

**CHAPTER-2**

**OTHER ORACLE DATABASE OBJECTS ,**

 **BACK UP & RECOVERY**

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| * **Types of Backups (Control File Backups, Redo Log File Backups,Cold Backups, Hot Backups)**
* **Net 8**
	+ **What is Net 8?**
	+ **Why use Net 8?**
	+ **Net 8 Features**
* **Listener**
* **Dispatcher**
* **View**
* **Sequence**
* **Synonyms**
* **Database Links**
* **Index**
* **Cluster , Snapshot**
* **Backup & Recovery**
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* 1. **Q-1 Write note on View.**

### Detail :-

* In Oracle, view is a virtual table that does not physically exist. It is stored in Oracle data dictionary and do not store any data. It can be executed when called.
* A view is created by a query joining one or more tables.
* When new records are inserted / updated / deleted in base table , the changes are automatically reflected in the view.
* View can be of two types :
	+ Read Only View
	+ Updatable View
1. **Read Only View :-**
* Read only view is used to just display the data.
* User can not update or modify the data.

**Syntax :-**

**CREATE [ OR REPLACE ] VIEW view\_name AS**

**SELECT columns**

**FROM tables**

**WHERE conditions;**

Here , REPLACE option is used to overwrite existing view.

 **Example :-**

**CREATE  OR REPLACE view v1 as select \* from emp where city = “Rajkot”;**

1. **Updatable View :-**
* In Updatable view , user can easily update or modify the data.
* Updatable view should match the following :
	+ View can be defined from single table.
	+ For insert , Primary key and Not Null columns must be included in the view.
	+ The columns that can be updated in a view can be queried from the data dictionary USER\_UPDATABLE\_COLUMNS.

**Force View :-**

* It is possible to create force view even if table does not exist at the time of view creation.
* When the table is created view will be linked up automatically with associated table.

**Example :-**

**CREATE  FORCE VIEW fv1 as select fname , lname from emp;**

* Force view is created with compilation errors at the time of creation.
* But as the associated table is created , it will be linked up by oracle automatically.
1. **Updatable View :-**
* The DROP VIEW statement is used to remove or delete the VIEW completely.

**Syntax:**

**DROP VIEW view\_name;**

**Example:**

**DROP VIEW  v1;**

* 1. **Q-2 Write note on Sequence.**

### Detail :-



* In Oracle, you can create an auto number field by using sequences.
* A sequence is an object in Oracle that is used to generate a number sequence.
* This can be useful when you need to create a unique number to act as a primary key.
* An Oracle sequence is a named sequential number generator.
* It is an independent object and can be used with any table that requires its output.

**Create Sequence:-**

* You may wish to create a sequence in Oracle to handle an auto number field.

**Syntax:**

* The syntax to create a sequence in Oracle is:

**CREATE SEQUENCE sequence\_name**

 **MINVALUE value**

 **MAXVALUE value**

 **START WITH value**

 **INCREMENT BY value**

 **CACHE / NOCACHE**

 **CYCLE / NOCYCLE**

**SEQUENCE PARAMETERS :-**

* **START WITH :-** Defines the first number for sequence.The default is one.
* **INCREMENT BY :**- Defines the increase or decrease value for subsequently generated numbers.
* **MINVALUE :**- The lowest number the sequence will generate.
* **MAXVALUE :**- The largest number that the sequence will generate.
* **CACHE :**- Defines the size of the block of sequence numbers held in memory.The default is 20.
* **CYCLE :**-It repeat the numbers after reaching the bounding value.

**Example :**

* The example to create a sequence in Oracle is:

**CREATE SEQUENCE supplier\_seq**

 **MINVALUE 1**

 **START WITH 1**

 **INCREMENT BY 1**

 **CACHE 20;**

* To retrieve the next value in the sequence order, you need to use nextval.

**Example :**

 **Select supplier\_seq.nextval from dual;**

**Drop Sequence:-**

* Once you have created your sequence in Oracle, you might find that you need to remove it from the database.

