

**TY B.Tech. (CSE) – II [ 2021-22 ]****5CS372 : Advanced Database System Lab.****LA2 ( Part 1 of 2 )****Distributed database implementation for bookstore**

Consider a distributed database for a bookstore with 3 sites called site1, site2 and site3. Consider the following relations:

Books (ISBN, Author, Topic, TotalStock, Price)

BookStore (Storeno, City, State, ZipCode, InventoryValue)

Stock (Storeno, ISBN, Qty)

Total Stock is the total number of books in stock.

Now here in this distributed database for bookstore, we have fragmented the books according to the ISBN numbers into:

F1: Books: ISBN from 1001 to 1010

F2: Books: ISBN from 1021 to 1030

F3: Books: ISBN from 1031 to 1040

Similarly, Book Stores are divided according to their store number into

S1: BookStore: Storeno from 1 to 10

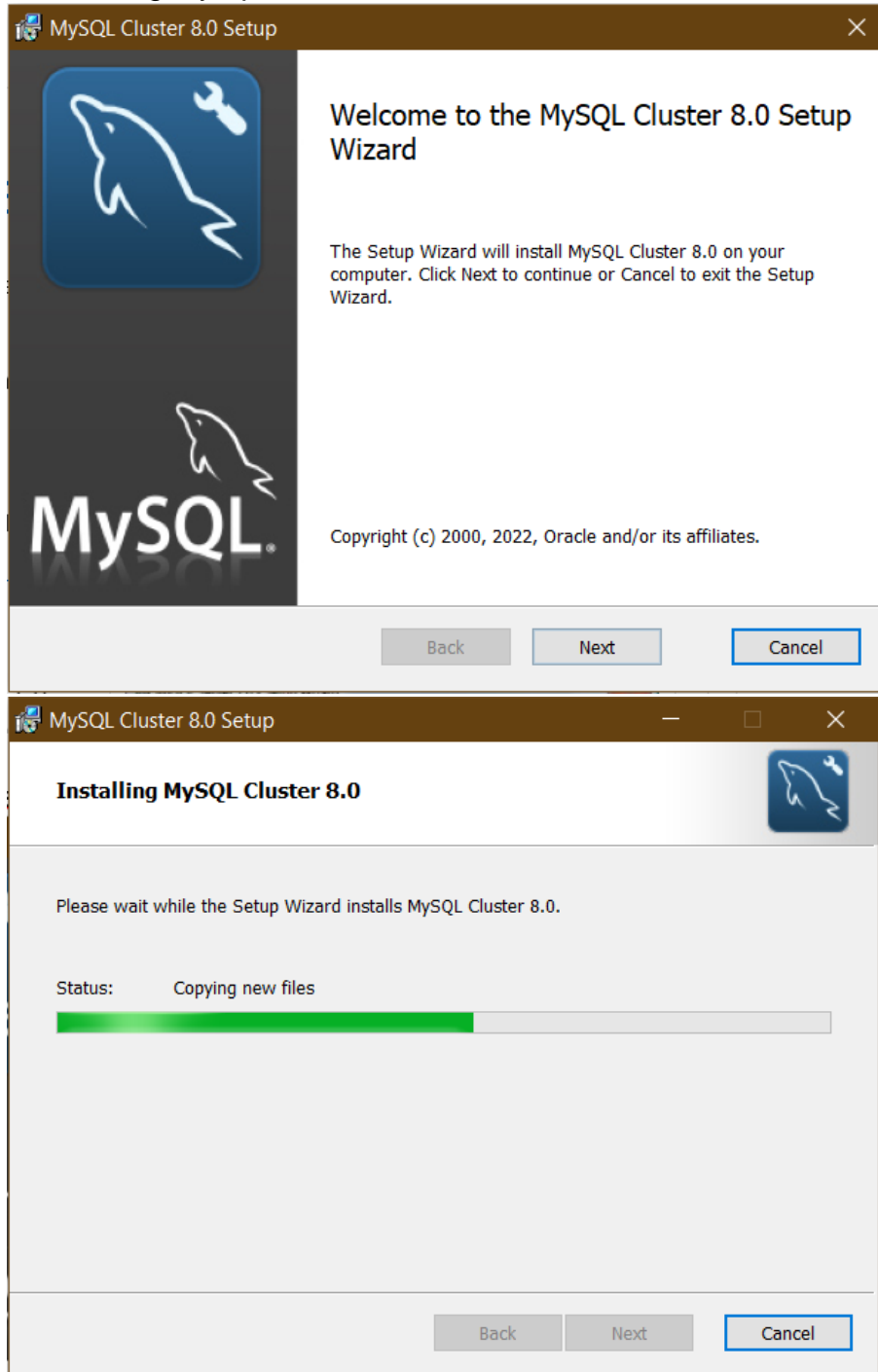
S2: BookStore: Storeno from 11 to 20

S3: BookStore: Storeno from 21 to 30

**Perform**

- a. Now from Site3, we want to check on the total number of books available at each site
- b. We are on site1 and we want to access the books on site3, site 2.
- c. From site 2, we want to check the available copies of particular book with ISBN number in the bookstore. According to the ISBN number in which fragment it belongs, search in the respective database
- d. Get the list of all the books available in the bookstore from any site.
- e. Get the list of all the stores from any site.

