ Configure .controlfile AutoBackup_on;

backup database plus archivelog

Alter tablespace example Read_only;

Select name from dba-datafiles;

Upgrading to 12c Database:-

DBUA

↳ Database Upgrade Assistant.

DBUA

↳ GUI and silent.

* performs a Database upgrade

* can restore Database after upgrade.

performs all the process Automatically.

OFA → optimal flexible Architecture.

* Lowdowntime

Manual upgrade steps

1) Execute the preupgrade.sql

2) Backup the source database

3) New oracle home.

4) SQLPLUS → Shut immediate

5) execute Startup upgrade

6) Execute parallel upgrade Utility (catctl.pl)

7) Restart the database instance

8) Execute the post upgrade status tool (ut1/u121s.sql)

9) Catupnst.sql and Utl1sp.sql

B1) Create a PDB into CDB

B2) Using expdp/12c impdp

These are two methods

A1) Upgrade a preexisting Non-CDB to 12c

A2) Plug Non-CDB into a CDB

plugging a Non-CDB into PDB

- * TTS on TDB or full export
- * XML file definition with DBMS-PDB
- * Replication

Adding Non-CDB to CDB as a container:-

- Startup mount
- alter database readonly
- Create a xml file
exec dbms_pdb.describe('')
- Log into CDB

Create a pluggable database PDB-one
using:

- listener.netmigr
- Select con_id, name, open_mode from v\$pdbs;
- execute the NonCDB_to_PDB.sql → in mount mode

POST UPGRADE TASKS:-

* For manual upgrade

→ Set Oracle_Home, Path

→ Update oratab.

Auditing

1) Statement

↳ dba_stmt_Audit
- options

2) Object

↳ dba_obj_Audit
- options

* Update RMAN recovery catalog

* Configure the FTP and HTTP ports

i2c → Unified Auditing.

↓
One location

audit stored
in system table space.

Select Value from V\$option

whose parameter = 'Unified Auditing'!

sys.Aud\$

Unified
- audit-trail

Audit_ Unified - Policies

Enable unified Auditing

grn
scripts
at Homelevel

audit-file-dest

like dba
- audit
- trail

→ SHUT immediate

Audit (create any table by
harm)

→ /snrctl stop

dba_audit_trail

xm, os

→ \$ cd \$oracle_Home/rdbms/lib

→ Audit-trail= DB, DB-extended,
- trail,

make -f ins_rdbms.mk -Uiaud -Ooracle oracle_Home=\$oracle_Home

→ /snrctl start

FGA

Fine grained auditing.

→ Startup

Create Audit-Policy

Roles for Auditing

→ Audit_ADMIN

↳ View Audit-data

↳ Create unified and fine grained Audit policies

↳ View and Manage the Audit trail

→ Audit_VIewer

↳ View and analyze audit data.

→ post upgrade tasks.

→ check oratab for new home

→ check the status of oracle_data-dictionary

. dba-registry.

→ check invalid objects

cd \$ORACLE_HOME/rdbms/admin/utluobj.sql

Check password file exists

Home/dbs/

→ Orapwd

ASM

→ alter DISKGROUP data set Attribute | compatible ASMI=;

Migrating By Using Data Pump:-

→ LOG

AS a Server-based utility for high Speed data

and metadata movement.

→ callable via DBMS_Datapump

→ PL/SQL package

Parameters

attach → JobName.

content= metadata only,

Data-only;

Directory.

Estimate → estimate
the size

Estimate-only;

Exclude

Flashback SCN

full=Y

OR

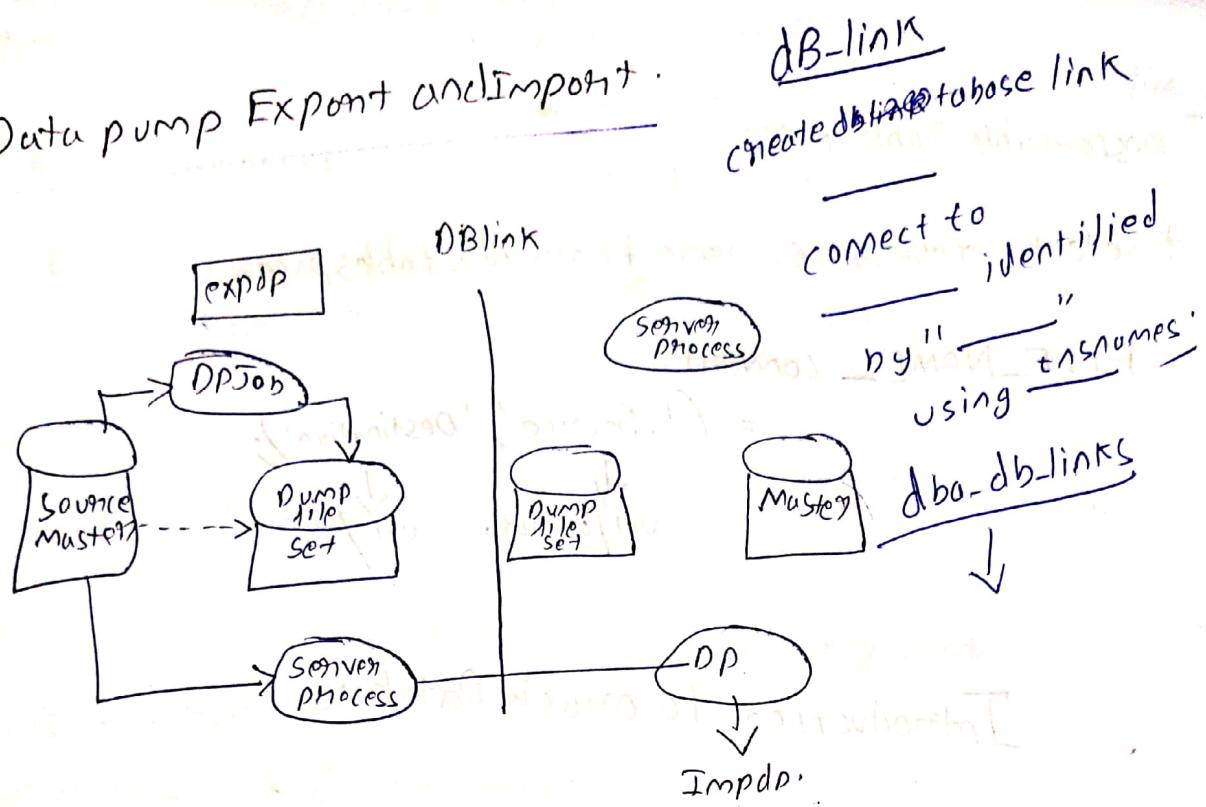
Network

link

= → dB-link,

Query

Data pump Export and Import



Modes

- Full
- Schema
- Table
- Tablespace
- Transportable Tablespace
- "

dba-datapump-jobs
dba-indexes
alterindex unusable

Create a 12c database

Import from 11g database.

→ Network link.

pluggable seed

System
SYSAUX
temp

Exporting from a Non-CDB and Importing into PDB

1) \$ expdp system@prodDB FULL=Y Dumpfile=prodDB.dmp

2) Create pluggable database pdbc using pdbyseed;

3) open PDBC

1) Create a Dumpfile directory in PDBC
 impdp system@PDBC FULL=Y Dumpfile=prodDB.dmp

- Transportable Tablespace:

* Select tablespace_name from dba tablespaces;

FILE_NAME_CONVERT

= ('Source', 'Destination');

↓
vol/oracledata

↓
vol/

Introduction to Oracle Database

Oracle Database 12c editions

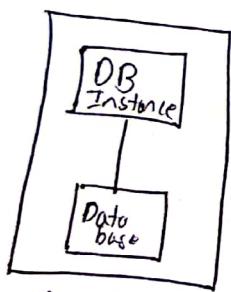
→ personal

→ express → 4GB

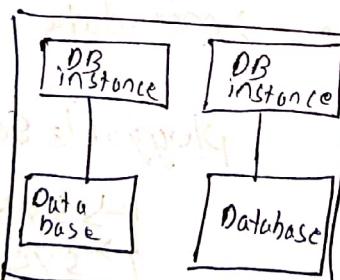
→ Enterprise

→ Standard edition

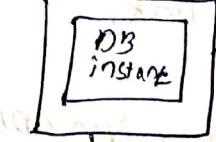
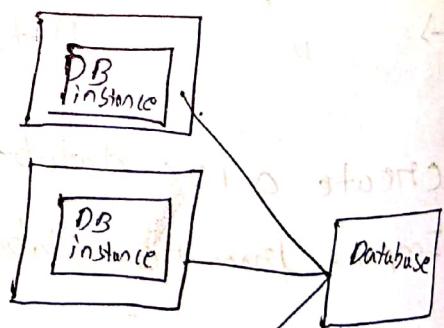
SE2 → RAC No DG, No CC.



Single Instance



Share databases



Library.
example.

Background process

↳ LGWR
DBWR

Creating a wallet
wallet_location = (source = method = file)
↳ put in \$ORACLE_HOME/dbs/
ORACLE system set key authenticated by
"oracle@123", encryption

Instance

↳ SGA JAVA
PGA

server process → Foreground process.

Read Data always in blocks.

LRU → Algorithm.

Largepool → I/O transactions.

ASH BUFFERS

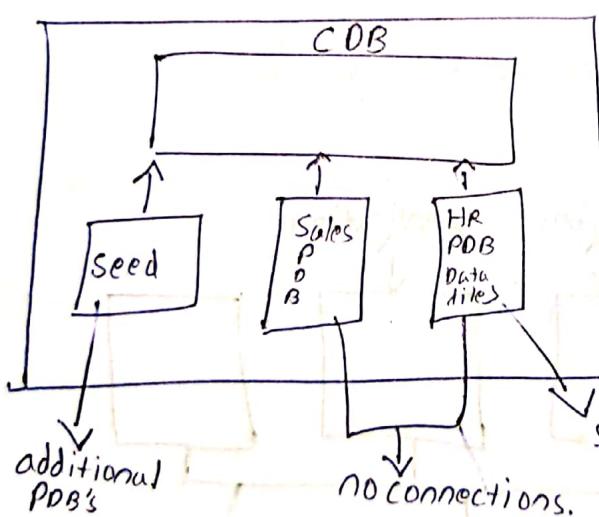
↳

Over 100 → 109 → maximum

REG

↳ Listener Registration

Multitenant Database:-



Segment → Multiple TB's → N
Segment → Multiple Datafiles → N
Extent → Multiple Segments → N
separate SYSTEM, SYSAUX, UNDO, TEMP.

Tablespace → 1024 Datafiles.

Datafile → 128TB.

ORACLE operates

on Memory

RAC → NFS.

Databases → collection of TB's

Client connects to the Instance.

No uncommitted information can be viewed.

Easy connect syntax: connect hr/hr@host:1521/instance.

SqlPLUS Show User:-

→ Sqlplus

connect HR/hr @Script.sql

SQLCI

↳ Is a Cross Between SQLPLUS and SQL Developers

↳ produces CSV

SQL Developers:-

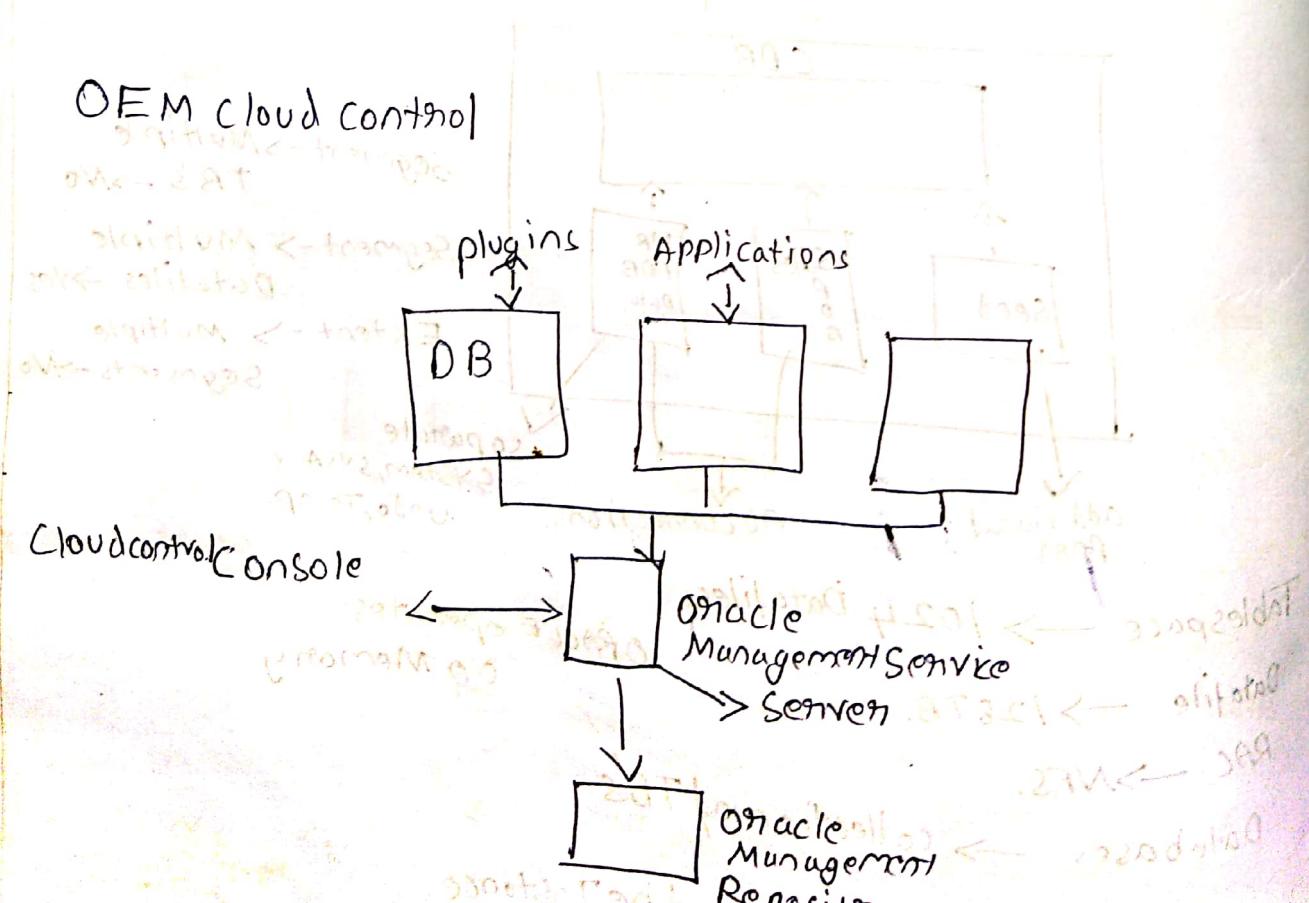
↳ GUI tool

OEM Express

↳ Manage Databases.