 **Syntax:**

* The syntax to drop a sequence in Oracle is:

**DROP SEQUENCE sequence\_name;**

 **Example:**

* The example to drop a sequence in Oracle is:

**DROP SEQUENCE supplier\_seq;**

**Q-3 Write note on Synonym.**

### Detail :-

* A Synonym is an alternative name for objects such as tables , views , sequences , procedures and other database objects.
* A public synonym is available to all users.
* While private synonym is available only to the owner or to the accounts to whom that owner grants privileges.
* A synonym can point to table , view , sequence ,procedure ,function or package in local database.
* A synonyms are used to simplify SQL by giving a universal name to local or remote object.

 **Syntax:**

* The syntax to create synonym in Oracle is:

**CREATE [OR REPLACE] [PUBLIC] SYNONYM <SYNONYM NAME> FOR <OBJECT NAME>**

**Example:**

* The Example to create synonym in Oracle is:

**Create synonym stock for inventory;**

* Now , you can use stock synonym instead of inventory table in the query like following :

**Select \* from stock;**

**Advantages of Oracle synonyms**

* First, synonyms allow you to change complicated and lengthy names by simplified aliases.
* Second, synonyms can help you rename a table but do not want to affect the current applications that currently use the table
* To keep the applications working properly, you can create a synonym that has the name the same as the old name of the table.

**Drop Sequence:-**

 **DROP Synonym Stock;**

**Q-4 Write note on Database Link.**

### Detail :-

* A database link is a connection from the Oracle database to another remote database.
* The remote database can be an Oracle Database or any ODBC compliant database such as SQL Server or MySQL.



 **Why do you need a database link**

* A database link allows a user or program to access database objects such as tables and views from another database.
* Once you create a database link, you can access the tables or views from the remote database using the following pattern:

 **table\_name@database\_link**

* For example, you can query data from a table in the remote database as if it was in the local server:

 **SELECT \* FROM remote\_table@database\_link;**

* When accessing a remote table or view over the database link, the Oracle database is acting as an Oracle client.

**Oracle CREATE DATABASE LINK statement**

* There are two types of database links: public and private.
* Private database links are visible to the owners while public database links are visible to all users in the database. For this reason,  public database links may pose some potential security risks.
* To create a private database link, you use the CREATE DATABASE LINK statement as follows:

**CREATE DATABASE LINK dblink**

**CONNECT TO remote\_user IDENTIFIED BY password**

**USING 'remote\_database';**

* To create a public database link, just add the PUBLIC keyword:

**CREATE PUBLIC DATABASE LINK dblink**

**CONNECT TO remote\_user IDENTIFIED BY password**

 **USING 'remote\_database';**

**Q-5 Write note on Cluster.**

### Detail :-

* A Cluster is a group of tables that share the same data blocks i.e. all the tables are physically stored together.
* If you have more than one tables that are joined together on a single column then most of time you issue join queries on them.
* For example , EMP and DEPT tables are joined on deptno column.
* If you cluster them , oracle physically stores all rows for each department from both the emp and dept tables in the same data blocks
* Cluster stores related rows of different tables in the same data blocks .
* Each cluster key value is stored only once each in the cluster and the cluster index.
* The main benefit is , less storage might be required to store related table and index data in a cluster.

**Creating Cluster :-**

* To create clustered table , first create cluster and then create index on it.
* Then create tables in it.
* For example to create cluster of EMP and DEPT tables in which the deptno will be cluster key , first create the cluster by following command:

**Example :-**

 **Create cluster emp\_dept(deptno number(2));**

 **Create index on cluster emp\_dept;**

* Now , create table in the cluster like :

**Create table emp(empno number(5),name varchar2(20), deptno number(2)) cluster emp\_dept(deptno);**

**Create table dept(deptno number(5),name varchar2(20),**

**sal number(10,2)) cluster emp\_dept(deptno);**

**Dropping Cluster :-**

* To drop a cluster use DROP CLUSTER statement.
* To drop emp\_dept cluster give the following command :

**Drop cluster emp\_dept;**

**Q-6 Write note on Snapshot.**

### Detail :-

* A Snapshot is replica of a target master table from single point in time.
* In Snapshot , the copy of master table is maintained on client side.
* Oracle uses snapshot , that also known as materialized view.
* Snapshots are updated from one or more master tables through individual batch updates.
* Snapshot also contains WHERE clause so that snapshot sites can contain customized data sets.
* When snapshot is refreshed , oracle must examine all of the changes to the master table.

