

Cheat Sheet for comprehensive Oracle Database 12c Administrator (OCA)

Oracle Database 12c Installation and Configuration

Installation Steps

- **Pre-installation Tasks:**

- Check system requirements.
- Set up OS users and groups.
- Configure kernel parameters.

- **Installation Types:**

- **Enterprise Edition**
- **Standard Edition**
- **Express Edition**

- **Post-installation Tasks:**

- Run ``root.sh`` script.
- Configure network services.
- Set up Oracle environment variables.

Configuration

- **Oracle Environment Variables:**

- ``ORACLE_HOME``
- ``ORACLE_SID``
- ``PATH``
- ``LD_LIBRARY_PATH``

- **Listener Configuration:**

- ``lsnrctl start``
- ``lsnrctl status``
- ``lsnrctl stop``

- **Database Creation:**

- ``CREATE DATABASE`` command.
- ``DBCA (Database Configuration Assistant)``

Oracle Database 12c Architecture

Key Components

- **Instance:**

- SGA (System Global Area)
- Background Processes

- **Database:**

- Datafiles
- Control Files
- Redo Log Files
- Archived Log Files

Memory Structures

- **SGA (System Global Area):**

- **Shared Pool:**

- Library Cache
- Dictionary Cache

- **Database Buffer Cache:**

- Default, Keep, Recycle Pools

- **Redo Log Buffer:**

- Stores redo entries

- **Large Pool:**

- Used for large I/O operations

- **Java Pool:**

- Used for Java operations

Process Structures

- **User Processes:**

- SQL*Plus, SQL Developer

- **Server Processes:**

- PMON (Process Monitor)
- SMON (System Monitor)

- DBWn (Database Writer)
- LGWR (Log Writer)
- CKPT (Checkpoint)
- ARCn (Archiver)

Oracle Database 12c Administration

User Management

- Creating Users:

- ``CREATE USER username IDENTIFIED BY password;``

- Granting Privileges:

- ``GRANT privilege TO username;``
- ``GRANT CONNECT, RESOURCE TO username;``

- Roles:

- ``CREATE ROLE role_name;``
- ``GRANT role_name TO username;``

Tablespace Management

- Creating Tablespaces:

- ``CREATE TABLESPACE tablespace_name DATAFILE 'file_name' SIZE size;``

- Managing Datafiles:

- ``ALTER DATABASE DATAFILE 'file_name' RESIZE size;``
- ``ALTER DATABASE DATAFILE 'file_name' AUTOEXTEND ON;``

Backup and Recovery

- Types of Backups:

- Cold Backup (Offline Backup):

- Requires database shutdown.

- Hot Backup (Online Backup):

- Can be performed while the database is running.

- Recovery:

- Complete Recovery:

- ``RECOVER DATABASE;``

- **Incomplete Recovery:**

- ``RECOVER DATABASE UNTIL TIME 'YYYY-MM-DD:HH24:MI:SS';``

Performance Tuning

- **SQL Tuning:**

- Use ``EXPLAIN PLAN`` for query analysis.
- Index creation: ``CREATE INDEX index_name ON table_name(column_name);``

- **Memory Tuning:**

- Adjust SGA and PGA sizes.
- Use ``V$SGAINFO`` and ``V$PGASTAT`` views.

- **I/O Tuning:**

- Use ASM (Automatic Storage Management).
- Balance I/O across disks.

Oracle Database 12c Security

Authentication Methods

- **Password File Authentication:**

- Used for SYSDBA and SYSOPER privileges.

- **OS Authentication:**

- Authenticates users based on OS credentials.

- **Network Authentication:**

- Uses Oracle Net Services for authentication.

Auditing

- **Fine-Grained Auditing (FGA):**

- ``DBMS_FGA.ADD_POLICY``

- **Standard Auditing:**

- ``AUDIT SELECT ON table_name BY ACCESS;``

Encryption

- **Transparent Data Encryption (TDE):**

- ``CREATE TABLESPACE encrypted_tbs DATAFILE 'file_name' ENCRYPTION USING 'AES256';``

- **Column Encryption:**

- ``ALTER TABLE table_name MODIFY (column_name ENCRYPT);``

Oracle Database 12c PL/SQL

Basic Syntax

- **Declaring Variables:**

- ``DECLARE variable_name datatype;``

- **Assigning Values:**

- ``variable_name := value;``

- **Control Structures:**

- ``IF-THEN-ELSE``
- ``LOOP``
- ``FOR LOOP``
- ``WHILE LOOP``

Procedures and Functions

- **Creating Procedures:**

- ``CREATE OR REPLACE PROCEDURE procedure_name IS BEGIN ... END;``

- **Creating Functions:**

- ``CREATE OR REPLACE FUNCTION function_name RETURN datatype IS BEGIN ... RETURN value; END;``

Cursors

- **Implicit Cursors:**

- Automatically managed by PL/SQL.