↳ Flash installed

OEM cloud control

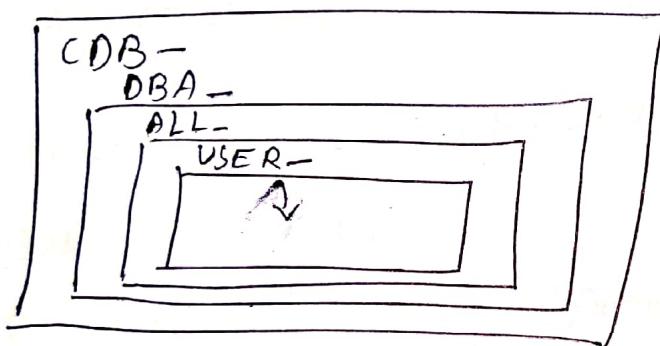


Oracle Users:-

- DBA
- Security Officers
- Network Administrators
- Database users.

- Common users
- Local users

Querying the Oracle Data Dictionary



Select Catalog Role → to see all tables in Data-Dictionary mode

Version → Version. → all the releases and other data

dba_temp_files; → to check the temp status

dba_users;

express:-

check the port

DBMS_XDB_Config.GETHTTPPORTC)

5500

@exec DBMS_XDB_Config.SetGlobalPortEnabled(true);

- SqLci

- Sqldeveloper/sqlcl/bin

alter session set container = PDB1;

Sqlformat CSV

ORACLE CLOUD SERVICE:-

→ SaaS

→ PaaS

→ IaaS

Features and Tooling.

→ Automatic Patching

→ Automated Backups

→ Node, Angular, PHP

→ Advanced Security

→ I3C

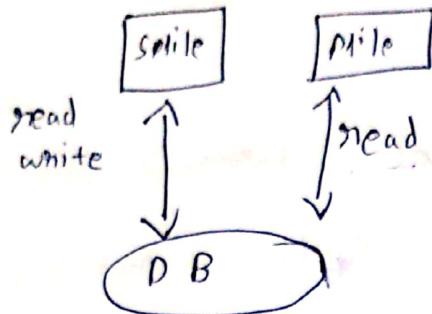
→ Dataguard

→ RAC

→ Compute Node

parameters.

over 417 parameters.



dbms → Init.ora

- Set DB limits
- Specify files and directories
- Affect performance.

* 30 parameters necessary to run the DB.

→ Basic SGA_TARGET

Donot touch → Advanced Parameters
DB_CACHE_SIZE.

Controlfile → 8

Recursive sessions

parameters modified by:

→ 2 types

ALTER SESSION or ALTER SYSTEM.

→ V\$parameter → Show's parameters

→ Session (ISSES_modifiable)

→ System (ISSYS_modifiable)

→ PDB (ISPDB_modifiable)

ALTER SYSTEM forward.

ALTER SESSION backward.

Information for

different environments

different applications

different users

different databases

Sessions

→ 1 to 2^{16} .

process

is a
Derived
parameter

process → segment → block → page → byte

process → segment → block → page → byte

process → segment → block → page → byte

process → segment → block → page → byte

process → segment → block → page → byte

process → segment → block → page → byte

process → segment → block → page → byte

process → segment → block → page → byte

ALTER SYSTEM scope

* Memory → dynamic

* Split → static

* Both apply simultaneously

→ Show parameter archive

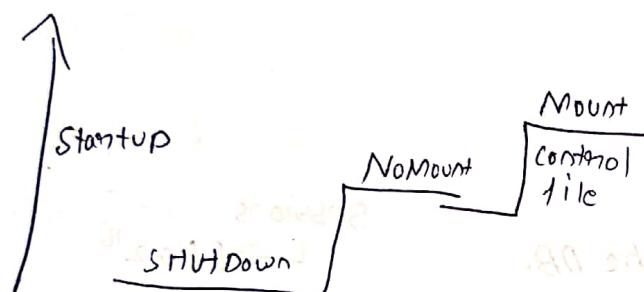
Col name format as.

V\$ parameters

V\$ Parameter 2 → multiple lines.

V\$ SP parameters

V\$ SYSTEM_PARAMETER2



Shutdown

- ↳ Normal
- ↳ Abort → goes through Automated Recovery.
- ↳ Immediate
- ↳ Transactional

Open → 4 modes PDB's

- Read write
- Read only
- Migrated
- Mounted

Alter pluggable Database PDB1 open Readwrite;

ADR

→ Automatic Diagnostic RC position

→ trace files Select * diag_info;

Alert log is a chronological log

recently occurring events

→ ADR CI Help

Tracefiles

↳ Details when error occurs.

ADR can be purged with retention policy

Enable - DDL - logging → true

↳ init parameter.

XMLDDL log.xml

Base/diag/rdbms/Ldbnames/SIDs

Text+DDL log

↳ v\$

Averaging Dynamic performance Views

SYSDate - 1

→ session, file

Starts with v\$

↳ greater than

→ Backup status

longest 2790 entries

→ System, Session

v\$Datafile

Read consistency not guaranteed

→ SQL execution

Views are owned by SYS.

↳ v\$

v\$ fixed-table

→ definition

Creating a pfile from spfile:-

Create pfile = ' ' from spfile;

Showparameter spfile;

- → show parameter db-name

db_recovery_file_dest_size global DBAA

undo

compatible

Control_files 1028] → shared_pool_size

processes

transactions

commit_logging

commit_wait

db_block_size

db_cache_size

NLS_DATE_FORMAT → 'Mon dd yyyy'; set SPOOL

NLS_TERRITORY

↓
change the dateformat

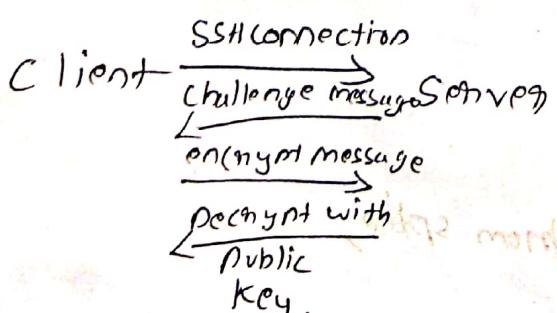
1 - \$diag_info;

Creating DBCS deployments.

Automatic Wizard.

Computeshape → Memory.

SSH key pairs



Port

→ 22

bits → 30GB
boot → 21
data → 110GB minimum
192a → 1.7GB data
medo → 10GB

→ key pair during DB creation

→ before DB deployment.

Creating PDB's:-

Methods of creating PDB

- Clone a PDB by using seed
- Create a PDB from non-CDB
- Clone existing PDB or non-CDB.
- plug or unplug
- Relocate a PDB
- PROXY PDB

Tools

- SQLplus
- SQL Developer
- DBCA

Creating PDB from SID:-

- CDB → read and write

Cloning PDB's:-

→ PDB₁ copy to PDB₂

Unplugging and plugging In PDB's:-

→ generate a xml manifest file

→ use it to plug.

Dropping a PDB

- Drop pluggable Database SalesPDB including Datafiles;

- Archived logs and Backup are not Deleted.

Creating a PDB from seed:-

Create pluggable database

roles=(dbn)

default Tablespace users

datafile '_____'

size 250M autoextented ON

File-name-convert=(source,destination)

Select con_id, name, open_mode from v\$pdbs;

dba_data_files;

dba_temp_files;

dba_users;

Create pluggable database PDB3 from PDB1

Create file dest='_____';

Unplugging and plugging:-

→ alter pluggable database PDB3 close immediate;

→ alter pluggable database PDB3 unplug into

→ drop pluggable database PDB3 keep datafiles;

→ check compatibility

DBMS_PDBCHECK_Plug_compatibility(

→ create pluggable database .HR_PDB using (Pdb_desc_file=>'____');

Dropping

NOCOPY TEMPFILE

→ Drop pluggable Database hrpdb including Datafiles;

Cloud Tools

- Simplified Automated Backup
- Simplified Automated Recovery
- Simple Automated Patching.

bkup-api
graccli

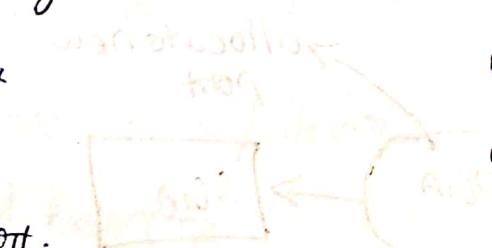
orec
graccli
dpatchm
dba

Consoles

- DBaaS Monitor
- Application Express
- Em console
- SSH Access
- Access Rules
- Delete

Managing the Compute Node

- Start
- Stop
- Restart.



09u-p2-dbconsole

09u-p2-dbexpress

09u-p2-blisoneg

09u-p2-HTTP

09u-p2-HTTPS

- ### Managing Network Access
- SSH → SecureShell
 - Port → 22

Scale up → Add new storage

Scale down → Remove node

ORACLE LISTENER SERVICES:-

→ oracle NetServices

→ Client → middleware → database

→ Configure additional network services (External Code Libraries)

→ enables to connect to Non-oracle databases (SYBASE)

→ Oracle Net Services

* Oracle Net

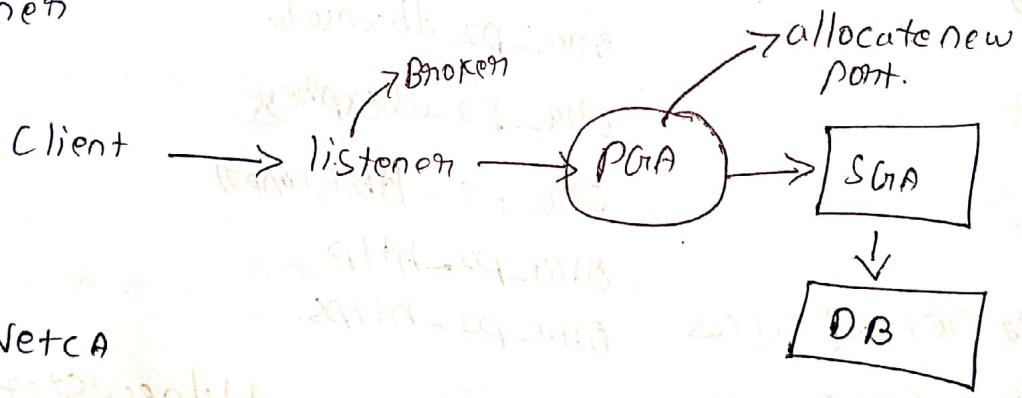
* Oracle Net Listener

* Oracle NetManager

* NetCA

lsnrctl → EMCC → to control Oracle NetServices

Listener



→ NetCA

Listener → unique name

→ Automatically
→ Dynamic Registration
ADDRESS=(Protocol=tcp)
(Host=hostname)
(Port=1521))

lsnrctl → connects only to listeners

↳ listener.ora

↳ tnsnames.ora.

Hostname --
Linux

→ Oracle automatically configures the listener (starts and stops it based on the configuration)

LREG → Listener Registration

General steps

→ Instance-Name, Local-listener, Remote-listener and Services-Names.

Both static and dynamic at same time.

LDAP Server → All tns-names.

Failover=True → in tns.names, allows us to use the 2 IP method.

Advanced Connection options

→ Connect-time failover → always make copy and then work.

→ Load balancing

→ Source Routing.

Connection Testing

Ensuring

Easy connect:

\$ tnsping host1.example.com:1521/tns

Cloud Backups

Cloud and local Backups of Standard edition are not encrypted

local

Master key used to decrypt the Backups.

bkup-api utility.

Configuring Communication Between Databases

✓ Configure tnsnames.ora

✓ dblink is a schema. → public, private

↳ only to user

Sqlplus / as sysdba → public

Create database link < db-link-name >

connect to user identified by pwd using

' connect string. >;' → tnsnames

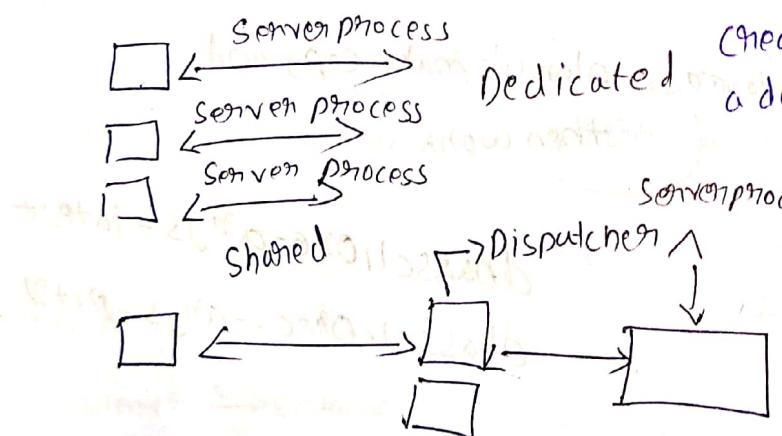
Select * from employees @ < dblink >;

→ dba_db_links

→ user_db_links

I) Public
not mentioned
it will create
private db-link;

Use @ to



view it in tnsnames.ora

DBlink

Create database link MyLink connect to system identified by Oracle4u
using 'empdept';

Select name, cdb from v\$database @mylink;

dba_db-links;

I) GLOBAL_NAME
is set to true

DBLINK name
the same as
username

define /system \$NLNET DOMAIN

"US.ORACLE.COM"

Administrating User Security

User Accounts

Unique name

Authentication method

Default tablespace

Temporary tablespace

User profile

Schema

↳ user own's stuff

Synonym

↳ point to

Initial consumer group

Account status

- open
- lock
- expired
- grace

Login

to PDB

CDB

Root container

Common user → DBA

↓
Common user
~~HR~~ → C_admin1

Local user → only to PDB in

↓ user1 which it is created.

