Abstract—PoC is a part of the IP Multimedia Subsystem service, and provides one to one and group call through a half-duplex VoIP technology. The Group List Management Server (GLMS) in PoC is the auxiliary functional entity to provide services for the PoC contact list management, group list management, etc group business capabilities. In paper the GLMS as the research object is analyzed of the PoC service needs. Finally, a PoC GLMS is designed and realized.

Keywords—PoC, Group list management, Pre-arranged PoC Group User

I. INTRODUCTION

PUSH-TO-TALK over Cellular (PoC) [1] is a “walkie-talkie” service designed for mobile networks. In this service, several predefined PoC group members participate in one PoC session. Since the PoC session is half-duplex, only one PoC member speaks at a time, and the others listen. When a PoC member attempts to speak, he presses the button of his mobile terminal to apply the permission. This mobile terminal with push-to-talk function is called the PoC client.

The Group List Management Server (GLMS) in PoC system is the accessibility entities of the PoC server. It is not directly involved in the PoC session establishment and control, which is used by PoC users to store their contact information list, group list function and access control policy on the server. The GLMS in PoC system provides the group access capability for the PoC Server, and supports all specific functions in PoC. Figure 3 shows the logical structure of the OMA PoC specification in PoC system. Among them, The XML Document Management achieves GLMS function [2].
GLMS provides the following features for the PoC:
(1) Provide a list of management operations. For example, the creating, modifying, reading and deleting of the group list;
(2) Provide a storage of group list;
(3) Access control policy management [3].

III. GROUP LIST MANAGEMENT

The group list management is defined by OMA PoC XDM, and its aims at achieving the creation, deletion, updating, and query for group list and group member [4]. In PoC session, the group is created by an owner, and the other users are invited to join the group. The members of the group can look over the information of the group. Usually, only the group owner who creates the group can update and delete the group information. The group information includes the group name, PoC special service information, the visibility and the permission right. The group owner can invite others to join the group, and delete someone from the group. The group members can modify themselves attributes and exit the group in permission.

The partly XCAP rules is described by OMA PoC XDM as follows:
(1) AUID is org.openmobilealliance PoC-groups;
(2) The style of the MIME is application/vnd.oma.poc.groups+xml;
(3) Namespace is um:oma:: xml:PoC:list-service;
(4) Users tree stored in the users list of each group is only one list-service elements;
(5) Group list should use the form of SIP UIR. And, the SIP UIR in group should be the only.

Group inquiry function is defined by the following mechanism: in the index document of the global tree which can have more than one list-service elements. All users group list is stored in the index documents. This PoC Server can be used as a XDMS to send XCAP request, and get the contents of the group by the group label. That is, if only the users tree of the document is changed (such as create, delete and update), the index documents of the global tree should be changed. So, PoC XDMS should avoid the ordinary users to change the index document of the global tree.

IV. SIMULATION

The PoC service management system is developed by Myeclipse 8.0 and Mysql database in Linux. Its main functions include: the adding, deleting, modifying and updating users, and the adding temporary users.

A. Database Design

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Type</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>integer</td>
<td>Key Word</td>
</tr>
<tr>
<td>Username</td>
<td>integer</td>
<td>Username</td>
</tr>
<tr>
<td>Password</td>
<td>integer</td>
<td>Login password</td>
</tr>
</tbody>
</table>

Mysql database needs three forms to store data as follows:
(1) Login: It stores login information of administrator user;
(2) User: It stores user information, such as user number, username, user level, and group number;
(3) Groupuser: It stores the pre-defined user group number and the temporary number group which is generally defined as no more than 10 users.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Type</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>integer</td>
<td>Key Word</td>
</tr>
<tr>
<td>Username</td>
<td>integer</td>
<td>Communications User Name</td>
</tr>
<tr>
<td>Usernumber</td>
<td>integer</td>
<td>Communications User number</td>
</tr>
<tr>
<td>Userlevel</td>
<td>integer</td>
<td>Communications user priority</td>
</tr>
<tr>
<td>Groupnumber</td>
<td>integer</td>
<td>Communications User Group Number</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Integer</td>
<td>Key Word</td>
</tr>
<tr>
<td>Groupnumber</td>
<td>Integer</td>
<td>Temporary group number</td>
</tr>
<tr>
<td>User1</td>
<td>Integer</td>
<td>Temporary group members</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>User10</td>
<td>Integer</td>
<td>Temporary group members</td>
</tr>
</tbody>
</table>

B. WEB Development

Myeclipse is used to develop WEB which connects to the database. The JSP language is used to add, delete, change, check users, and modify black list, white list.

The part codes connected to the database is as follows:
```java
<%@ page language="java" import="java.util.*" pageEncoding="UTF-8"%>
<%@ page contentType="text/html; charset=gb2312" language="java" import="java.sql.*" %>
<%ResultSet rs; Connection conn;
String username=request.getParameter("userName");
String password=request.getParameter("passwd");
String driverName="com.mysql.jdbc.Driver";
```
The WEB is used to achieve the group list management services, and it is appropriate to visit the group list management server simultaneously by the terminal and the server. Figure 3 is the development interface for the server management.

C. Function Realization

WEB GLMS is to access by eclipse 6.0 and the Android SDK 2.0. The PoC was implemented by adding, deleting, modifying user group list information, and adding, deleting temporary groups of users. Figure 4 is a screenshot through Android phones to access GLMS. From this we achieve group list management through GLMS. It is used to achieve the PoC service [5].

V. CONCLUSIONS

In this paper, the GLMS is analyzed. We design a GLMS by WEB and database. The job will work for PoC service in next step. On the one hand, PoC service can open up new markets, and does not affect the original voice services. On the other hand, it can increase data revenue. The operator's Average Revenue Per User (ARPU) is improved effectively. GLMS as PoC system support subsystems will play its due role.

REFERENCES

[1] OMA, Push to talk over cellular (PoC) - architecture, OMA-AD-PoCV2.0 1-20080226-C Candidate Version 2.0[S], 2008, 9.