**Why use Snapshot ?**

* We can use snapshot to achieve one or more of the following goals:
	+ Ease Network Load
	+ Mass Deployment
	+ Data Sub setting
	+ Disconnected Computing
* The snapshot is maintained on to get the data of query with immediate effect.
* To get correct data , the snapshot is refreshed periodically.
* A snapshot can be of two types :
	+ Read Only Snapshot
	+ Updatable Snapshot
* In many situations, only part of table is used as snapshots.
* For example , Head office contains master table and Branch office can

 See only the part of table as per requirement.

**Q-6 Write note on Index.**

### Detail :-

* Just like we have index present in the textbook to help us find the particular topic in the book , Oracle index behaves the same way.
* Indexes are used to search the rows in the oracle table quickly.
* If the index is not present the select query has to read the whole table and returns the rows.
* With the index , the rows can be retrieve quickly because it stores only index key.
* We should create index when retrieving a small number of rows from the table.
* The best thing about index is that retrieval performance of indexed data remains almost constant , even as new rows are inserted.
* Oracle support mainly following types of indexes :
	+ B-Tree Index
	+ Bitmap Index
	+ Function based index

**B – Tree Index :-**

* B-tree index also known as Balance tree index.
* It is most common type of index.
* B-tree index stored the ROWID and the index key value in the tree structure.
* As the name suggest , B-tree index is based on Binary tree constructed with branch block and leaf block.
* Branch block contains index column (the key) and address to another index block.
* Leaf block contains the key and the ROWID for each matching row in the table.
* This type of index performs the best when the column has many distinct values.

**BITMAP Index :-**

* Bitmap indexes are primarily used for decision support system.
* Bitmap index should be used when the update frequency of index column is less and the column has almost similar entry.
* Each key value has a bitmap , which contains a TRUE , FALSE or NULL value for every row in the table.
* The Bitmap index is constructed by storing the bitmaps in the leaf nodes of a B-tree structure.
* Each bit in the bitmap corresponds to a possible ROWID and if the bit is set , it means that the row with the corresponding ROWID contains the key value.
* Bitmaps are stored in a compressed format , so they take up significantly less disk space than B-tree indexes.

**Function Based Index :-**

* Function based indexes are indexes created on columns that a function is usually applied on.
* When using function on an indexed column , the index is ignored therefore a function based index is very useful for these operations.

**Q-6 What is Backup ? Explain with types.**

### Detail :-

* Back up is a duplicate copy of data.
* This copy can include important parts of database such as the control file , redo logs and data files.
* A backup is a safeguard against unexpected data loss and application errors.
* If you lose the original data, then you can reconstruct it by using a backup.
* Follwing are main types of Backup available :
	+ Physical Backup
	+ Logical Backup
	+ Data File Backup
	+ Control File Backup
	+ Redo Log Backup

**1.Physical Backup :-**

* A Physical backups are copies of physical database files like control files and data files.
* For example, a physical backup might copy database content from a local disk drive to another secure location.
* A physical backup can be hot or cold:

**Hot backup**—

* Hot backup, also known as **Dynamic or Online backup.**
* A hot backup is the standard way of doing most database backups.
* Users can modify the database during a hot backup.
* Log files of changes made during the backup are saved, and the logged changes are applied to synchronize the database and the backup copy.
* A hot backup is used when a full backup is needed and the service level does not allow system downtime for a cold backup.
* **Cold backup**—
* Cold backup, also known as **Static or Offline backup.**
* Offline or cold backups are performed when the database is completely shutdown.
* The disadvantage of an offline backup is that it cannot be done if the database needs to be run 24/7.
* Users cannot modify the database during a cold backup, so the database and the backup copy are always synchronized.
* Cold backup is used only when the service level allows for the required system downtime.