SYS → Superuser, Data Dictionary and AWR

SYSTEM → additional administrative tables and views

SYSBACKUP → RMAN

SYSDG → DB operations

SYSKM → Encryption

SYSRAC → RAC

SYSMAN → OEM

DBSNMP → Agent managed by OEM

SYSTEM privileges

Create session,

Drop table,

Alter table,

Alter session.

SYSOPER → Notable access.

ANY clause → Not limited to only schema but can access all

ADMINOPTION → provide Administer to other users.

Object privileges

Grant object > on object > to user

GRANT, REVOKE

REVOKE →
DBA → JOE → will have to revoke
X ↓ individually from all
Create table → Emily → the users
Create table → measured → manual

Granting Roles:

Connect / as SYSDBA

Grant L > to L > CONTAINER=ALL;

Locally

Grant L > to L >;

ROLES

DBA → God of DBA

Resource → Create cluster, Create Index type, Create Sequence,
Create table, Create type

Scheduler-ADMIN → Create any job, Create Job → dba-jobs;

Role → Select on dba-jobs

Roles:-

↳ automatically created when user is granted a role.

(initially enabled)

Set Role command

- * Make a Role non-default
- * Use role authentication
- * Create Application role

REVOKE:-

→ Revoke System privileges

→ Revoke Role

→ Revoke object privileges

profile

↳ used to control passwords and

two ways

→ commonly

↳ ALTER USER <username> PROFILE <profile> CONTAINS ALL;

↳ ALTER USER _____;

Password Parameters

→ account locking, password aging and expiration, password history

→ Account locking.

→ Password aging and expiration

→ Password history

→ Password complexity

profiles control

→ CPU resources → Idle

→ SGA

→ I/O resources

→ connect time

Resource-Limit → This allows to restrict the resources used by user.

→ Init parameters

password verification function

[utlpwdmg.Spl]

→ Oracle_Verify_Function

→ Oracle_Strong_Verify_Function

→ N Verify_Function_HG

Authenticating users:-

The following authentication

→ password

→ OS

→ password file

→ Strong Authentication with SSL

→ DBA user → OS authentication.

passwords are case-sensitive

→ 26 methods

passwords are encrypted by Advanced Encryption Standard (AES)

Algorithm before sending through network

password file Authentication:-

→ Set Remote-Login-Password file

Quota

- ↳ How much space can be used in tablespace
- No quota by default
- No quota on temp and undo
- 影响 on purging objects in recyclebin
- types
 - * unlimited
 - * Value
 - * unlimited tablespace

Least privilege:

- protect data dictionary OR dictionary
- Revoke privileges from public
- use control lists utltcp → send mail
- OS direct access
- Unified Auditing
- Limit user's with Administrative privileges.

Create profile

Select * from session
↳ shows all privilege

Select * from session_privileges;
session_privs;

Unified Auditing

→ Home/enable_unified_Auditing v2.5

Create Audit Policy drop-pol by user with granted roles dba;

Table → audit_unified_enabled_policies

passwords:-

cat /etc/group

grep oracle /etc/passwd.

desc v\$pwfile_users;

Patching the Database components

dbaascli → to apply patch

dbpatchm → for single instance

raccli → RAC

dppatchmdg → Oracle DG configurations.

dbaascli · dbpatchm --run -preeq

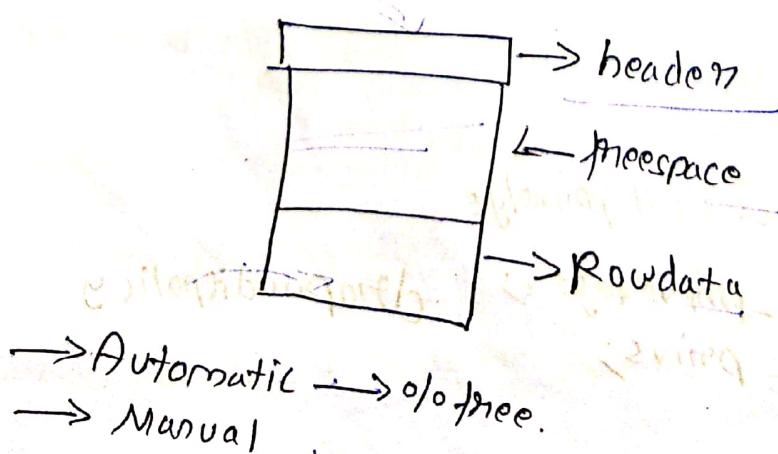
dbaascli · dbpatchm -- run -apply

dbaascli dbpatch -- run -rollback → runafile

Creating and Managing Tablespaces.

TSE B

Database Block content



→ Tablespace contains Datafiles

Types

→ permanent tablespace

→ Undo tablespace

doesn't specify extent

→ Temporary tablespace

↳ system automatically creates extent size

↳ stored in tempfiles

Big datafile → 128TB

Small file → 128MB for 32

↳ 1024 Datafiles

Alter tablespace

↳ recovery

→ offline

↳ readonly

→ online

↳ Normal

→ Drop tablespaces.

↳ Temporary
↳ Immediate

View Tablespaces

→ DBA-tablespaces

→ v\$ tablespaces

Datafiles

→ DBA-Data-files

→ v\$DATAFILE → more about Ckpt SCN

Tempfiles

→ DBA-temp-files

→ v\$ tempfile → recreated everytime

Tables in a tablespace

* All_tables

→ All_segments

→ Oracle Managed Files
OMF → Automatically puts the files in destination

↳ Oracle Managed Files

DB_CREATE_FILE_DEST

DB_CREATE_ONLINE_LOG_DEST_D

DB_RECOVERY_FILE_DEST

Moving or Renaming Datafiles

File system → ASM

Relocating an online Datafile

ALTER DATABASE MOVE DATAFILE ' / source ' TO ' / destination '

Copying a datafile from filesystem to ASM;

ALTER DATABASE MOVE DATAFILE ' / ' TO '+DISKGROUP'

Keep;

→ do not drop original file

Renaming a online datafile;

ALTER DATABASE MOVE DATAFILE ' / ' TO '+DISKGROUP'

ALTER DATABASE ADD DATAFILE ' / '

ALTER TABLESPACE ' / '

RESIZE 40M

DROP TABLESPACE ' / ' INCLUDING CONTENTS AND DATAFILES

ADD DATAFILE ' / ' INCREMENTAL SIZE 30M AUTOEXTEND ON;
INCLUDING CONTENTS AND DATAFILES

CDB and PDB Masterkey encryption:-

- Alter session set container = pdb;
- Select WNL parameter, status, wallet-type from v\$encryption_wallet;

Administer key management set keystone close;

Administer key management set keystone open;

identified by keystone_password container=ALL;

Managing storage

→ Naming conventions, filename.

→ Oracle Managed files.

→ how much tablespace is used

→ Free Space Management with bitmaps ('locally managed')
automatic file extension

→ proactive space management (shrink Segments)

(space optimizer) or (alter online table)

→ capacity planning (growth reports)

BlockSpace Management.

PCTFree = 10

Block becomes available only when below threshold.

Freespace Management within Segments

Tracked by bitMap in segments

Benefits

→ More flexible

→ Runtime adjustment

Row Chaining and Migration

→ RowID is preserved

→ Segment Advisor

Forwarding address

↳ PCTree

Blocks are repacked and put in

Disc.

Types of Segments

→ Tables and clusters

→ Index

→ Undo

→ Temporary

Segments are dynamically allocated by Oracle.

→ Sizing extents

→ uniform

→ AutoAllocate

→ Viewing extentMap

BitMAP
↳ identify the exact location.

Deferred Segment Creation:-

Deferred_Segment_Creation = TRUE (Save the Space.)

1) Table Creation > Data Dictionary

40\$ → 1GB.

per

Year

2) DML → Segment Creation

Prevents creating space for empty tables

Select * from user_segments.

Segment Creation clause

* Immediate

* Deferred

Create table Seg_fab3(c1 number,
c2 number)
Segment creation Immediate Tablespace
Deferred Seg-TBS;

Exceptions:-

- clustered tables
- tables in dictionary-managed tablespaces.

space saving features:-

Create Index without Segment

→ Alter Index test_i1 on Seq-test(c) unusable

Removing unallocated space.

→ Alter Index test_i unusable.

→ Alter Index test_i Rebuild.

dbar indexes

Table compression:- → NO DML

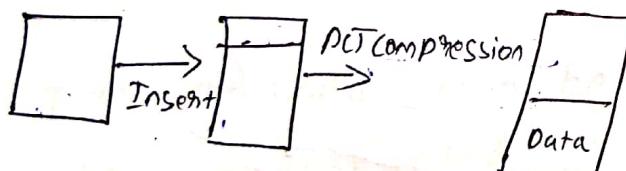
* Basic → 10X times → NO-DML

* Advanced → 2-4X times → DML

Basic

* Create table — Compress BASIC.

PCTFree → trigger's compression.



Advanced

* Create table — Rowstore Compress Advanced.

→ Advanced compression OLTP.

Y	G	Y
G1		

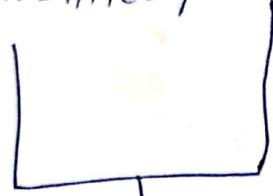
G	Y

Compression cannot be used in 255 columns.

Drop a column direct but not with advanced now compressed.

R DBMS_Server_Alert
↳ for changing warning.

dba_data_files, dba_free_space



↳ for freespace of

tablespace

dba_alert_history, dba_outstanding_alerts

dba_extents

alter table hr.employees shrink space.

User-indexes

alter session resumable

↳ will stop when script exceeds the limit.

Select * from dba_reusable;
will complete automatically

Tablespace encryption:

↳ default in cloud services



Algorithm AES128

Transparent Data encryption overview:-

→ encrypts data in datafiles, Backups.



Security Module

→ Software keystone

→ Hardware keystone

* Algorithm support.

controlling Tablespace

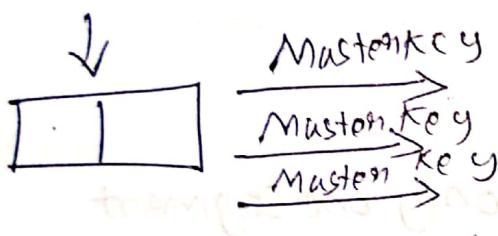
* ALWAYS.

wallet → Master key
is stored

* DDL

* CLOUDONLY

sqlnet.ora



Create tablespace

Datalife | size(100M)

encryption using

Default Storage (encrypt);

Temp and undo cannot be encrypted

key for encrypted tablespace cannot be changed

System cannot be encrypted

dba asci → to rotate Masterkey.

Managing the UNDO:-

Undo data

- A record of the action
- Captured every second that changes data
- Retained until transaction is ended.

* used to support:-

- * Rollback transactions.
- * Read consistency queries
- * Oracle query, Flashback

Transactions and undo Data

- * Each transaction assigned to only one segment
- * A undo Segment can service more than one transaction at a time.
- * undo is stored in undo segments.
- * only one active.
- * Automatic Undo transaction
↳ Shared → only CDB Shared by PDB
↳ Local → One PDB, one undo

Tablespace

- ↳ Shared → only CDB Shared by PDB
- ↳ Local → One PDB, one undo

Local Undo

- * Hot Closing
→ Startup upgrade
→ Alter DataBase Local undo on;

* Undo retention → how long committed undo information is retained.

→ undo tablespace always autoextendable

Categories of undo:-

* Active → uncommitted, never overwritten

* Unexpired → committed undo information, still stays.

* Expired → overwritten

Guarantee Undo Retention

→ Alter tablespace undots1 retention guarantee

↳ 15 minutes

→ Undo Advisor

Making undo fixed → is not a good policy.

Temporary undo

Undo↑ redo↑

Temporary undo reduces the effort on redo logs.

Reduces the permanent undo.

Reduces redo log.

Alter session Set tempundo_enabled=true;

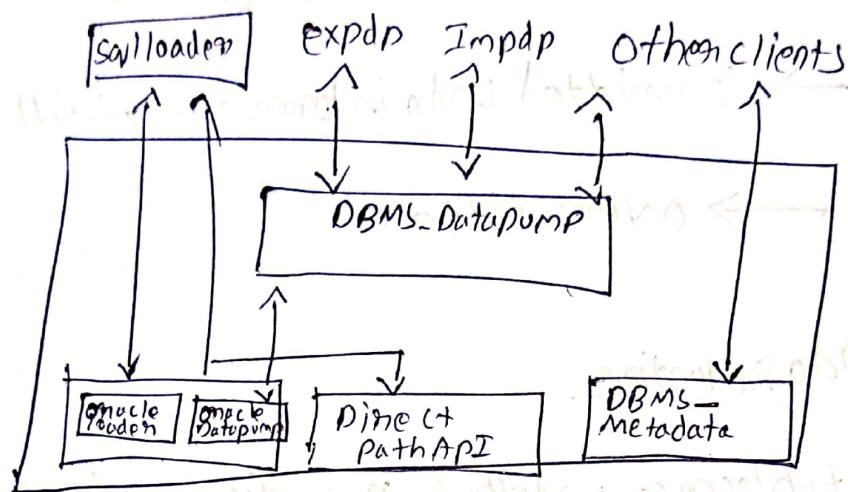
Alter system "

V\$TEMPUNDOSTAT;

Data base - properties

↳ Local_ undo_enabled

Moving Data → General Architecture:-



Datapump → server utility.

Is callable via DBMS_DATAPUMP.

