



## Implementation of an Instant Messaging Tool

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**Abstract --** Instant messaging (IM) becomes a vital part of our daily use in social media and internet network. The growing of communication needs reliable and fast technologies and tools. As a result, companies are implementing various IM applications such as QQ, We Chat, What Sapp, MSN Messenger, and Skype, allowing user to send and receive messages with many others at same time. Therefore, designing and implementing an IM tool to meet the user's and organization's desires is very significant. In this paper, IM software based on TCP and UDP protocols has been developed with visual C++ and WinSocket. The aims of this paper are to improve IM service and enhance session control. The developed IM tool has been tested with one server and several clients. The results demonstrate the effectiveness of in terms of authentication control and communication reliability for server and clients. It is observed that the proposed study can be applied in large-scale real-time worldwide communication systems.

**Keywords—** instant messaging tool, Architecture of messaging tool, Detailed design of server model, detailed design of client model, detailed design of message protocols

### I. INTRODUCTION

Instant Messaging enable individuals to exchange text messages and track availability of a list of users in real-time [1]. The popularity of an online service depends on many factors, such as ease of use, uniqueness, usefulness and a little bit of luck. But no matter how many people are willing to use a communication service, it is not going to be a success when the architecture is not able to handle the load [2]. The instant messaging (IM) becomes one of the most frequently used applications on the Internet. IM-chat is happening in a period, as the on-line chat systems allow messages to be sent to other users without "Login" offline messages [3]. Today, Instant Message Tools are widely applied in organizations. By using this kind of software, people online can get response in a short time after sending message to other online users, this is a way of real-time communication and chatting. For most people, it is cheaper than chatting by telephone; furthermore, the newest IM software integrated functions such as data transmission, voice chatting, video conference, and e-mail, etc. Some analysts call IM as "real-time e-mail".

For enterprises, IM exploits new area for web-services. People approve IM software not only for fun and chat, but also for excellent performance in business communication. The attraction in business is obvious to see: on one hand, it will tell the stuff weather other colleagues online, to prevent wasting time on telephone or informing conference and this kind of affairs. On the other hand, it provides a real-time dialog to catch the business opportunity, especially for the interaction between companies and their customers [4]. The motivation of instant messaging usage has presently become a very important subject of psychological study. IM application provides user a brief connection time than other older applications do. Also, IM offers quick and useful strategies for people in troubles. As a result, QQ becomes the most popular instant messaging software employed in China.

All along, the distance in space is the biggest obstacle for people to communicate with each other. Shortening the space distance between each other will make everyone your neighbour, this become the urgent desire of people. With the development of computer network and communication technology, people are no longer satisfied with relying solely on email to communicate. More immediately intuitive is that people can identify the online Internet users and exchange their messages in real-time. Therefore, the instant communication technology comes into being. Since electronic mail invention, it is the rapid rise of online communication, a real-time chat, to provide a communication platform for Internet users. In addition, the instant communication and social networking, unified communications, and online collaboration will become the three major hot spots of relationship. These hot spots become more and more closer, and have formed a trend of integration and development.

In the consumer market, instant communication has become a social network of important support application; in the enterprise market, instant communication of general adaptive application value for the enterprise unified communications, and online collaboration has produced important influence[5], so the application of instant communication technology will become more and more widely, more and more common. Within the mid-1960s, Initially a number of these systems were used as notification systems for services like printing. However quickly were accustomed facilitate communication with different users logged into the identical machine. As networks developed, the protocols unfold with the networks. A number of these used a peer-to-peer protocol (e.g. talk, talk and talk); while others needed, peers to attach to a server (see talker and IRC). The Zephyr Notification Service (still in use at some institutions) was invent at MIT's Project Athena within the 1980s to permit service suppliers to locate and send messages to users [6]. Instant messaging parallel to chat facilities, the earliest of that was Talkomatic (1973) on the philosopher system. throughout the bulletin board system (BBS) development that peaked throughout the 1980s, some systems incorporated chat options that were just like instant messaging; Free-lancing' round-table conference [7].

The first another business on-line chat service (as the critical philosopher, that was educational) was the CompuServe CB machine in 1980. Early instant messaging programs were primarily real-time text, wherever characters appeared as they were typewrite. This includes the UNIX "talk" command program that was common within the 1980s and early 1990s. Some BBS chat programs (i.e. celerity BBS) conjointly used an analogous interface. Trendy implementations of period text conjointly exist in instant messengers, like AOL's period IM as an associate optional feature [8]. In the latter half the 1980s and into the early 1990s, the computers offered user-to-user messages between at the same time connected customers developed by Quantum that provides on- line communication for short, and later "Flash Mail." (Quantum Link later became America on-line and created AOL Instant traveller (AIM), mentioned later). whereas the Quantum Link client package ran on a commodore sixty-four, victimization solely the Commodore's PETSCII text-graphics, and OLMs would seem as a yellow bar expression "Message From:" and conferred a listing of options for responding[9].

