Practical - 2

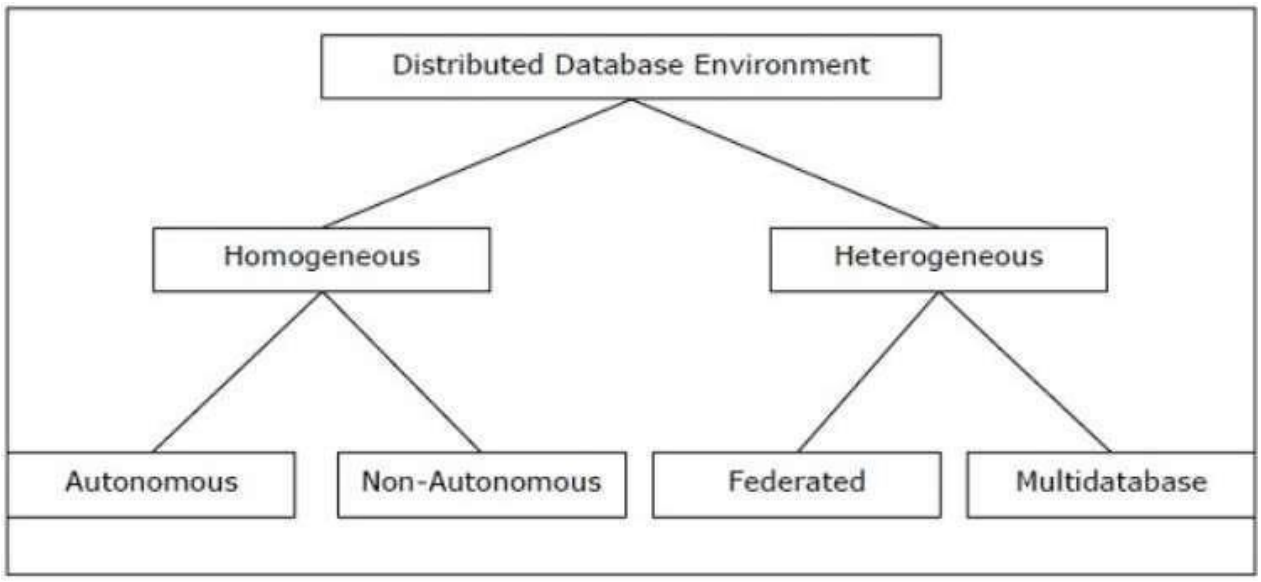
Aim: Implementation of Data Partitioning through Range and List Partitioning

Distributed Databases:

A distributed database (DDB) is an integrated collection of databases that is physically distributed across sites in a computer network. A distributed database management system (DDBMS) is the software system that manages a distributed database such that the distribution aspects are transparent to the users. To form a distributed database system (DDBS), the files must be structured, logically interrelated, and physically distributed across multiple sites. In addition, there must be a common interface to access the distributed data.

Types of Distributed Databases :

Distributed databases can be broadly classified into homogeneous and heterogeneous distributed database environments, each with further subdivisions, as shown in the following illustration.



Homogeneous Distributed Databases :

In a homogeneous distributed database, all the sites use identical DBMS and operating systems. Its properties are

- The sites use very similar software.
- The sites use identical DBMS or DBMS from the same vendor.

- Each site is aware of all other sites and cooperates with other sites to process user requests.
- The database is accessed through a single interface as if it is a single database.

Types of Heterogeneous Distributed Databases :

- Autonomous - Each database is independent and functions on its own. They are integrated by a controlling application and use message passing to share data updates.
- Non-autonomous - Data is distributed across the homogeneous nodes and a central or master DBMS coordinates data updates across the sites.

Heterogeneous Distributed Databases :

In a heterogeneous distributed database, different sites have different operating systems, DBMS products and data models. Its properties are -

- Different sites use dissimilar schemas and software.
- The system may be composed of a variety ofDBMSs like relational, network, hierarchical or object oriented.
- Query processing is complex due to dissimilar schemas.
- Transaction processing is complex due to dissimilar software.
- A site may not be aware of other sites and so there is limited co-operation in processing user requests.

Types of Heterogeneous Distributed Databases :

- Federated-The heterogeneous database systems are independent in nature and integrated together so that they function as a single database system.
- Un-federated -The database systems employ a central coordinating module through which the databases are accessed.

Data Partitioning :

Data partitioning is the technique of distributing data across multiple tables, disks, or sites in order to improve query processing performance and increase database manageability Query processing performance can be improved in one of two ways.

First, depending on how the data is partitioned, in some cases it can be determined a priori that a partition does not have to be accessed to process the query. Second, when data is partitioned across multiple disks or sites, 1/0 parallelism and in some cases query parallelism can be attained as different partitions can be accessed in parallel.