Provides

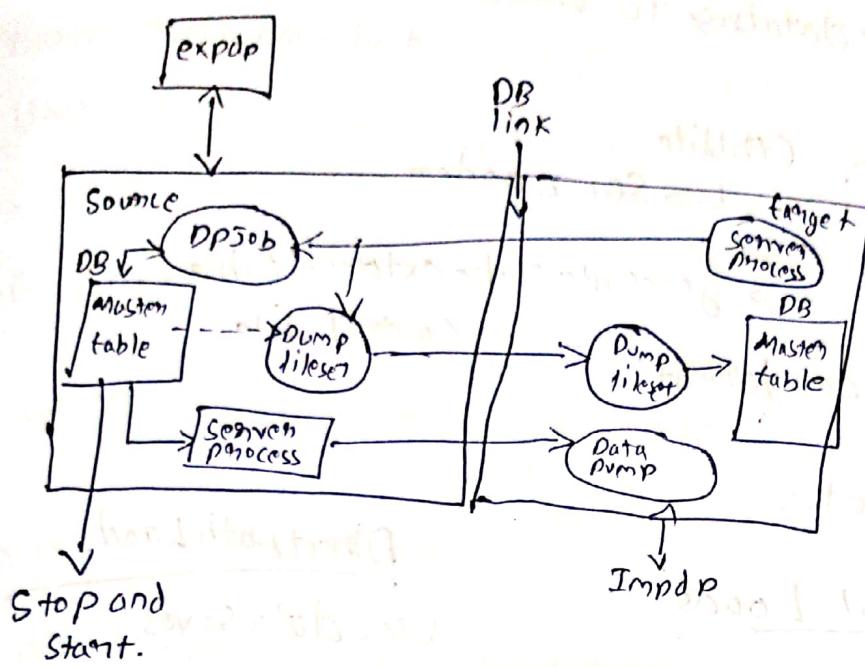
expdp and impdp.

GUI interface

DataPump Benefits:-

- * Fine grained object and data selection.
- * Explicit Specification of database Version.
- * Compression
- * parallel execution
- * Remapping Capabilities.

Data Pump export and Import.



Data Pump Interface and Modes

- Command line
- Parameter file → Preferred
- Interactive command file
- Enterprise Manager Cloud Control

* Data Pump Export and Import modes

- Full
- Schema
- Table
- Tablespace
- Transportable tablespace
- Transportable database

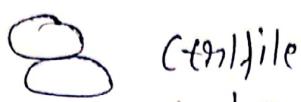
Remap:-

- Remap-Datafile
- Remap-tablespace
- Remap-schema
- Remap-table
- Remap-Data

{ } → Rename.

SQl Loader

→ Non oracle database to oracle database.



SQL Loader.

EXPRESSMode → generates the external table

Should be dat format

Control file.

Loading Methods:-

Conventional Loads

uses commit

Redo entries

enforces all constraints

finishes Insert

Direct Path Load

uses data saves

redo only specific conditions

primary key, unique Not Null.

Doesn't use INSERT

External Tables

→ only access But not load

SQL Loader or Datapump

12.2 → partition In out
Data.

Expdp

expdp user / password
@expdp oe/oracle — Schema=oe
Directory objects

Create sql level directory

Create directory drop as!

IMPDP System

dump schema = \Rightarrow default directory =
↳ different user dumpfile =
Network-link = link-pdb1

Create database link: link-pdb1 connect to system

identified by oracle -40 using 'PDB1';

SQL LOADER

Sqlldr -user/pwd table=products

Querying external Tables:-

* dba_external_loc_partitions;

(Create Index on table(column);

alter table add partition less than (to_date('1', 'MM'

location ('));

Select * from table partition (year 2000);

Import & Export

Export data using edict

Options before export file

-TRUNCATE

Compress

Compress data and all rows in table

BACKUP AND RECOVERY CONCEPTS:-

- * Protect Database from failure
- * Increase Mean Time Between Failures
- * Protect components using Redundancy.
- * Minimize of Loss of DATA.
- * Decrease the mean time to recover.

CATEGORIES OF FAILURE:-

- * Statement failure → enter invalid data, no privileges, allocate space that fails, logic errors.
- * User process failure → abnormal disconnect, terminated.
- * Network failure → Listener fails, Network interface card fails.
- * User error → delete or modify Data.
- * Instance failure → power, hardware failure, slot failure
- * Media failure → Hard disk, disk controller

Logminer → find the SCN Number
Logminer → query online redo log and archived logs.

Table point in time recovery.

CHECKPOINT:-

- * CKPT is responsible for updating data files
- * Major CKPT and Minor CKPT
 - ↳ SCN number.

Redo Log Files

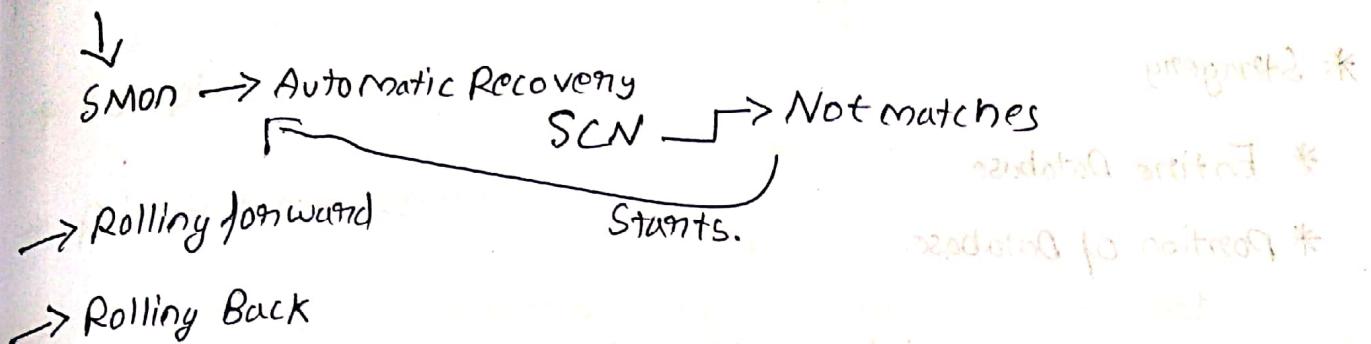
* Record changes to the database

Log writer writes

* At commit * 3 Seconds

* When one third full * Before shutdown

Automatic Instance Recovery



1) Instance Startup

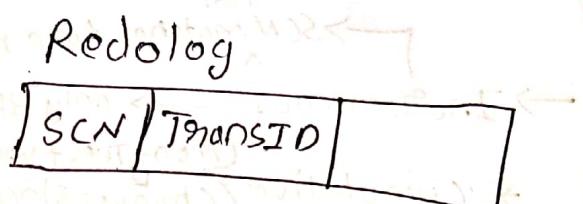
2) Roll forward

3) Committed and uncommitted data in files

4) Database opened

5) ROLLBACK

6) Committed data in file.



Tuning Instance Recovery:

CKPT → Important.

Distance between tail of the log and CKPT → Recovery Time

MTTR ADVISOR:-

→ default 0

→ 3600 (one hour)

FAST_START_MTTR_TARGET → fast startup recovery.

LOG_CHECKPOINT_TIMEOUT → 1800

BACKUP TERMINOLOGY:-

* Strategy

* Entire Database

* Portion of Database.

* Backup type may include: After Full Backup SCN changes

→ Full

 not SCN matches take backup.

 RMAN → only blocks in use.

→ Incremental → only blocks which changed after Backup

 * Cumulative (Changes since last level) → all changed blocks

 * Differential (Changes since last incremental) → Only changed blocks

* Backup mode

 * offline (cold, consistent) → RMAN

 * online (inconsistent, hot) → USR

Type of BACKUPS:-

* Imagecopies → OS format

* Backup Sets. → Oracle format.

Full or Incremental level, Backup piece.

RMAN BACKUPTYPES → Archive log mode.

Backup Database: ACTIVE BACKUP

Full or Incremental level, Backup Incremental Database ←

Cumulative or Incremental level, (read end) 3600 (DBP)

Differential: (DBP) ←

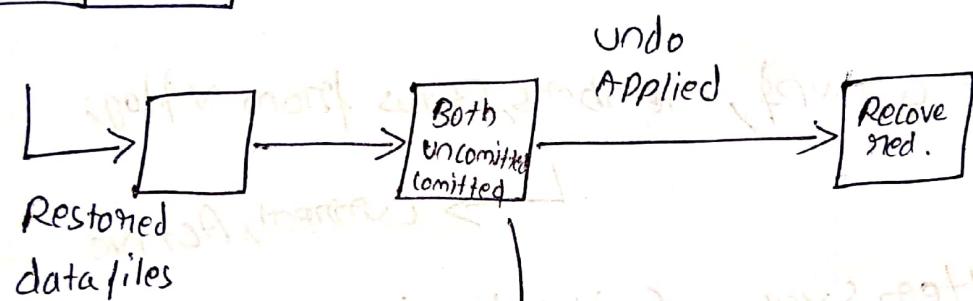
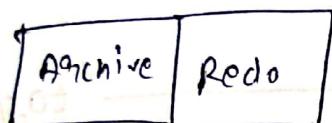
Recovery:-

* Complete Recovery

* Point in time Recovery.

↳ One point and apply archive log's till needed.

Complete Recovery Process



Take a full Backup always.

Data Recovery Advisor

Flushback technology:-

Analysis

Flashback query

Flashback Version's query

Flashback Transaction query

Recovery

Flashback Transaction Backup

Flashback Table

Flashback Drop

Flashback Database.

Configuring Database for recovery:-

Select * from v\$controlfile

↳ always one in fast
recovery area.

Create SPFILE from pfile;

Show parameters db_recovery_file_dest.

Select group#, status, member from v\$logfile;

alter database add logfile member'_____' to group_____,

Select group#, members, status from v\$log;

↳ Current, Active

Alter System Switch logfile;

↳ to make all log's Active.

alter database ArchiveLog;

alter database open;

alter system set log_archive_dest1='Location=use_db_recovery
-file_Dest';

Select name from v\$archived_log order by stamp;
Scope=both;

Backup the control file;

→ alter database backup controlfile to trace;

No Backup of controlfile and spfile.

gman

connect target /

Show all;

Whole Database Backup;

→ Report Schema

→ Backup Database plus Archivelogs;

→ list backup

→ Show Retention Policy;

→ backup@copy database plus archivelog delete input;

→ backup pluggable Database pdb1 plus archivelogs;

→ backup Database;

→ backup tablespace tbs-app;

→ backup tablespace pdb2:tbs-app;

→ restore datafile 1; → System
Tablespace always 1.

Mount mode

→ recover datafile 1;

→ list failure → show missing file → repair failure

→ archive failure → what to be done

C Restoring from Application Datafile loss:-

Select tablespace-name from dba_data_files where file_id=92;

Rman > Report Schema;

Memory management

Issues

- Memory Allocation Issues
- I/O contention → constantly loading some data
- Network bottleneck
- Application code problems.

Performance planning considerations:-

- System Architecture
- Workload Testing
- Scalability.
- New Application Deployment.

Statistics level = typical or ALL

Performance monitoring.

Instance

V\$ Database

V\$ instance

V\$ Parameters

V\$ SPParameter

V\$ System Parameters

V\$ Process

V\$ BG_Process

V\$ System_Event

Memory

v\$BUFFER_POOL_STATISTICS

v\$LIBRARY_CACHE

v\$PGASTAT

v\$SGAINFO

DISK

v\$DATAFILE

v\$FILESTAT

v\$LOG

v\$LOG_HISTORY

v\$DBFILE

v\$TEMPFILE

v\$TEMPSEG_USAGE

Contention

v\$LOCK

v\$UNDOSTAT

v\$WAITSTAT

v\$LATCH

STATISTICS

v\$EVENT_NAME

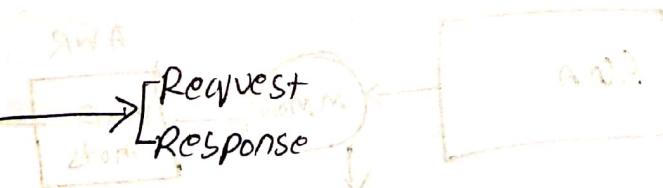
v\$SYSSTAT

v\$SGASTAT

Monitoring Sessions:- See Monitor Session

* v\$SESSION

* v\$SESSION_EVENT



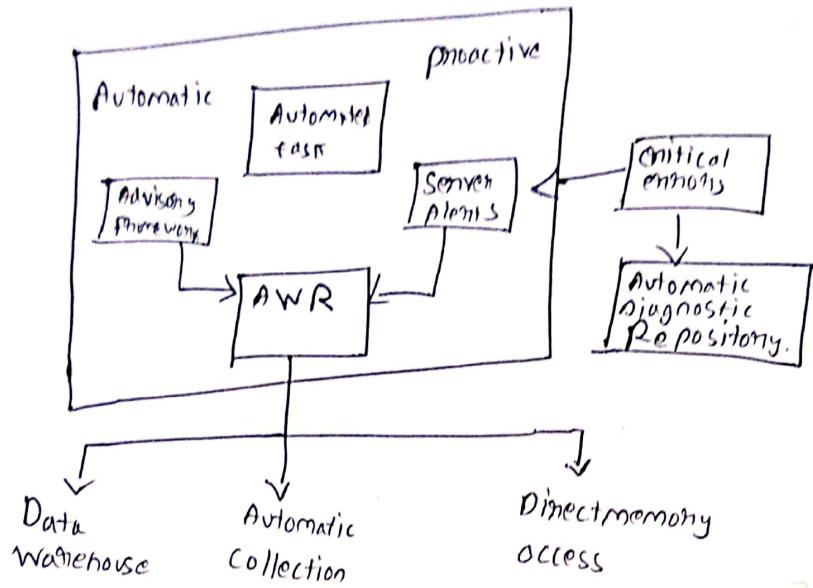
Monitoring Services:

DBMS_Service.Create_Service.

v\$service_wait_class

v\$service_event.

