Project Name: Phone Call Management System

PHASE - I
DATABASE MANAGEMENT & APPLICATIONS

1. REQUIREMENTS DOCUMENT

A phone company requires to maintain records of every user subscribed to it's services. These records include mentionable personal details about the user that are necessary to ascertain the identity of the user, have information to various methods of contact to the user in case of either promotional contact or sending bill receipts and details about his choice of plan among those provided by the company, among other useful information. It also needs to maintain logs of calls made by the user, and the calls received by the user, irrespective of whether the person on the other end of the call is a registered user to the same company or not. The company cannot restrict a user to be able to make a call to another user if and only the other user is a registered user of the same company, keeping in mind the business ideologies of a for-profit organization. Lastly, the company also needs to keep track of the amount to be paid by each user so as to be reliably able to generate a monthly(or whatever the bill cycle is, per the policy of the company) bill and sent it to the user. The user may or may not use internet services. Hence, the need for the company to maintain various means of delivering the bill, which can be accomplished using any of either the contact information that was initially collected from the user, or his address to send him or her a hard copy of the bill. The bill payment is to be endorsed upon receipt by the user. This is the responsibility of the user. Upon failing to do so for a consecutive number of bill cycles, as specified in their contract, the company would be eligible to immediately discontinue it's services. At the core of the technological problem, all the necessary requirements are ideal to be salvaged by the use of a relational database, which not only makes it considerably more convenient but also, at the very same time, incredibly reliable.

2. DATABASE REQUIREMENTS

In order to use the calling services, user has to register himself in the application's database. For this user has to provide an identification proof and address proof. If these details are verified, user has to further provide the organisation with required personal details to register. Once the user is registered, he would be able to utilise the calling services provided by the company. The billing cycle starts from the date on which the user is assigned the phone number(s). For every call a user makes and receives, a log is maintained to store this history in the application database. The log for the case a registered user is the caller or receiver are maintained in two separate

chunks. In case a call is made from a registered user to another registered user, an entry will be made in both the chunks. Only the entries in the former would be used to generate bills. The two logs would individually support various queries, and support for further development, in case of extra services to be added in the future.

Each entry in the call logs would be accompanied by timestamps pertaining to the start and end of that particular call, along with the caller and receiver information. In case either is not a registered user, only the phone number will be stored, otherwise the unique ID provided to the user at the time of registration. The call would be considered belonging to a certain period if it's finishing time stamp lies inside that period.

Bill generation process may be carried out in a monthly cycle, depending on the plan chosen by the user. To generate a bill for a month for a user, all calls made by that user (entries corresponding to the user's unique ID in the caller's log) will be fetched such that the call's finish time lies in that month and the total talktime will be calculated for those entries. This would be processed using the plan chosen by the user and a amount payable would be generated.

3. CONSTRAINTS

1. A new user is added to the table if his identity and address are verified.
2. Each user will be provided with a unique ID.
3. A user can either be active or inactive.
4. All active users should have unique phone numbers. 5. Billing is done on a monthly basis.
6. Bill due should not be extended by more than 6 months.
7. Billing is done only on the calls made by a registered user.
8. No limit on the duration of a call.
9. An entry of a call is added only after it has been disconnected.
10. Calls made and calls received by a caller should be individually handled.
11. A registered user can make or receive calls independent of their respective call centers.
12. A quantitative measure in terms of the number of billing cycles overdue is maintained and updated upon the generation of a new bill and payment of the old bill.
13. The Storage must have consistent and accurate data on the call records.

4. APPLICATIONS REQUIREMENTS

1. Addition of new user
2. Update user info
3. Archive a user
4. Add entries for each call
5. Generate a monthly bill
6. Display all calls made by a certain user in a specified period.
7. Display all calls made in a specified period.
8. Display list of dialed numbers by a certain user in a specified period.
9. Display all calls made to a certain user in a specified period.
10. Display list of dialed numbers to a certain user in a specified period.
11. Display the most frequently called user in a specified period.
12. Display the most frequently called number by a user in a specified period.
13. Display the most frequent caller to a user in a specified period.
14. Add details about payment of bills.
15. Display all users.
16. Display all users of a particular area,
17. Display all users who have not paid bills for the specified duration (in months).
18. Display all the active numbers and their location for a particular user.
19. Display all the active numbers of an area.
20. Display all available free-to-allocate - numbers.
21. Adding a new calling plan.
22. Opdaling an existing calling plan.
23. Archiving a calling plan that becomes inactive.
24. Displaying all active calling plans for a user.
25. Display all available calling plans for an area.
26. Suggest a calling plan according to users' end requirements.