## 1. Installing Mysql Cluster.



## 2. Making 4 copies of the Data folder

This PC > Windows (C:) > ProgramData > MySQL > MySQL Server 8.0					
	Name	Date modified	Type	Size	
	Data	06/04/2022 09:08 PM	File folder		
	Data2	07/04/2022 02:38 PM	File folder		
	Data3	07/04/2022 02:39 PM	File folder		
	Data4	07/04/2022 02:39 PM	File folder		
(C:)	Uploads	03/09/2021 01:15 AM	File folder		
.gent	installer_config	03/09/2021 01:15 AM	XML Document	1 KB	
a	my	03/09/2021 01:15 AM	Configuration setti...	14 KB	

3.

```
Administrator: Command Prompt - ndb_mgmd -f config.ini
C:\>ndb_mgmd -f config.ini
MySQL Cluster Management Server mysql-8.0.28 ndb-8.0.28
```

4.

```
C:\Users\Vaishnavi>ndb_mgm
-- NDB Cluster -- Management Client --
ndb_mgm> show
Connected to Management Server at: localhost:1186
Cluster Configuration
-----
[ndbd(NDB)] 2 node(s)
id=2 (not connected, accepting connect from localhost)
id=3 (not connected, accepting connect from localhost)

[ndb_mgmd(MGM)] 1 node(s)
id=1 @127.0.0.1 (mysql-8.0.28 ndb-8.0.28)

[mysqld(API)] 3 node(s)
id=4 (not connected, accepting connect from localhost)
id=5 (not connected, accepting connect from localhost)
id=6 (not connected, accepting connect from localhost)
```

5.

```
Administrator: Command Prompt - mysqld --defaults-file=my.6.cnf
C:\>cd mysqlcluster
C:\mysqlcluster>mysqld --defaults-file=my.6.cnf
```

6.

```
C:\% Administrator: Command Prompt - ndb_mgm

ndb_mgm> show
Cluster Configuration
-----
[ndbd(NDB)] 2 node(s)
id=2 @127.0.0.1 (mysql-8.0.28 ndb-8.0.28, Nodegroup: 0, *)
id=3 @127.0.0.1 (mysql-8.0.28 ndb-8.0.28, Nodegroup: 0)

[ndb_mgmd(MGM)] 1 node(s)
id=1 @127.0.0.1 (mysql-8.0.28 ndb-8.0.28)

[mysqld(API)] 3 node(s)
id=4 @127.0.0.1 (mysql-8.0.28 ndb-8.0.28)
id=5 @127.0.0.1 (mysql-8.0.28 ndb-8.0.28)
id=6 @127.0.0.1 (mysql-8.0.28 ndb-8.0.28)
```

7. Creating database on Node 4 i.e. master node

```
C:\% Administrator: Command Prompt - mysql -u root --port 3307 -p

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> use test;
ERROR 1049 (42000): Unknown database 'test'
mysql> create database bookstore;
Query OK, 1 row affected (0.22 sec)

mysql> show databases;
+-----+
| Database |
+-----+
| bookstore |
| information_schema |
| mysql |
| ndbinfo |
| performance_schema |
| sys |
+-----+
6 rows in set (0.02 sec)
```

8. Viewing database from node 5

```
C:\. Administrator: Command Prompt - mysql -u root --port 3308 -p

mysql> show databases;
+-----+
| Database                |
+-----+
| bookstore                |
| information_schema       |
| mysql                   |
| ndbinfo                  |
| performance_schema       |
| sys                      |
+-----+
6 rows in set (0.01 sec)
```

## 9. Creating tables from node 6

```
Administrator: Command Prompt - mysql -u root --port 3309 -p
mysql> use bookstore;
Database changed
mysql> create table Books(
  -> isbn varchar(20) primary key,
  ->   author varchar(100),
  ->   topic varchar(100),
  ->   totalStock integer,
  ->   price numeric
  -> ) engine=ndbcluster;
Query OK, 0 rows affected (0.33 sec)

mysql> create table BookStore(
  -> storeno integer primary key,
  -> city varchar(100),
  ->   state varchar(100),
  ->   zipcode integer,
  ->   inventoryValue integer
  -> ) engine=ndbcluster;
Query OK, 0 rows affected (0.40 sec)

mysql> create table Stock(
  -> storeno integer,
  ->   isbn varchar(20),
  ->   qty integer,
  ->   foreign key (storeno) references BookStore(storeno),
  ->   foreign key (isbn) references Books(isbn)
  -> ) engine=ndbcluster;
Query OK, 0 rows affected (0.43 sec)
```

10.