Database Maintenance:



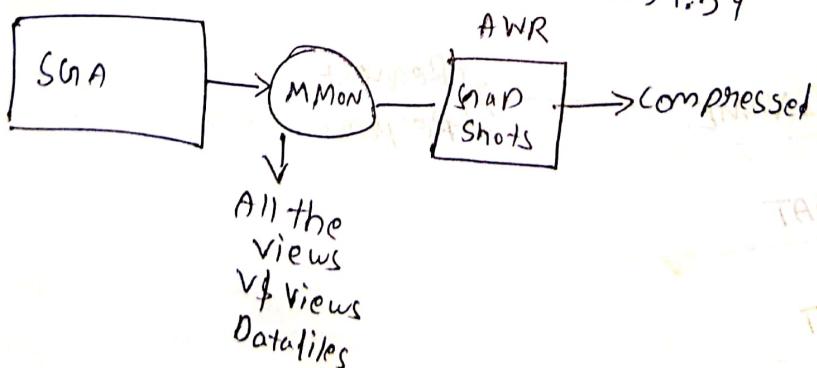
AWR

→ SYSAUX

→ Performance Information

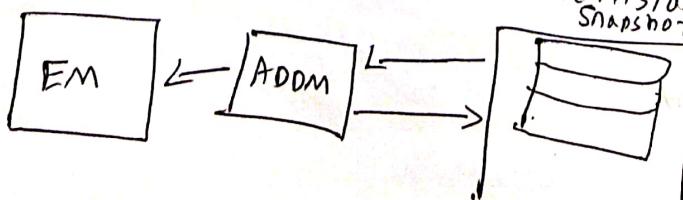
→ Every 60 minutes and retained for eight days

8:59:59



ADDM

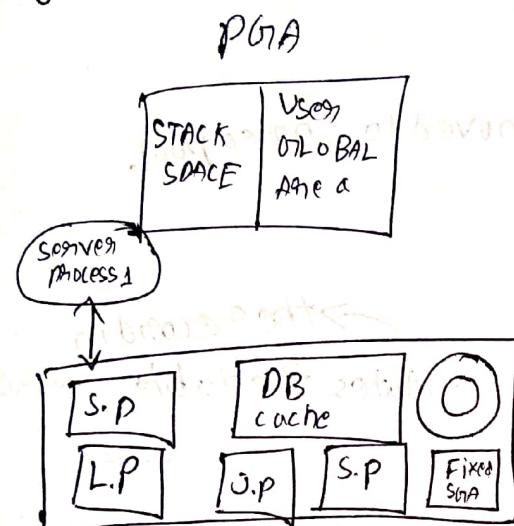
→ Runs after each snapshot. → Monitors the instance snapshots.



Performance Tuning

- System health and OS Statistics
- Top Down Approach → Design, Application, DB instance
- Tune Areas
 - ↳ Repeated

Managing Memory Components:-



Automatic Shared Memory Management

→ Changes size of Blocks Like DBcache, Shared pool frequently.

MMAN → Separate pools
MMON

SGA_Target

SGA_Max_Size

Automatic Memory Management

↳ One Pools

ALTER SYSTEM SET MEMORY_TARGET = 800M;

V\$MEMORY_DYNAMIC_COMPONENTS

V\$MEMORY_RESIZE_OPS

V\$MEMORY_TARGET_ADVICE

→ dynamic memory parameters

In 12.2

↳ Every PDB can be provided separate memory usages:

UGA

private SQL	cursor and SQL	session memory	work area
----------------	----------------------	-------------------	--------------

In Shared UGAs moved to Shared pool.

RESOLVING LOCK ISSUES

- * Lock occurs when someone updates the table and doesn't issue Commit.

Kill → is the only option

→ alter system kill session
↳ blocking session
↳ number
↳ name

SQL TUNING

→ Identify poorly tuned SQL statements

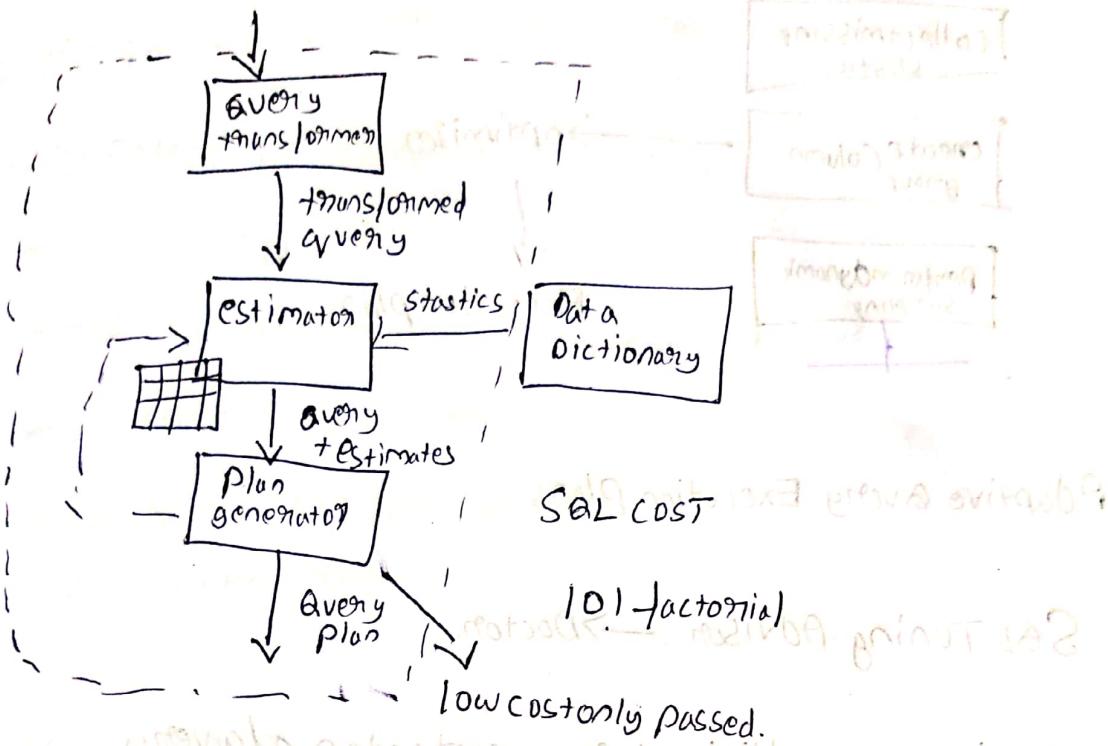
→ Tune the individual statements

→ Tune the application as a whole

SQL using more resources than needed → poorly tuned SQL

Identify the mostly used SQL statements sub-program & V

Oracle Optimizer



Where clause

↳ Important.

PBA_INDEXES

USER_INDEXES

Optimizer Statistics:-

DBMS_STATS → optimizer statistics
 package Database collects data automatically

STATISTICS COLLECTION

↳ during maintenance window

DYNAMIC STATISTICS COLLECTION

DBMS_STATS.GATHER_*_STATS

↳ Gather statistics

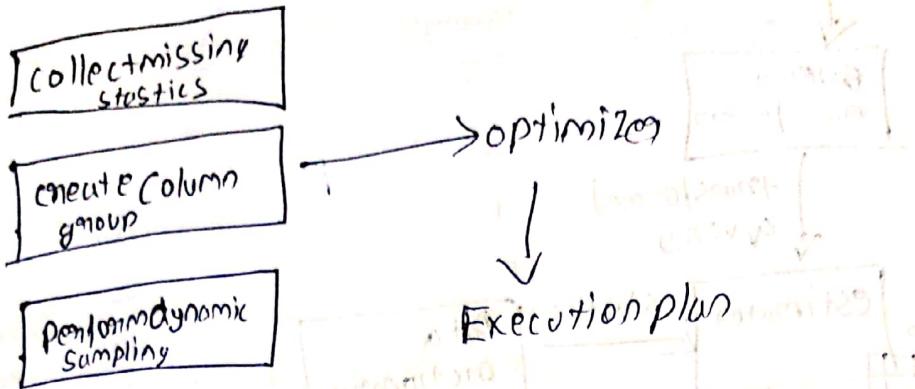
SET_*_PREFS → SYS or SYSTEM

DBA_TAB_STAT_PREFS → object-level

DBMS_STATS.GET_PREFS

ADVISOR → provides advise.

PLAN Directive

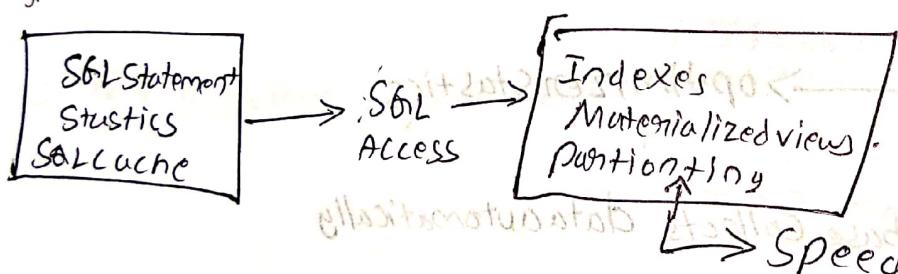


Adaptive Query Execution Plans

SQL Tuning Advisor → Doctor.

profile → additional component on top of query

SQL Access Advisor

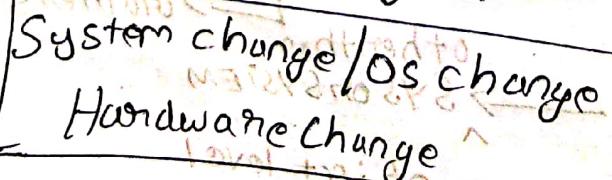


Materialized view → execute query and store it in view.

↳ table refreshed on periodic basis

SQL Performance Analyzer

↳ System changes.



SQL TUNING

(to) Inside OEM

→ Select performance

→ SQL ID

→ We will see the cost under anything.

→ Tune SQL statement.

→ View the recommendation

→ Implement plan

SQL tuning Advisor

→ Plan using SQL profile

→ alter system flush shared_pool;

→ alter system flush buffer_cache;

OPTIMIZER ADVISOR:-

First Download and run the optimizer scripts.

\$user_advisor_tasks.

user_advisor_executions

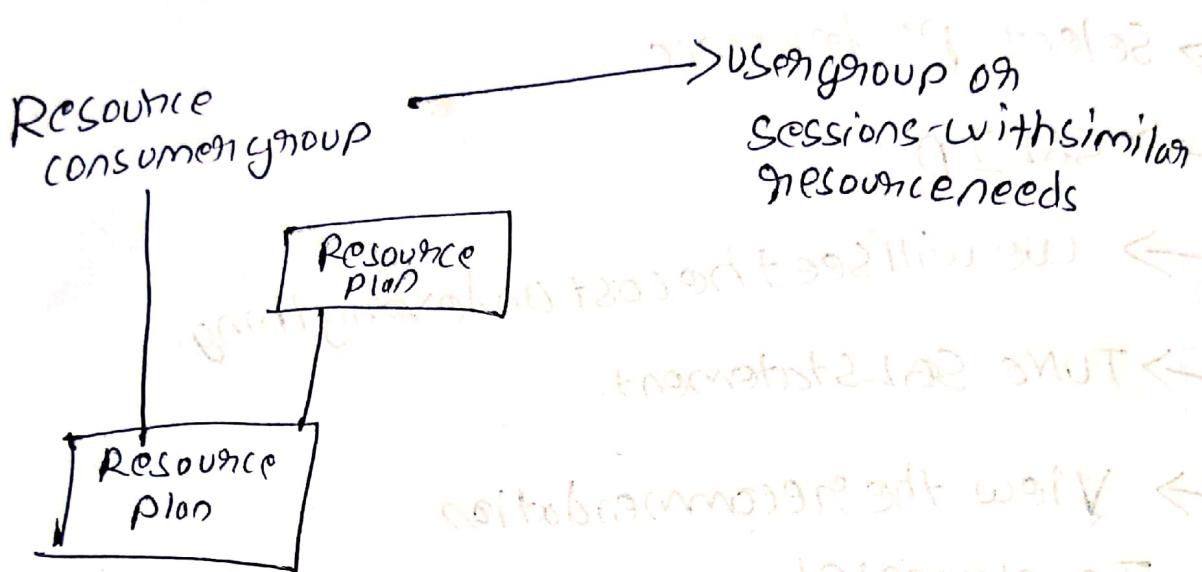
Run the scripts and it will take care

Finally drop

exec dbms_stats.drop_advisor_task('my advisor');

Database Resource Manager.

Control the allocation of Resources to users.



Types

- CPU Method.
- Degree of parallelism
- Undo pool
- Execution Time limit
- Idle Time limit

Creating a simple Resource plan

Consumergroup Level1 Level2 Level3

SYSGROUP

Engine resource settings for the log file

Limits CPU Utilization at Server Level.
Redistributes to Services with Program

* Partitioning Approach

* Over-provisioning Approach.

viewing Resource Management.

* DBA-RSRC-PLANS

* DBA-RSRC - PLAN-DIRECTIVES

* Avoid excessive usage of PGA

* Set a Limit on PGA on every Session.

Run the Script.

Select plan from cdb-cdb_rsrc_plans

alter system set resource_manager_plan = fairplan;

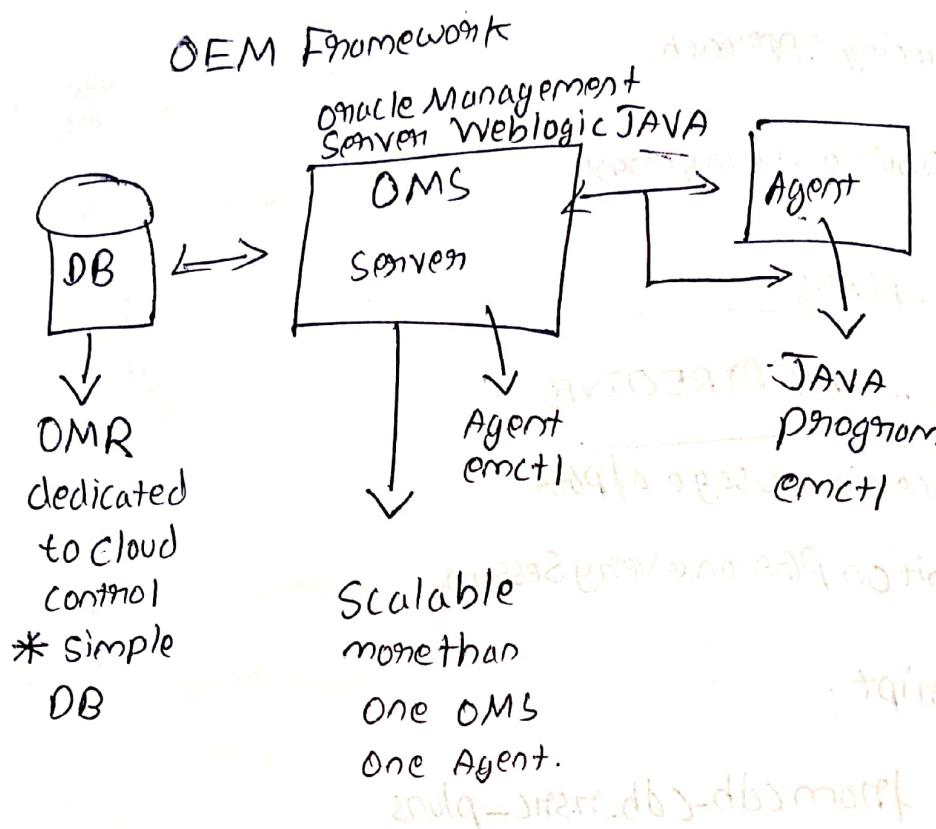
AVOIDING EXCESSIVE PGA USAGE:

→ Execute Scripts.