Range Partitioning :

Range partitioning is a type of relational database partitioning wherein the partition is based on a predefined range for a specific data field such as uniquely numbered IDs, dates or simple values like currency. A partitioning key column is assigned with a specific range, and when a data entry fits this range, it is assigned to this partition; otherwise it is placed in another partition where it fits.

List Partitioning :

List partitioning enables you to explicitly control how rows map to partitions by specifying a list of discrete values for the partitioning key in the description for each partition. The advantage of list partitioning is that you can group and organize unordered and unrelated sets of data in a natural way.

1] Range Partitioning :

Code :

```
create table employee_range_finny(
employee_id NUMBER(5),
employee_name VARCHAR2(30),
employee_salary NUMBER(10),
employee_dateofjoining DATE)

PARTITION BY RANGE (employee_id)
(
PARTITION employeeID_lessthan_11 VALUES LESS
THAN(11),
PARTITION employeeID_lessthan_21 VALUES LESS
THAN(21),
PARTITION employeeID_lessthan_31 VALUES LESS
THAN(31),
PARTITION employeeID_lessthan_41 VALUES LESS
THAN(41),
PARTITION employeeID_lessthan_51 VALUES LESS
THAN(51)
);
```

```
SELECT TABLE_NAME, PARTITION_NAME FROM USER_TAB_PARTITIONS WHERE
TABLESPACE_NAME='employee_range_finny';

insert into employee_range_finny values(1,'finny
sabu',10000,TO_DATE('13/05/1995','DD/MM/YYYY'));
insert into employee_range_finny values(2,'omkar
khandre',20000,TO_DATE('11/02/2000','DD/MM/YYYY'));
insert into employee_range_finny values(23,'krishnanunni
sureshkumar',30000,TO_DATE('10/03/2000','DD/MM/YYYY'));
insert into employee_range_finny values(17,'abhishek
rajbhar',40000,TO_DATE('25/04/2001','DD/MM/YYYY'));
insert into employee_range_finny values(45,'kevin
varghese',50000,TO_DATE('3/01/1997','DD/MM/YYYY'));
insert into employee_range_finny values(11,'deepak
Kadam',70000,TO_DATE('23/07/1990','DD/MM/YYYY'));
insert into employee_range_finny values(49,'ajinkya
kumar',80000,TO_DATE('30/08/2002','DD/MM/YYYY'));
insert into employee_range_finny values(33,'amit
kumar',95000,TO_DATE('13/09/2000','DD/MM/YYYY'));
insert into employee_range_finny values(29,'kevin
stanley',25000,TO_DATE('18/10/2000','DD/MM/YYYY'));

select * from employee_range_finny;
select * from employee_range_finny PARTITION(employeeID_lessthan_41)
```

Output:

```
Table created.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

EMPLOYEE_ID	EMPLOYEE_NAME	EMPLOYEE_SALARY	EMPLOYEE_DATEOFJOINING
1	finny sabu	10000	13-MAY-95
2	omkar khandre	20000	11-FEB-00
17	abhishek rajbhar	40000	25-APR-01
11	deepak Kadam	70000	23-JUL-90
23	krishnanunni sureshkumar	30000	10-MAR-00
29	kevin stanley	25000	18-OCT-00
33	amit kumar	95000	13-SEP-00
45	kevin varghese	50000	03-JAN-97
49	ajinkya kumar	80000	30-AUG-02

Download CSV

9 rows selected.

EMPLOYEE_ID	EMPLOYEE_NAME	EMPLOYEE_SALARY	EMPLOYEE_DATEOFJOINING
33	amit kumar	95000	13-SEP-00

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2] List Partitioning :

Code:

```
create table employee_list_finny(
employee_id NUMBER(5),
employee_name VARCHAR2(30),
employee_state varchar2(30),
employee_salaryamount NUMBER(10),
employee_dateofjoining DATE)
PARTITION BY LIST (employee_state)
(
PARTITION sales_west VALUES ('Mumbai','Pune'),
PARTITION sales_east VALUES ('Kolkata'),
PARTITION sales_south VALUES ('Chennai'),
PARTITION sales_north VALUES ('Delhi'),
PARTITION sales_other VALUES (Default)) enable row movement;
SELECT TABLE_NAME, PARTITION_NAME FROM USER_TAB_PARTITIONS;
insert into employee_list_finny values(1,'finny sabu','Mumbai',10000,TO_DATE('10/01/2000','DD/MM/YYYY'));
insert into employee_list_finny values(2,'omkar khandare','Pune',20000,TO_DATE('10/02/2000','DD/MM/YYYY'));
insert into employee_list_finny values(3,'nikhil kumar','Delhi',30000,TO_DATE('10/03/2000','DD/MM/YYYY'));
insert into employee_list_finny values(4,'krishnan unni','Kolkata',40000,TO_DATE('10/04/2000','DD/MM/YYYY'));
insert into employee_list_finny values(5,'kevin varghese','Chennai',50000,TO_DATE('20/04/2000','DD/MM/YYYY'));
insert into employee_list_finny values(6,'joel varghese','kerela',60000,TO_DATE('10/05/2000','DD/MM/YYYY'));
insert into employee_list_finny values(6,'deepak kadam','Allahabad',90000,TO_DATE('11/01/2000','DD/MM/YYYY'));
insert into employee_list_finny values(6,'Ajinkya kumar','Mumbai',65000,TO_DATE('17/04/2000','DD/MM/YYYY'));
insert into employee_list_finny values(6,'darshna salian','Kolkata',98000,TO_DATE('19/04/2000','DD/MM/YYYY'));
insert into employee_list_finny values(6,'joel peter','Chennai',75000,TO_DATE('10/05/2000','DD/MM/YYYY'));
select * from employee_list_finny;
select * from employee_list_finny PARTITION(sales_west)
```

Output:

```
Table created.
```

TABLE_NAME	PARTITION_NAME
EMPLOYEE_LIST_FINNY	SALES_EAST
EMPLOYEE_LIST_FINNY	SALES_NORTH
EMPLOYEE_LIST_FINNY	SALES_OTHER
EMPLOYEE_LIST_FINNY	SALES_SOUTH
EMPLOYEE_LIST_FINNY	SALES_WEST

```
Download CSV
5 rows selected.


1 row(s) inserted.


1 row(s) inserted.
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

EMPLOYEE_ID	EMPLOYEE_NAME	EMPLOYEE_STATE	EMPLOYEE_SALARYAMOUNT	EMPLOYEE_DATEOFJOINING
1	finny sabu	Mumbai	10000	10-JAN-00
2	omkar khandare	Pune	20000	10-FEB-00
8	Ajinkya kumar	Mumbai	65000	17-APR-00
4	krishnan unni	Kolkata	40000	10-APR-00
9	darshna salian	Kolkata	98000	19-APR-00
5	kevin varghese	Chennai	50000	20-APR-00
10	joel peter	Chennai	75000	10-MAY-00
3	nikhil kumar	Delhi	30000	10-MAR-00
6	joel varghese	kerela	60000	10-MAY-00
7	deepak kadam	Allahabad	90000	11-JAN-00

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10 rows selected.

EMPLOYEE_ID	EMPLOYEE_NAME	EMPLOYEE_STATE	EMPLOYEE_SALARYAMOUNT	EMPLOYEE_DATEOFJOINING
1	finny sabu	Mumbai	10000	10-JAN-00
2	omkar khandare	Pune	20000	10-FEB-00
8	Ajinkya kumar	Mumbai	65000	17-APR-00

Download CSV

3 rows selected.

3] Hash Partitioning :

Code

```
create table emp_range_finny
(
emp_id NUMBER(5) PRIMARY KEY,
emp_name VARCHAR2(50),
emp_location VARCHAR2(40),
dept VARCHAR2(40)
)
PARTITION BY HASH (emp_id)
(
PARTITION P1,
PARTITION P2,
PARTITION P3);
SELECT TABLE_NAME, PARTITION_NAME FROM USER_TAB_PARTITIONS;
insert into emp_range_finny values(100,'finny sabu','dombivili','development');
insert into emp_range_finny values(101,'nikhil pradeep','kalyan','cloud');
insert into emp_range_finny values(102,'akshay kumar','powai','development');
insert into emp_range_finny values(103,'omkar khandare','vidyavihar','database');
insert into emp_range_finny values(104,'ajinkya pawar','chembur','frontend');
insert into emp_range_finny values(105,'deepak kadam','vikhroli','cloud');
insert into emp_range_finny values(106,'rohan mehta','airoli','assistance');

select * from emp_range_finny;
select * from emp_range_finny PARTITION(P2);
```

Output

```
Table created.
```

TABLE_NAME	PARTITION_NAME
EMP_RANGE_FINNY	P1
EMP_RANGE_FINNY	P2
EMP_RANGE_FINNY	P3

```
Download CSV
3 rows selected.


1 row(s) inserted.


1 row(s) inserted.


1 row(s) inserted.


1 row(s) inserted.
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

EMP_ID	EMP_NAME	EMP_LOCATION	DEPT
101	nikhil pradeep	kalyan	cloud
104	ajinkya pawar	chembur	frontend
106	rohan mehta	airoli	assistance
100	finny sabu	dombivili	development
102	akshay kumar	powai	development
103	omkar khandare	vidyavihar	database
105	deepak kadam	vikhroli	cloud

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7 rows selected.

EMP_ID	EMP_NAME	EMP_LOCATION	DEPT
101	nikhil pradeep	kalyan	cloud
104	ajinkya pawar	chembur	frontend
106	rohan mehta	airoli	assistance

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3 rows selected.