Inserting 10 books from node 4 (master)

```
Administrator: Command Prompt - mysql -u root --port 3307 -p
mysql> use bookstore;
Database changed
mysql> insert into Books(isbn, author, topic, totalStock, price)values(1001, 'Author1', 'Topic1', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1002, 'Author1', 'Topic2', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1003, 'Author1', 'Topic3', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1004, 'Author1', 'Topic4', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1005, 'Author1', 'Topic5', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1006, 'Author1', 'Topic6', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1007, 'Author1', 'Topic7', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1008, 'Author1', 'Topic8', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1009, 'Author1', 'Topic9', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(1010, 'Author1', 'Topic10', 30, 50);
Query OK, 1 row affected (0.03 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)
```

## 11. Inserting 10 books from node 5

```
Administrator: Command Prompt - mysql -u root --port 3308 -p
mysql> use bookstore;
Database changed
mysql> insert into Books(isbn, author, topic, totalStock, price)values(2001, 'Author1', 'Topic1', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2002, 'Author1', 'Topic2', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2003, 'Author1', 'Topic3', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2004, 'Author1', 'Topic4', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2005, 'Author1', 'Topic5', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2006, 'Author1', 'Topic6', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2007, 'Author1', 'Topic7', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2008, 'Author1', 'Topic8', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2009, 'Author1', 'Topic9', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(2010, 'Author1', 'Topic10', 30, 50);
Query OK, 1 row affected (0.03 sec)

Query OK, 1 row affected (0.02 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)
```

## 12. Inserting 10 books from node 6

```
Administrator: Command Prompt - mysql -u root --port 3309 -p
mysql> use bookstore;
Database changed
mysql> insert into Books(isbn, author, topic, totalStock, price)values(3001, 'Author1', 'Topic1', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3002, 'Author1', 'Topic2', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3003, 'Author1', 'Topic3', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3004, 'Author1', 'Topic4', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3005, 'Author1', 'Topic5', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3006, 'Author1', 'Topic6', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3007, 'Author1', 'Topic7', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3008, 'Author1', 'Topic8', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3009, 'Author1', 'Topic9', 30, 50);insert into Books(isbn, author, topic, totalStock, price)values(3010, 'Author1', 'Topic10', 30, 50);
Query OK, 1 row affected (0.03 sec)

Query OK, 1 row affected (0.02 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.01 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)

Query OK, 1 row affected (0.00 sec)
```




## 13. Retrieving all data from node 4

```
Administrator: Command Prompt - mysql -u root --port 3307 -p

mysql> select * from books;
```

isbn	author	topic	totalStock	price
1002	Author1	Topic2	30	50
1005	Author1	Topic5	30	50
1009	Author1	Topic9	30	50
2004	Author1	Topic4	30	50
2005	Author1	Topic5	30	50
2006	Author1	Topic6	30	50
3003	Author1	Topic3	30	50
3004	Author1	Topic4	30	50
3005	Author1	Topic5	30	50
3006	Author1	Topic6	30	50
3007	Author1	Topic7	30	50
3010	Author1	Topic10	30	50
1001	Author1	Topic1	30	50
1003	Author1	Topic3	30	50
1004	Author1	Topic4	30	50
1006	Author1	Topic6	30	50
1007	Author1	Topic7	30	50
1008	Author1	Topic8	30	50
1010	Author1	Topic10	30	50
2001	Author1	Topic1	30	50
2002	Author1	Topic2	30	50
2003	Author1	Topic3	30	50
2007	Author1	Topic7	30	50
2008	Author1	Topic8	30	50
2009	Author1	Topic9	30	50
2010	Author1	Topic10	30	50
3001	Author1	Topic1	30	50
3002	Author1	Topic2	30	50
3008	Author1	Topic8	30	50
3009	Author1	Topic9	30	50

## 14. Getting all bookstores from node 5

 Administrator: Command Prompt - mysql -u root --port 3308 -p

mysql&gt; select \* from bookstore;

storeno	city	state	zipcode	inventoryValue
3	Pune	Maharashtra	411003	50
6	Pune	Maharashtra	411006	50
7	Pune	Maharashtra	411007	50
9	Pune	Maharashtra	411009	50
10	Pune	Maharashtra	411010	50
15	Pune	Maharashtra	421005	50
16	Pune	Maharashtra	421006	50
17	Pune	Maharashtra	421007	50
18	Pune	Maharashtra	421008	50
20	Pune	Maharashtra	421010	50
23	Pune	Maharashtra	431003	50
24	Pune	Maharashtra	431004	50
26	Pune	Maharashtra	431006	50
28	Pune	Maharashtra	431008	50
29	Pune	Maharashtra	431009	50
1	Pune	Maharashtra	411001	50
2	Pune	Maharashtra	411002	50
4	Pune	Maharashtra	411004	50
5	Pune	Maharashtra	411005	50
8	Pune	Maharashtra	411008	50
11	Pune	Maharashtra	421001	50
12	Pune	Maharashtra	421002	50
13	Pune	Maharashtra	421003	50
14	Pune	Maharashtra	421004	50
19	Pune	Maharashtra	421009	50
21	Pune	Maharashtra	431001	50
22	Pune	Maharashtra	431002	50
25	Pune	Maharashtra	431005	50
27	Pune	Maharashtra	431007	50
30	Pune	Maharashtra	431010	50

30 rows in set (0.02 sec)