→ Activate the PGA Plan. Set as target or

Enterprise Manager Cloud Control

- * Manage all the services of the Database.



To start the cloud control

- Start OMR listener
- Start OMR DB
- Start Oracle Management Server
- Start the agent on the OMS server
- Start the agents on particular DB's

To stop the cloud control

- Stop the managed server
- Stop the agent on the OMS server
- Stop OMS
- Stop the OMR

Installation of OEM:-

Login in as
→ Sysman

→ Hosts → Configuration

→ Registering a Oracle Database In OEM

→ Setup → Add targets Manually



Install Agent on Host.

Add

→ Hostname → Next

→ Directory.

+ → Credential

Run privilege

Sudo - Root

→ Next

Deploy Agent.

Setup

→ Targets

→ Databases

→ Search List.

→ + Add

→ Oracle Database

→ Next

→ Test Connection

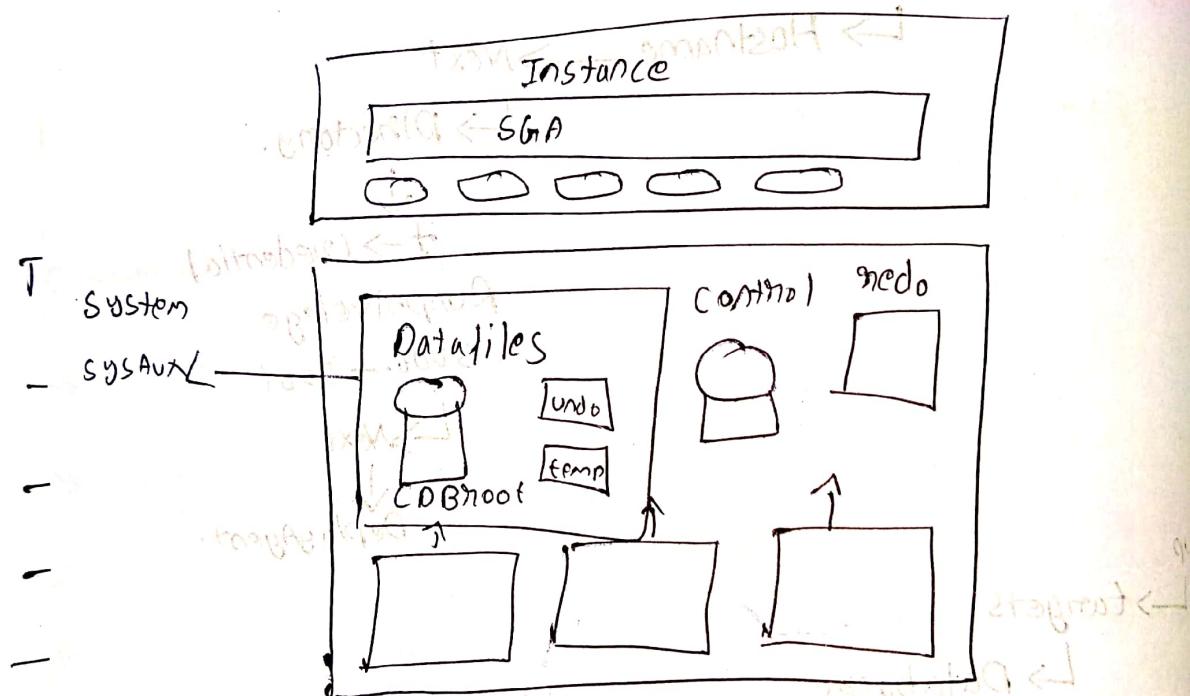
→ Next

→ Save.

USING ADDM:

- * ∇ → views can be used
- Login to Performance HUB as SYS user
- ↳ Run ADDM
- ↳ Analysis section

CONTAINER DATABASE BASICS:-



- CDB System tablespace → **bdatashares**
 - BG process
 - memory
 - Oracle metadata
 - Redolog files
 - Control files
 - Undo tablespace.
- PDB points to

Containers:-

→ v\$containers

CDBroot

→ all in the root

PDB → 4000

→ Application data

→ seed from which new PDB created

Data Dictionary Views:-

→ CDB_P dbs → All PDBs within CDB

→ CDB_tablespaces → All tablespaces within CDB

→ CDB_USERS → All users within CDB.

CDB_XXX → All PDBs

DBA_XXX → All objects

ALL_XXX → Current user

USER_XXX → Objects by current user.

→ DBA, CDB_DBA, PDB_DBA

↳ different DBA users.

OEM on CDB:-

* emctl stop oms -all -force
emctl start oms

Setup → Add Targets → Add Targets Manually.

Add Non-Host Targets

Search Select

Create Credentials:-

Settings Security → named credentials.

→ to access all the DB's through OEM.

OEM Express

→ check the port

→ activate the port

- Creating ACDB

→ pfile → enable_pluggable_database to true.

→ Instance

→ CDB

→ Catalog, catproc → Oracle packages

Script:-

→ Create Database CDB\$

Logfile group 1 (' ', ' ') size 100M

Character Set

System Datapfile

default Temporary Tablespace

Tempfile ' ' size 20M

undo Tablespace Undotbs

Datapfile ' ' size 200M

Seed File_Name_Convert=(' ', ' ')

CDB Root → container ID → 1

CDBseed → container ID → 2

DBA-tablespaces

DBA-datafiles

DBA-tables

DBA-users.

CDB-pdbs

CDB-tablespaces

CDB-data-files

CDB-users

V\$bh

V\$Locked_object;

ADR:-

V\$DIAG_INFO;

ADRCI

ADR → alert.log file.

New PDB from PDB\$seed

→ copies datafiles from PDB\$seed

→ creates tablespaces SYSTEM, SYSAUX, UNDO

→ Create common users

→ SYS

→ SYSTEM

→ PDB-DBA role

*SQL script

Create pluggable DataBase PDB1

ADMIN user identified by P1.ROLE=CONNECT

FILE_NAME_CONVERT = ('PDB\$SEEDdir', 'PDB1dir');

Without FILE_NAME_CONVERT

USEOMF= DB_CREATE_FILE_DEST= ?

OR in pfile

PDB_FILE_NAME_CONVERT= ?

services:-

Select name, con_id from v\$services;

Select open_mode from v\$pdbs;

cdb-temp-files.

cdb-users.

cdb-roles.

SYS_PRIVS

TAB_PRIVS

ROLL_PRIVS

Create CDB using DBCA in silent Installation.
using DBCA

Create APDB:-

Use query in Documentation

Or use SQL Developer

Applications PDB:-

→ Regular PDB - is a PDB within a CDB

→ Application Root .

↓
Application PDB's
optional seeds.

Application PDB

↓
12.2

Creating an Application PDB

- 1) COB1 → connect
- 2) Create pluggable Database — as Application Container
- 3/ optionally can create PDB-APP1

Application Name and Version

DBA_Applications

DBA_App-Versions

DBA_App-PATCHES.

Installing Applications

→ Alter PDB —

Begin Install '4.1'

→ @scripts

→ .EndInstall '4.1'

→ Alter PDB Application —

→ 'SYNC;

→ Synchronization is always needed.

Begin Upgrade

'4.0 to '4.1';

Types of Application Container

→ pure SaaS

→ Hybrid SaaS

→ Logical DW

Partition is needed for Application Databases.

Container MAP:

→ Create table tab1 (region, —);
→ Create table tab2 (region —);

Create table .app1.app-map (→)
partition by List(region)

(partition NA values (—, —, —));

Container Default

↳ Select empno
From container1s(emp)
where CON_ID=6;

Container - Map

↳ Automatically
directs

proxy PDB

↳ Link DB link
to Application
root.

Container Map is used

no need of container Default.

PDB Creation:-

Cloning Regular PDB

- 1) Configure the file using `PDB_FILE_NAME_CONVERT`
- 2) Connect to the CDB root.
→ Create pluggable Database `pdb3 from pdb1`
`Create_FILE_DEST = 'PDB3dir';`

Cloning Application container:-

- 1) Clone the application root
- 2) Then clone all the application PDBs.

plugging a NonCDB into CDB as a pluggable

- Datapump
- Plugging (XML)
- Cloning
- Replication.

NONCDB into PDB

- 1) Open ORCL in Read only mode
- 2) Exec `DBMS_PDB.Describe('/tmp/orcl.xml')`
- 3) Connect to Root
- 4) Create pluggable Database `PDB2` using `'/tmp/orcl.xml'`
- 5) Connect `SYS@PDB2` as `sysdba`.
→ Run `noncdb_to_pdb` script
- 6) Open `PDB2`

Replicating NonCDB into CDB

- Create Pluggable Database
- Create New PDB2
- Open PDB2 in ReadWriterMode
- Configure Unidirectional Replication Environment from ORCL to PDB2
- Check Application Data

Cloning a Non-CDB on Remote PDB

- 1) Set ORCL in Read-only mode
- 2) Create Database Link link-orcl Connect to System identified by sys, using 'ORCL';
- 3) Create Pluggable Database PDB-ORCL from Non-CDB @ link-orcl
Create_File_Dest = L...
- 7) Run noncdb2pbb.sql
- 5) open

Plugging and Unplugging

- 1) Connect to CDB Root
→ Unplugging
- 2) Verify that PDB1 is closed
- 3) Alter pluggable Database PDB1 unplug into 'xmlfile1'
- 4) Drop PDB1 from CDB1

Plug

- 1) Connect to CDB
- 2) Use DBMS_PDB to check compatibility
- 3) Create pluggable Database PDB1 using 'XMLFILE' 'NOCOPY'
- 4) Open PDB1

Flow

- AS-clone → generates new DBID.
- SOURCE-FILE-NAME-CONVERT → XML files accurately located
- COPY to copy files to new location
Move to move them
No copy, copy is the default.
- STORAGE to specify storage.

Plugging Using Archive files:

- Unplugging a PDB
 - XML file → Alter pluggable Database pdb1
 - Datafiles. → UNPLUG INTO _____ .Pdb'
- * Plugging the PDB requires Archive

Create pluggable Database pdb_new
using / _____ .Pdb'

* Converting Regular PDB's to Application PDB's.

- 2 methods
- Clone the regular PDB into application root
- Unplug the regular PDB to plug into application
- pdb-to-appdb.sql

unplug

Encrypt using "tpwd1";

de-encrypt using "tpwd1";

plug

keystone identified by _____

Decrypt using "tpwd1";

UNDO MODES:-

Shared v/s Local

↓
Default

→ used for

* Hot cloning

* Near zero downtime PDB relocation

→ Startup upgrade

→ Alter Database Local undo on;

Incremental Refreshing

* Manual

* Automatic

Cloning In Hotmode

→ Local undo on

PROXY

→ DBLink

AS PROXY

→ Clone

Same Steps

extra

Near Zero Downtime

Archive log mode

→ Create pluggable Database with RELOCATE Clause

Proxy PDB:- Query Across CDB's proxying Root Replica.

CDB\$seed, ApplicationSeed

↓
Cannot
be
dropped

Source PDB after relocation dropped.

Learn on —

Create public DatabaseLink link_toys_noct Connect to system, identified by oracle_4u using '—';
↳ tnsnames.

Connection:

Listener is used to connect to CDB and PDB.

Every PDB as a default service

→ Connect System@PDBtest as sysdba

→ local_user1@hostName:1525/PDBHR

→ CommonUser2@PDBdev

Two ways to switch connection:

* Connect localUser@PDBdev

* Alter Session Statement

Connect sys@PDBtest as

Alter Session Set Container = ;

Creating Services:

Exec DBMS_Service.Create Service('_____,_____)' create2 create A

Exec DBMS_Service.Start Service('_____,_____)' start2 start A

Renaming Services:

→ Creating Pluggable Database pdb1 -- From Pdb1@link-node create1 create A

Service_NAME_CONVERT = ('_____,_____)' create1 create A

Opening CDB at some_node@some_node Addressing with open1 open A

↳ Similar to NCDB.

→ Open

but PDB's still not open; open2 open A

CDB Seed in Readonly readonly A

alter pluggable Database all open; alter1 alter A

Save state; state1 state A → Crash, will be in

→ alter pluggable Database pdb1 Save State; same state A

→ Alter pluggable Database pdb1 Discard State;

→ Alter pluggable Database ALL except .pdb1, .pdb2 Close;

→ Alter pluggable Database open Restricted;

→ Alter pluggable Database ALL open Readonly;

→ Alter pluggable Database Datafile '_____1' online;

→ Alter pluggable Database Storage (Maxsize 2G);

* A single SPFILE per CDB

Alter System Flush Shared_Pool

Alter System flush Buffer_Cache

Alter System enable/disable Restricted Session

Alter System Kill Session

Alter Pluggable Database Container Host =

Alter pluggable Database Container Port =

Alter pluggable Database Rename Global_Name to pdb3_cdb2;

STORAGE:-

Creating Permanent tablespace.

Create Tablespace tbs_CDB_Users Datfile

Size 100M;

Alter Database Default Tablespace tbs_CDB_Users;

Alter Database Default temporary Tablespace loca_temp;

Alter user Default Tablespace

Creating Common Users:

Create profile container=ALL;

Alter table app.t1 enable container_data;

Alter user u1 set container_data=

(, ,)

For app.t1 container=current;

Restricting Operations with PDB Lockdown Profile:

PDB-Lockdown =

lock-profile2

↓
Restrictions on a PDB User.

→ AUDIT POLICY

→ NOAUDIT POLICY

Data Vault Two Modes

→ Common

→ Strict.

[Data Vault] : [Enforceable] = Inheritable

→ If [Enforceable] = Not inheritable → (Common)

* Common users:

* Cdb-users;

Common user start with C##

Container=ALL;

Container=Current;

dba_roles → all roles

Session_roles → to view all the roles.

while performing any operation we have to use in upgrade mode.