**2.Logical Backup :-**

* A Logical backups are store informations about the objects created for database.
* It contains data that is exported using SQL commands and stored in a binary file.
* Oracle records both committed and uncommitted changes in redo log buffers.
* Logical backups are used to supplement physical backups.
* Facilities like EXPORT and IMPORT are used for logical backup.

**Q-7 Write note on Control File ,Data File & Redo Log File Backup.**

### Detail :-

* An offline backup consists of physically copying the following files:
	+ Data files
	+ Control files
	+ Redo Log Files

**1.Data File Backup:-**

* A datafile backup is a backup of a single datafile.
* Datafile backups, which are not as common as tablespace backups, are valid in ARCHIVELOG databases.
* The only time a datafile backup is valid for a database in NOARCHIVELOG mode is if:
	+ Every datafile in a tablespace is backed up. You cannot restore the database unless all datafiles are backed up.
	+ The datafiles are read only or offline-normal.

 **2.Control File Backup :-**

* Control files are needed at the time of startup and during normal operation.
* Backing up the control file is a crucial aspect of backup and recovery. Without a control file, you cannot mount or open the database.
* You can instruct RMAN to automatically backup the control file whenever you run backup jobs.
* You can make manual backups of the control file by using the following methods:
* The RMAN BACKUP CURRENT CONTROLFILE command makes a binary backup of the control file, as either a backup set or an image copy.
* The SQL statement ALTER DATABASE BACKUP CONTROLFILE makes a binary backup of the control file.

**3.Redo Log File Backup:-**

* Archived redologs are essential for recovering an inconsistentbackup.
* The only way to recover an inconsistent backup without archived logs is to use RMAN incremental backups.
* To be able to recover a backup through the most recent log, every log generated between these two points must be available.
* In other words, you cannot recover from log 100 to log 200 if log 173 is missing.
* If log 173 is missing, then you must halt recovery at log 172 and open the database with the RESETLOGS option.

**Q-8 Write note on Recovery.**

### Detail :-

* There are two ways to perform Oracle backup and recovery:
	+ Recovery Manager
	+ user-managed backup and recovery.
* You can also use operating system commands for backups and SQL\*Plus for recovery.
* This method, also called user-managed backup and recovery, is fully supported by Oracle.
* RMAN is highly recommended because it is more robust and greatly simplifies administration.
* Whether you use RMAN or user-managed methods, you can supplement your physical backups with logical backups of schema objects made using the Export utility.

**Complete Recovery**

* Complete recovery involves using redo data or incremental backups combined with a backup of a database, tablespace, or datafile to update it to the most current point in time.
* It is called complete because Oracle applies all of the redo changes contained in thearchived and online logs to the backup.
* Typically, you perform complete media recovery after a media failure damages datafiles or the control file.
* You can perform complete recovery on a database, tablespace, or datafile.
* If you are performing complete recovery on the whole database, then you must:
	+ Mount the database.
	+ Ensure that all datafiles you want to recover are online.
	+ Restore a backup of the whole database or the files you want to recover.

**Incomplete Recovery**

* Incomplete recovery, or point-in-time recovery, uses a backup to produce a noncurrent version of the database.
* In other words, you do not apply all of the redo records generated after the most recent backup.
* You usually perform incomplete recovery of the whole database in the following situations:
* Media failure destroys some or all of the online redo logs.
* A user error causes data loss, for example, a user inadvertently drops a table.
* You cannot perform complete recovery because an archived redo log is missing.

