**DBMS Project**

**BSNL Database**

Presented By:

Aditya Kumar Anguria(502)

Dipankar Gosh(113)

Paras Mehndiratta(140)

**Project Report**

The goal of our project is to develop a database for BSNL in MySQL similar to what BSNL uses in real life for maintaining its employees, clients, their services, billings and complains or requests.

Maintaining and organizing the data is the main task of any database management system so there is no conflict and anomalies among the database. The entire database has been coded in MySQL using query languages and commands.

In real world BSNL is uses TCS as its partner for carrying out these data management tasks.

The following steps have been used for creating the project:-

1. Write the functional requirements of the project.
2. List out all the entities and their relationships.
3. Prepare the entity relationship diagram.
4. Convert the entity relationship diagram into relational tables.
5. List out if any anomalies occur in the tables.
6. Normalize the tables if any anomalies are present.
7. Implement the tables in MySQL.
8. **Functional Requirements:** The basic functional requirements of the project are –

* BSNL has employees and customers whose information in stored in the database.
* BSNL provides three type of connections – Mobile, Landline (Fixed) and Internet.
* Bill(s) are generated for each customer depending upon the services the customer utilizes and connections the customer has.
* Customer can also make/launch a request or complain regarding a services/connection, this is also stored in the database.
* A customer can have multiple connections and services.
* An employee manages or responds to complain/request.
* A BSNL master is maintained to keep track of all the connections relating to each customer.
* An employee may or may not have a manager/supervisor.

1. **List of all entities:** The list all the entities required in the database are –

* BSNL\_Master (Customer\_ID, Connection\_ID, Connection\_type)
* Customer (Customer\_ID, Name, Gender, Date\_of\_birth, Email ID, Address, Photo ID, Address Proof, Category Code, Concessional Group Code, Date, Nationality, Contact No.)
* Landline (Connection\_ID, Number\_of\_Connections, Purpose, Connection\_Category, Telephone Required, Internet Wiring Required, Traffic Plan, Initial Payment, Applicant\_Type)
* Mobile (Connection\_ID, Type, Status, Number\_of\_Connections, Services, Traffic Plan, Initial Payment)
* Internet (Connection\_ID, BSNL No., New Connection, Type, Traffic Plan, Modem Required, Initial Payment)
* Bill (Customer\_ID, Connection\_ID, Period, Total Amount, Status, Remaining Amount, Last Date)
* Employee (Employee\_ID, Name, Address, Department, Salary, Date\_of\_birth, Gender)
* Complain (Complain\_ID, Customer\_ID, Connection\_ID, Employee\_ID, Date, Type, Description, Status)

1. **Entity-Relationship Diagram:** The E-R Diagram of the database along with their relationship with each other is draw bellow –
2. **E-R Diagram into relational tables:** The E-R diagram after conversion to relation tables gives the following tables –

* BSNL\_Master (Customer\_ID, Connection\_ID, Connection\_type)
* Customer (Customer\_ID, FName, LName, Gender, Date\_of\_birth, Email ID, Street Address, Locality, City, State, Pin code, Photo ID, Address Proof, Category Code, Concessional Group Code, Date, Nationality, Contact No.)
* Landline (Connection\_ID, Number\_of\_Connections, Purpose, Connection\_Category, Telephone Required, Internet Wiring Required, Traffic Plan, Initial Payment, Applicant\_Type)
* Mobile (Connection\_ID, Type, Status, Number\_of\_Connections, Traffic Plan, Initial Payment)
* Services (Connection\_ID, Description)
* Internet (Connection\_ID, BSNL No., New Connection, Type, Traffic Plan, Modem Required, Initial Payment)
* Bill (Customer\_ID, Connection\_ID, Period, Total Amount, Status, Remaining Amount, Last Date)
* Employee (Employee\_ID, Name, Address, Department, Salary, Date\_of\_birth, Gender)
* Complain (Complain\_ID, Customer\_ID, Connection\_ID, Employee\_ID, Date, Type, Description, Status)

1. **List of all anomalies:** The following anomalies occur in the above converted tables –

* The table of ‘Services’ have a conflict in relation with the table ‘Mobile’ and the table ‘Services’ also needs to be linked with the tables ‘Landline’ ‘Internet’ and ‘Bill’.
* Each of the particular service attributes should be removed from the tables ‘Landline’ and ‘Internet’.
* There is a problem in the table ‘Landline’ regarding Concessional Group Code and Category Code. We need to create a separate table for these two attributes.
* There is an insertion anomaly in the attribute Department of the table ‘Employee’. Therefore, we need to create a separate table for ‘Department’.

1. **Normalization:** Therefore the normalized table removing all the above anomalies are -

* BSNL\_Master (Customer\_ID, Connection\_ID, Connection\_type)
* Customer (Customer\_ID, FName, LName, Gender, Date\_of\_birth, Email ID, Street Address, Locality, City, State, Pin code, Photo ID, Address Proof, Category\_ID, Concession\_ID, Date, Nationality, Contact No.)
* Category (Category\_ID, Description)
* Concession (Concession\_ID, Group)
* Landline (Connection\_ID, Number\_of\_Connections, Purpose, Connection\_Category, Traffic Plan, Initial Payment, Applicant\_Type, SerConn\_ID)
* Mobile (Connection\_ID, Type, Status, Number\_of\_Connections, Traffic Plan, Initial Payment, SerConn\_ID)
* Services (SerConn\_ID, Description)
* Internet (Connection\_ID, BSNL No., New Connection, Type, Traffic Plan, SerConn\_ID, Initial Payment)
* Bill (Customer\_ID, Connection\_ID, SerConn\_ID, Period, Total Amount, Status, Remaining Amount, Last Date)
* Employee (Employee\_ID, FName, LName, Address, Department\_ID, Salary, Date\_of\_birth, Gender)
* Department (Department\_ID, DeptArea)
* Complain (Complain\_ID, Customer\_ID, Connection\_ID, Employee\_ID, Date, Type, Description, Status)

1. **Implementation in MySQL:**

