- **Explicit Cursors:**

- ``DECLARE CURSOR cursor_name IS SELECT statement;``
- ``OPEN cursor_name;``
- ``FETCH cursor_name INTO variable_list;``
- ``CLOSE cursor_name;``

Oracle Database 12c SQL

Data Manipulation Language (DML)

- **INSERT:**

- ``INSERT INTO table_name (column_list) VALUES (value_list);``

- **UPDATE:**

- ``UPDATE table_name SET column_name = value WHERE condition;``

- **DELETE:**

- ``DELETE FROM table_name WHERE condition;``

Data Definition Language (DDL)

- **CREATE TABLE:**

- ``CREATE TABLE table_name (column_name datatype, ...);``

- **ALTER TABLE:**

- ``ALTER TABLE table_name ADD (column_name datatype);``
- ``ALTER TABLE table_name MODIFY (column_name datatype);``

- **DROP TABLE:**

- ``DROP TABLE table_name;``

Data Control Language (DCL)

- **GRANT:**

- ``GRANT privilege ON object TO user;``

- **REVOKE:**

- ``REVOKE privilege ON object FROM user;``

Oracle Database 12c Utilities

*SQL*Plus*

- **Connecting to Database:**

- ``sqlplus username/password@database``

- **Running Scripts:**

- ``@script_name.sql``

- **Setting Parameters:**

- `SET LINESIZE 100`
- `SET PAGESIZE 50`

Oracle Enterprise Manager (OEM)

- **Accessing OEM:**

- URL: `https://hostname:port/em`

- **Features:**

- Monitoring database performance.
- Managing backups and restores.
- Configuring database parameters.

Data Pump

- **Export:**

- `EXPDP username/password DIRECTORY=directory_name DUMPFILE=file_name.dmp`

- **Import:**

- `IMPDP username/password DIRECTORY=directory_name DUMPFILE=file_name.dmp`

Oracle Database 12c Advanced Features

Multitenant Architecture

- **CDB (Container Database):**

- Contains one or more PDBs (Pluggable Databases).

- **PDB (Pluggable Database):**

- Independent databases that can be plugged into a CDB.

In-Memory Column Store

- **Enabling In-Memory:**

- `ALTER SYSTEM SET INMEMORY_SIZE=size;`

- **Populating In-Memory:**

- `ALTER TABLE table_name INMEMORY;`

Automatic Data Optimization (ADO)

- **Enabling ADO:**

- ``ALTER TABLE table_name ADO (policy_name);``

- **Policies:**

- ``CREATE ADO POLICY policy_name COMPRESS FOR OLTP;``

Oracle Database 12c Tips and Tricks

Performance Tips

- **Use Bind Variables:**

- ``SELECT * FROM employees WHERE employee_id = :emp_id;``

- **Avoid Using `SELECT *`:**

- ``SELECT column_list FROM table_name;``

Security Tips

- **Use Strong Passwords:**

- Complexity and rotation policies.

- **Enable Auditing:**

- Monitor critical operations.

Backup Tips

- **Regular Full Backups:**

- Ensure data integrity.

- **Test Recovery Procedures:**

- Validate backup and recovery processes.

Oracle Database 12c Shortcuts

*SQL*Plus Shortcuts*

- **Clear Screen:**

- ``CLEAR SCREEN``

- **Run Last Command:**

- ``RUN`` or ``R``

- **Save Script:**

- ``SAVE script_name.sql``

PL/SQL Shortcuts

- **Compile Procedure:**

- ``ALTER PROCEDURE procedure_name COMPILE;``

- **Debugging:**

- Use ``DBMS_OUTPUT.PUT_LINE`` for debugging.

OEM Shortcuts

- **Quick Links:**

- Access common tasks quickly.

- **Alerts:**

- Set up alerts for critical events.

Oracle Database 12c Best Practices

Database Design

- **Normalization:**

- Reduce redundancy.

- **Indexing:**

- Create indexes on frequently queried columns.

Maintenance

- **Regular Patching:**

- Apply security and performance patches.

- **Monitoring:**

- Use OEM and AWR reports for performance monitoring.

Security

- **Least Privilege Principle:**

- Grant minimum necessary privileges.

- **Encryption:**

- Encrypt sensitive data.

Oracle Database 12c Resources

Documentation

- **Oracle Documentation:**

- [Oracle Database Documentation](<https://docs.oracle.com/database/121/index.htm>)

- **White Papers:**

- [Oracle White Papers](<https://www.oracle.com/technetwork/database/enterprise-edition/documentation/index.html>)

Community and Support

- **Oracle Support:**

- [Oracle Support](<https://support.oracle.com>)

- **Oracle Community:**

- [Oracle Community Forums](<https://community.oracle.com>)

Training and Certification

- **Oracle University:**

- [Oracle University](<https://education.oracle.com>)

- **Certification Paths:**

- OCA, OCP, OCM

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