PDB Lockdown profiles

→ to prevent users from using container commands inside PDB.

Alter Lockdown Profile alter-flush Disable

Statement = [alter system]; clause = [set];

Create Lockdown profile

Enabling Auditing:-

- 1) Shutdown the database.
run the Audit script.
- 2) Create Audit policy user_toys-pol
privileges Select any table Actions logon
contains all;
- 3) Audit Policy user_toys-pol;
Exec dbms_audit_mgmt

No Audit Policy

BACKUP, RECOVERY AND FLASHBACK:-

- Backup Database;
 - Recover Database;
 - BACKUP Pluggable Database "CDB\$ROOT"
 - Backup Tablespace Sales-Pdb:tbs2;
 - Restore Tablespace System;
- contains Database
- Control file → AutoBackup ON;

Instance Failure:-

- PDB recovery is impossible
 - Connect to the CDB → Temp file
 - Open the CDB root
 - Open all PDB's.
- automatic file creation possible.

System or Undo Tablespace Recovery:-

→ shutdown Abort

→ Restore Database

→ Recover Database.

Non System Recovery

→ put the tablespace offline

→ Alter tablespace tbs2 offline immediate;

→ Alter tablespace tbs2 online;

↳ use repair command.

Point in Time Recovery:-

Run

{

"Tns[1]" established connection to (DESCRIPTION={ADDRESS=(PROTOCOL=TCP)(HOST=192.168.1.10)(PORT=1521)})

Set until SCN = 1851648;

Restore pluggable Database pdb2_1;

Recover pluggable Database pdb2_2;

Auxiliary Destination = /u01/app/oracle/oradata/pdb2_1

}

Duplicate Database:-

Duplicate Database To cdb\$1 pluggable Database pdb1;

Block Corruption!

Validate Database;

(DB and PDB Flashback)

- Startup Mount;
- Alter Database Archivelog;
- Alter Database Open;
- Alter System Set DB_Flashback_Retention
Target=2880 Scope=Both;
- Alter Database Flashback On;

.. performing Flashback:-

- Flashback pluggable Database pdb1 to SCN 411010;
- Alter pluggable Database pdb1 Open Resetlogs;

Creating Restorepoint:

- Create Clean Restore point Step 1 For pluggable Database pdb1
Guarantee Flashback Database;

RMAN> List Failure; → ALL

→ Advice Failure; → ALL

→ Repair Failure preview; → ALL

→ Repair Failure; → ALL

→ Delete obsolete

↳ Delete invalid.

move datafile tablespace offline;

~~Open~~

Restore tablespace;

Recover tablespace;

Flushback pluggable Database upto SCN to Restonpoint;

Performance Tuning:-

→ SGA-TARGET

→ SGA-TARGET

→ SGA-MIN-SIZE

→ DB-CACHE-SIZE

→ SHARED-POOL-SIZE

→ PGA-TARGET

→ PGA-PAGEREGATE-TARGET

→ PGA-PAGEREGATE-LIMIT

AWR / ADDM

PDB
level

CDB
LEVEL

AWR Views:-

→ Select * from dba.Views where view.name like '%/AWR%';

Query Degree of parallelism:-

A User session Set contains - parallel_degree = 12;

Default → (4).

HeatMap and ADO Support: Automatic Data optimization.

→ ADO policies automatically compress data

→ ADO policies automatically move segments

→ Heat-Map = ON

If table not used for 3 days we can compress.

* performance Monitoring:-

* ADDM Recommendations.

Cloud control

↳ performance Home.

↳ Run ADDM Now

↳ View Report.

ADD

Benefits

SQL Tuning and Monitoring:-

→ Database express

↳ Set separate point for PDB.

→ performance HUB

↳ Monitor SQL

↳ click on SQL ID.

↳ Select It.

↳ Click Tune SQL

↳ Implement.

↳ check SQL plan

Settings on

DBA_stats_gather

↳ applies the best plan to all SQL's.

PLAN

profile₁

profile₂

RESOURCE ALLOCATION:-

Strategy

- ALLOW ALL PLUGABLES TO USE MAXIMUM RESOURCE
- ALLOW to use Minimum Resource
- ALLOW to use available Resource.

→ Create CDB-PLAN

→ UPDATE CDB-PLAN

→ DELETE CDB-PLAN

→ UPDATE CDB-PLAN-DIRECTIVE

1) Create a plan

set resource_manager_plan='HR_PLAN';

2) Alter System set resource_manager_plan='HR_PLAN';

where con_id=1;

3) Select name from v\$session_plan where con_id=1;

db_Performance_profile='prof_low'

4) Alter System set db_Performance_profile='prof_low'

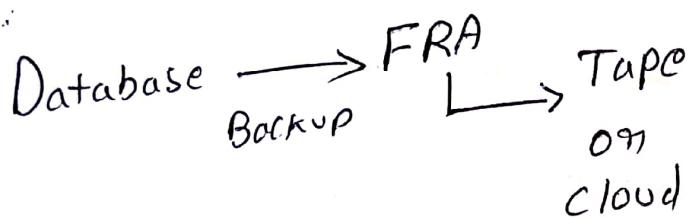
BACKUP AND RECOVERY

Don't Bother Asking

→ Oracle Secure Backup

- ↳ entire System.
- ↳ OS level files

Rman → 9



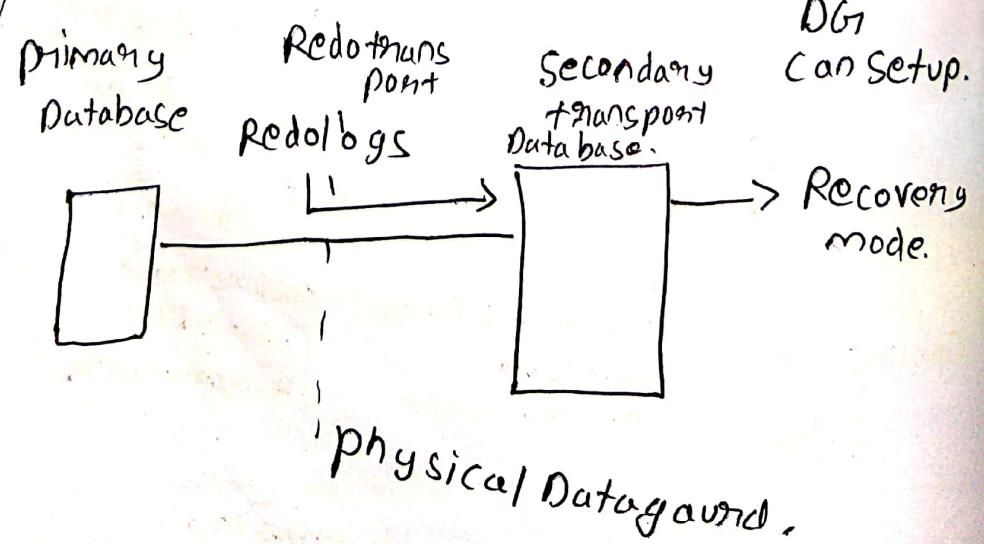
disk → encrypted

tape → not encrypted.

OSB

↳ Oracle Secure Backup
cloud module.

Data guard overview → 30



Active Datagaurd → Standby database in which we can query.

- ↳ Read-only mode

- ↳ allows to query.

Logical standby Architecture:

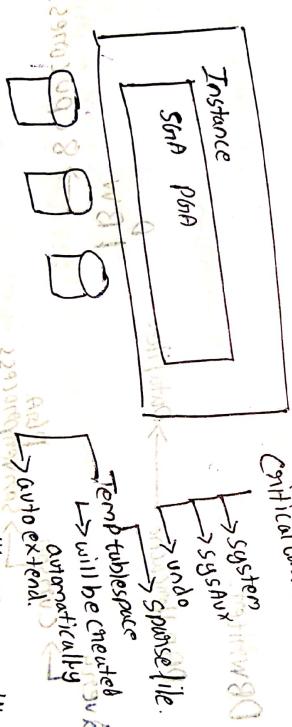
- take SAW statements from Redolog and apply them to the standby database.
- used to store Backup information.

Oracle Maximum Availability Architecture.

- Catalog database
- ↳ used to store Backup information.

Select log-node from v\$database;

Critical tablespaces



- headers → Backup parameter file
- Controlfile → timestamp → location of datafiles 369 → parameters, location
- ↳ Block size 16KB.

- ORA 600 → dangerous error.
- Oracle error codes: 200000 → ORA-00001

T → Tablespace

S → Segments

E → Extents

B → Blocks

Oracle restart

→ manages all the process.

Pmon

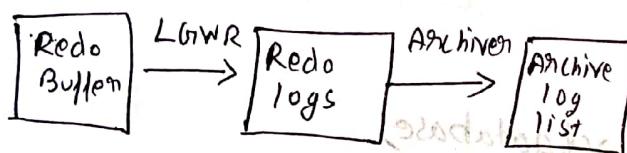
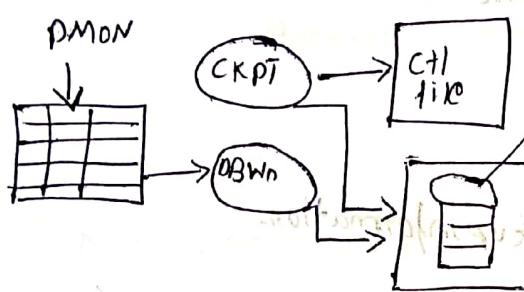
bad gentle

kill off statements (no 3rd)

→ crime scene kill off statements (no 3rd)

→ cleans all failed process.

Oracle processes:



DBWriter

DB Buffer Cache

Cursor

PGA

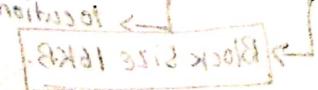
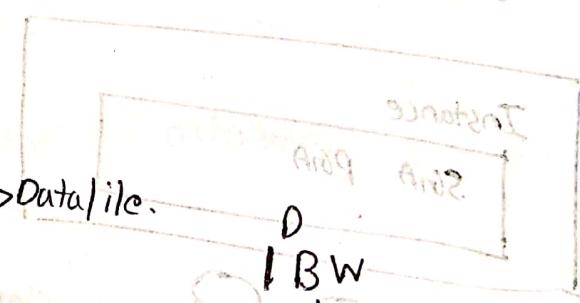
Sort Process

→ 8 CPU cores.

Logwriter

Log Buffer → online redologs.

↓
1/3, 3 seconds



checkpoint

- ↳ header of datalike Ctl file
- ↳ SCN number is written.
- ↳ synchronization number.

SMON

- ↳ performs system when it starts up
- ↳ cleans the temp
- checks the SCN of controlfile and Datafiles
- syncs (Both SCN same Starts UP)

UET\$

- ↳ used extent tablespace

FET\$

- ↳ free extent tablespace.

PMON

- ↳ pulling network cable from computer
- ↳ pmon runs deletes the dirty Data.

Archiving process

- ↳ Redologs to Archives.

Archive log switch

↳ creates a new Archivelog file.

No Archive Mode

- ↳ Shut the Database and take the Backup.

Archive log Mode

- ↳ Testing, Training
- ↳ production.

Starting Oracle restart with → **CRSCTL**

SRVCTL stop database -d ORCL -o abort.

ASMcmd → for All ASM tasks.

SYSBACKUP

↳ only for Backups.

→ used to do unarchived backups

RMAN

- connect target / A local instance will not work.
- Backup Database; → Archive log mode.
- LIST BACKUP;
- Delete obsolete;

Using SQL in RMAN

- Execute SQL and PL/SQL commands
- Describe catalog Schema.table @ DBLINK;
- RMAN>show all; → shows all registered configurations
↳ all configurations.

To show the Oracle error description:-

ORA-19602.

- recover Database;
- drop tablespace including contents and datafiles;

RMAN COMMANDS:-

→ standalone

→ Job command

 ↳ inside Run block

 ↳ ex:- allocate channel

Run

Allocate channel C1 Device type Disk

Format "/disk 2/p001";

Backup as Backupset Database;

Sql 'alter system archive log current';

3

↳ Reduces Redolog without
Bringing it down.

Viewing Settings:-

→ v\$RMAN_Configuration

→ Showall;

Configure AutoBackup ON; → always Set ON

Specifying a Retention Policy:-

→ Recoverywindow:-

→ Redundancy policy

 ↳ Number of Backups

FASTRECOVERY AREA

 ↳ Both permanent and transient items.

 → DB_Recovery_File_Nest

FRA can be

shared by

multiple databases.

 → DB_Recovery_File_Nest_Size

Flashback logs:-

Redo rate \times Flashback retention $\times 2$

FRA

↳ is auto managed

alter database backup controlfile to trace;

V\$ Diag_info.

Always maintain multiple copy of CTL files and Redolog files.

I) loose Redo-log all in a group DB crashes.

→ archive log enabling

Backup optimization

↳ what to

→ mount

Backup

→ alter database archive log;

multiple database subscribe

Set MLS parameters = → for setting Date.

multiple names for

Rman > report schema

↳ Shows structure of db.

→ backup tablespace USERS;

Sequence

0/0 0/0 0/0

↳ reset

→ asmcmd

IS + Data/orcl/control file

→ alter system set control files =

Scopes=spfile;

editions=

2020-07-01 10:00:00

→ restore controlfile from

2020-07-01 10:00:00

2020-07-01 10:00:00

?MAN Catalog Configuration:-

& control file

- Recovery Catalog → Backup of Control files.
- Replicates control file data.
- Holds large amount of information
- multiple databases.
- Datagaurd → Catalog is important.

Steps

- Create database
- Catalog owner
- Create Catalog.

Considerations:-

- Number of databases supported
- Number of archives and redo's.
- Use of RMAN scripts

SQL> Create tablespace gicat_ts Datafile size 15M;

Create user identified by

Temporary tablespace temp

Default tablespace gicat_ts

Quota unlimited on gicat_ts;

→ Grant recovery_catalog_owner to ;

Now connect to the catalog Database;

Rman → Connect Catalog / @ tns_names.ora

Rman → Create Catalog... X

Registering a Database:

→ rman target /catalog
username/password@net-service-name

Rman > register Database.

Rman > unregister Database.