**Datafile Media Recovery**

* Datafile media recovery is used to recover from a lost or damaged current datafile or control file.
* It is also used to recover changes that were lost when a tablespace went offline.
* Both datafile media recovery and instance recovery must repair database integrity.
* Media recovery has the followingcharacteristics:
* Applies changes to restored backups of damaged datafiles.
* Can use archived logs as well as online logs.
* Requires explicit invocation by a user.
* The database cannot be opened if any of the online datafiles needs media recovery.
* The following scenarios necessitate media recovery:
* You restore a backup of a datafile.
* You restore a backup control file (even if all datafiles are current).
* A datafile is taken offline (either by you or automatically by Oracle) without the OFFLINE NORMAL option.

**Q-9 Write note on Listener & Dispatcher.**

### Detail :-

**Listener :-**

* Listener is a separate database server process that runs locally on the database server or remotely on the oracle RAC environment.
* When the client request comes , the listener first receives it.
* Then it establish a connection between the client and the database instance.
* Once the client is connected to database instance successfully , it hands over the client connection to the server process.
* If the listener stops running , you can not connect to the oracle database anymore.
* So , here all the existing connections will not be affected.
* To lunch the listener control , you can use LSNCTRL command from the command line on windows or terminal on Linux.
* You can use different commands to control the listener Like:
	+ To know the status :- LSNCTRL > status
	+ To start the listener :- LSNCTRL > start
	+ To stop the listener :- LSNCTRL > stop

**Dispatcher :-**

* Dispatcher as a service handler handles and directs multiple imcoming network session requests to shared server processes.
* A Dispatcher can support multiple client connections concurrently.
* Each client connection is bound to a virtual circuit.
* Virtual circuit is a piece of shared memory used by the dispatcher for client database connection requests and replies.
* The dispatcher directs multiple incoming network session requests to a common queue.
* One can specify following attributes for the dispatchers parameter:
	+ ADDRESS
	+ CONNECTIONS
	+ DESCRIPTION
	+ DISPATCHERS
	+ LISTENER
	+ POOL
	+ PROTOCOL
	+ SERVICE
	+ SESSIONS
* The protocol attribute is required , and the others are optional.
* The number of dispatchers can be reduced by implementing connection pooling.

**Q-9 Write note on Net8 with its feature.**

### Detail :-

* Net8 is the foundation of networking products.
* It allows services and their applications to be stored on different computers and communicate.
* The main function of Net8 is to establish network sessions and transfer data between a client machine and a server or between two servers.
* Net8 is located on each machine in the network.
* Once the network session is established , Net8 acts as a data courier for the client and the server.
* Network sessions are established with the help of a listener.
* Specifically , Net8 performs 3 basic operations :
	+ Connection
	+ Data Transport
	+ Exception Handling

**Net8 Uses/Benefits :-**

* Net8 provide the following uses / benefits to users of networked applications:
	1. **Network Transparency :-** Net8 provide support for broad range of network transport protocols including TCP/IP , SPX/IPX.
	2. **Protocol Independence :-** Net8 enables Oracle applications to run over any supported network protocol by using oracle Protocol adapter.
	3. **Media / Topology Independence :-** Net8 inherits all media and topologies supported by that network protocol stack.
	4. **Large Scale :-** Net8 makes it possible for thousand of concurrent users to connect to the server.
	5. **Heterogeneous Networking :-** Oracle provide connectivity between multiple network protocols using oracle connection manager.

**Net8 Features :-**

* Net8 provide the following features to users of networked applications:
1. **Scalability :-** Scalability refers to the ability to support simultaneous network access by a large number of clients to single server.

Net8 offers improved scalability through two new features:

* **connection pooling &**
* **connection concentration**

**2. Manageability :-** Net8 introduce a number of new features that will manage configuration and administration of the oracle network for workgroup and enterprise environment.

 **3. Security :-** Net8 provide scalable and standard based security service and support for electronic commerce.

 **4. Exception Operation :-** Net8 support three types of exception operations :

* Break over the connection
* Reset the connection
* Test the connection

 **5. Client – Server Interaction :-** Net8 provide facility to pass the informations through Client – Server transactions by specific protocols.