Catalog database address.

in the form

source which contains
catalog needs to be
(created).

Resynchronization:-

→ Partial
↳ only datafiles, Backups

→ Full
↳ Control file Snapshot

Manual resyncing the catalog:-

Rman
* Resync Catalog

Using Rman stored Scripts

→ Local script

→ Global script

↳ keyword global. If local script is present then global script

Create global Script Script_name from file '_____';

print script Script_name;

Recovery Catalog Database

↳ Use controlfile to take Backup;

Virtual Private Catalog

↳ Partitioned catalog.

→ Grant Catalog for Database prod_1 to vpc_1;

→ Create Virtual catalog.

OEM
↳ TARGET
↳ Recovery Catalog database.

BACKUP STRATEGIES:-

RMAN is a Binary with API.

Backup Methods

→ FULL

→ Incremental.

→ online

→ offline

→ incremental level 0: Full Backup

no SCN
tracking.

→ incremental level 1

↳ differential → only changed blocks

↳ cumulative.

all the changed blocks,
including previously
changed Backup.

Restore

↳ Full database Backup.

RMAN

Recover

↳ Apply incremental Backup

↳ online.
↳ offline.

Full on Sunday

Incremental on one day

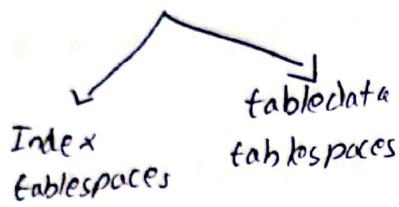
Cumulative on another day.

Backup- Readonly tablespaces:-

* skip read-only.

↳ gman skips read-only tablespaces

. tablespaces



Backup types:-

→ Image file copies

→ Backup Sets.

↳ made up of Backup pieces.

Creating Backupsets:-

→ Backup as Backupset

→ Format '1/Backup/d|-o|d|-o|s|-o|op. bus'

→ Tablespace hr-data.

Creating Image copies

→ Backup as copy Datafile'

→ Backup as copy Archivelog

→ Image copies are Bit-by-Bit copies as Datafiles.

Types

- Full Backup
- Incremental
- Cumulative level 1
- Differential level 1
- Fast Incremental Backup

↳ log file will be in system (changes will be recorded in the backup)

↳ When performing Backup need log file.

Alter Database enable/Disable Block Change Tracking.

RMAN COMMANDS:

- LIST → all Backups
- REPORT → analysis of Database
- REPORT NEEDBACKUP
- REPORT ABSTOLETE.

V\$ Backup_Set

V\$ Backup_Piece

V\$ Datafile_Copy

V\$ Backup_Files

Cross checking and Deleting

- Cross Check → checks the status of Backups.
- Delete expired → outside Window → Do Backup.
- Delete Obsolete. → cannot be recovered.

alter database
incremental backup enable block change tracking;

run {

allocate channel "ch1" device type disk format '/u01/backups/
oncl/u01/'

Backup as copy tag 'Base01' incremental level 0 database;

3

incremental level 0 database;

recover copy of database with tag 'Base01';

Delete obsolete..

Crosscheck datafilecopy all;

Compression Algorithm:-

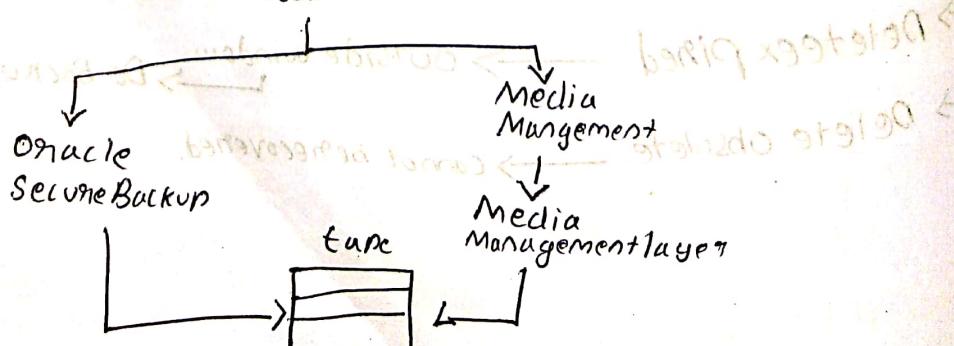
* Configure compression algorithm!

Advanced compression

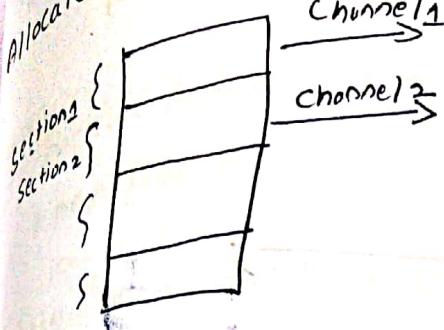
↳ Both tape and disk.

Using a Media Manager

Rman → Session
Session → Oracle Secure Backup



Allocate channels.



Multisession Backup:-

Backup Datafile 5 Section size = 25M TAB 'Section 25mb';

Creating Backup Copies:-

Backup as Backupset Device type sbt

Copies 2

Incremental level 0 Database;

Creating Backup of Backupset:-

→ Backup Device — Backupset all; readonly=0 init=1

Archive Backups:-

→ keep Clause specifies till what time Backup should be.

Connect target /

Connect catalog vman/vman@ catdb.

Change Backup Tag '_____'

keep forever;

NoKeep

→ Don't keep.

Backup FRA:-

Backup Recovery Area.

Backup Recovery files.

→ Alter Database Backup control file to trace;

↳ Always perform this command.

RMAN:-

Catalog Archivelog';

Catalog Start with _____;

Backing up ASM Diskgroup

ASMCMD

→ md-backup _____;

→ md-backup -G data.

Backing up controlfile:-

→ Alter database backup controlfile to _____;

alter database backup controlfile to trace;

as _____;

Setting Archivelog Backup:-

Run

{

allocate channel "ch" device type disk format

'/u01/backup/orcl/0001'

backup Archive log all delete all input;

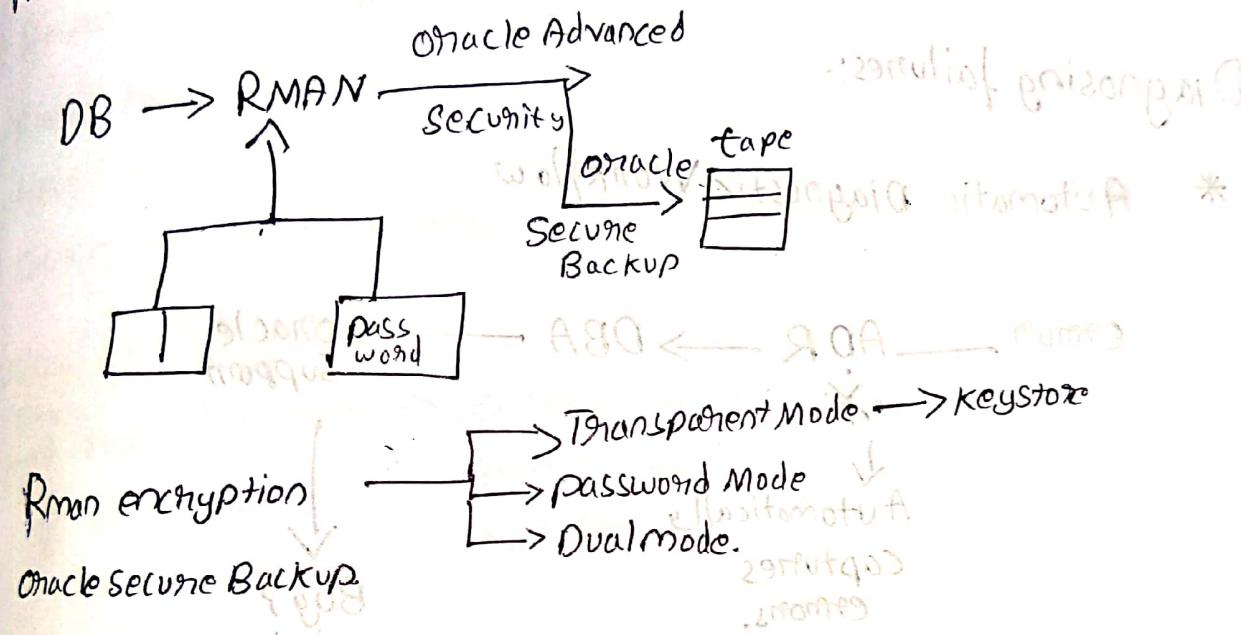
}

ASMCMD>

md-backup | ——| —

RMAN
Backup database Format '/vol/backup/o/out' tag keep-db-tag
keep forever.

RMAN Encrypted Backups:-



TDE

↳ Transparent Data Encryption.

1) Create a directory

2) Keystore in sqlnet.ora

encrypt_wallet_location=

(source=

(Method=File)

(Method-data=

(Directory=

3) Login

4) (Create Software Keystore file)

5) Open software

6) Create Master encryption keystore.

1) Configure Oracle Encryption

for Database on

2) Configure encryption

for tablespace

3) Set encryption algorithm.

Set encryption on identified

by only.

Dual mode

soft-espice ✓

* V\$RMAN_ENCRYPTION

Creating encrypted Backup:-

* USE OEM

↳ Use the encryption

Diagnosing failures:-

* Automatic Diagnostic Workflow

error → ADR → DBA

Automatically
captures
errors.

RMAN → 80



Bug?

patch → DBA

A → Audit dump

B → Background Dump

C → Core Dump

OracleBase → Diag → RDBMS.

Sid

(V11.7 = bottom)

(V10.2 = bottom)

(V9.2 = bottom)

Alert log, core dump, trace

trace

log

log

✓

Alert + login
XML

V\$Diag-info

ADR command Line

→ ADRCI

↳ Show Alert.

↳ Show incident.

Version 9.2.0.1.0 - 18

Version 9.2.0.1.0 - 18

Version 9.2.0.1.0 - 18

RMAN outputs can be viewed at:-

* RMAN Command output

* RMAN trace file

* Alert log

* Stdio.log file. → inside trace

using DEBUG option

Rman → run {

debug on

allocate channel

debug off

}

→ USE Very Carefully

generates lot
of outputs.

RMAN ERROR STACKS:-

→ always read from Bottom.

Data Recovery Advisor:-

- List Failure → ALL, Critical, High, Low
- Advise Failure → generates repair script.
- Report Failure → preview
- Perform productive checks.
- Change Failure. → status of failures.

V\$IR_FAILURE

V\$IR_MANUAL_CHECKLIST

Block CORRUPTION:-

ORA - 01578:

↳ Data block corrupted.

RMAN → RECOVER BLOCK;

V\$ DATABASE_BLOCK_CORRUPTION.

Must be in Archive log mode.

RECOVER DATAFILE 6 BLOCK 3;

RECOVER CORRUPTION LIST;

VALIDATE → checks for corruption.

Database Recovery:-

Physical Failure

- Data Recovery Advisor
- Data File Media Recovery
- Block Recovery.

Logical Failure (User or Application)

→ Flashback

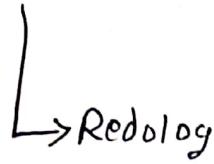
→ Point in Time Recovery

→ Database point in Time Recovery

→ Tablespace point in Time Recovery

→ Table point in Time Recovery

Positioning and Recovering



After restore nothing will be in sync
so recovery and apply Redologs.

Restoring Tablespace:-

→ Alter database ————— offline immediate;

→ Restore tablespace —————;

→ Recover tablespace —————;

Alter tablespace ————— online;

Instance Recovery:-

→ Startup

→ Roll forward

→ Committed and Uncommitted

→ DB OPEN

→ Rollback

→ Committed data in files.

Instance Recovery ————— MTR

Alter system set ~~abort~~ start_mtr target=30 scope=Both;

Recovery using Resetlogs

Point in Time

→ Restore Backup ————— Take Recovery

→ Recover Database

Fresh Backup

→ Open Database with resetlogs

Inconsistent ————— two different Redologs

with some SCN

→ Reset all the logs

RMAN RESTORE COMMAND:-

* RESTORE PREVIEW

* RESTORE VALIDATE

* RESTORE HEADER

catalog

NAM

during

the RESTORE.

Database should be shutdown,

RMAN

→ Shutdown

→ Restore Controlfile;

→ Alter Database mount;

→ Restore Database;

→ Recover Database;

→ Alter Database open Resetlogs;

↳ new incarnation.

Restore ASM DISKGROUP:-

→ Use the ASMCMD md_restore

↳ full

ASMCMD > md_restore /backup/asm-metadata --full

-G1 data

↳ group

Switch Command:

→ Switch Datafile 'filename' tocopy; + to mount2 data

↳ takes from FRA.

Mount point lost:-

Set NewName for Datafile ' /
to ' /

switch Datafile all;

Mountpoint → logical or physical disc;

Create restore point before_mods;

Alter system check Datafiles;

→ v\$archived_log

→ crosscheck archivelog all;

Create pfile from spfile; any (required) → = all segments

Create pfile = 'ora' from memory;

→ double underscore
→ automatic parameters of Database;
→ resetlogs → open

Restoring Spfile from Backup;

Redolog group lost

→ Restore spfile from AutoBackup;

→ delete

Startup force

→ includes Shutdown, Start up.

→ Restore control file from —;

MaterIALIZED VIEWS

→ stored query in database.

NOLOGGING → Little Redolog.

→ Cannot be recreated.

Redolog status:

- Current → LGWR writing
- Active → no longer written
still needed
- Inactive → no longer needed
for instance recovery.

Status → V\$LOG;

members → V\$LOGFILE;

Alter database clear Logfile;

Alter database clear Unarchived Logfile;

↳ Don't use.

Password file recreation.

ORUPWD file = \$ Home / db / orapwoc password = ora entries - 5.

→ add user in the password file.

Recovering from Index tablespace.

→ Just recreate the Index

using

parallel = 4 global

CreateIndex

on table (column);

Tempfile

↳ autocreation of tempfile will be created automatically.

Migration:-

* take Backup * shut immediate * Startup nomount.

* Restore Database.

Disaster recovery:-

- 1) have atleast one backup
- 2) all archive logs
- 3) Restore, Recover

Set Decryption identified by

< >

password of tnsnames