In and of itself, it can thought of a graphical user interface (GUI), albeit far more primitive than the later UNIX, Windows and Macintosh based mostly graphical user interface IM package. OLMs were what Q-Link knew as "Plus Services" that means they charged an additional per-minute fee on high of the monthly Q-Link access prices [10]. In the 1990s, instant messaging predates the web, initial showing on multi-user operational technic like Compatible Time-Sharing System (CTSS) and Multiplexed data and Computing Service (Multics) [11].

## 2. METHODS

### 2.1 - ARCHITECTURES OF THE MESSAGING TOOL

In network programming is the most commonly used program is Client/Server model. In this scenario, a client application requests a service from a server. A service program usually at a well-known address monitoring of service request. That is to say, service process has been in a dormant state, until a client to address the proposed connection request. The service program is "awakened" and provides services to the customer a response to the customer's request. Socket can be classified according to the nature of communication, the characteristics of the user visible. Applications generally only in the same kind of socket communication. But as long as the underlying communication protocol allows, among different types of sockets would still be able to communication

Windows socket MFC class: C visual ++ for a large number of socket function package, MFC provides the package is CAsyncSocket and CSocket class, they make the programming work is relatively simple, especially CSocket class:

In form of a call back function to express the CAsyncSocket classes offer only the abstract is would be associated with the socket windows messages. It brings only convenient is the programmer based need to dispose of the Winsock I free / O model, and for such as blocking processing, byte order differences and Unicode and still bears the responsibility and flexible control. The CSocket class is derived class of the CAsyncSocket class, which provides the use of socket through the CArchive object the more advanced the abstract. Csocket class more easily than the CAsyncSocket class, it inherits many package CAsyncSocket class member functions of API, and most of the management aspects of communication, which allows users to extricate themselves from the original to using the original API or CAsyncSocket type of complicated work. More important is CSocket and the CArchive class provides a blocking function is very important for the synchronous operation of the CArchive object, and through the use of CSocket together with csocket file and CArchive to send and receive data of the management object, to send data and easy. The following programming model CSocket and object serialization technology and CSocket.

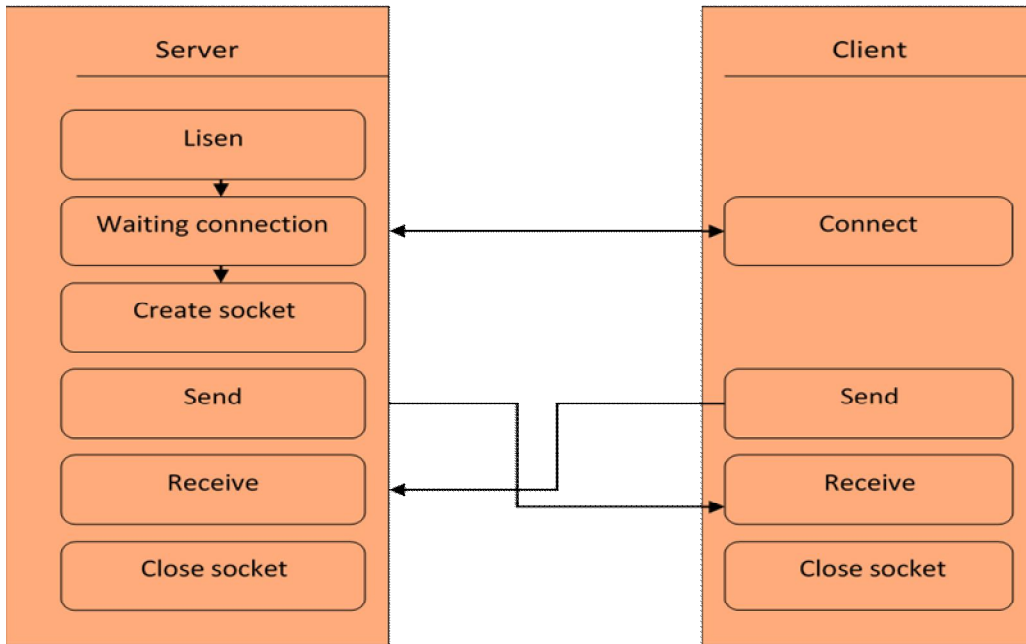


Fig. 1 System connection between server and client

## 2.2 - DETAILED DESIGN OF SERVER MODULES

The server design as program that will listen to clients then accept to connect. After data processing, it is first set up and open monitoring; lock the input box cannot be change. Then we first affirmed the variables of a character buffer. Before receiving data, we will empty the cache data, at the same time in the end with end labelled. In the server to receive other client to the corresponding IP and COM port data, we combine the received data together with the corresponding to the received user name combination format into a string, printed on the receive window. A recitation user online and offline message function, when a new user access, suggesting a new user access, all the client with server can receive prompt information, at the same time, the user is offline, will also receive the corresponding prompt

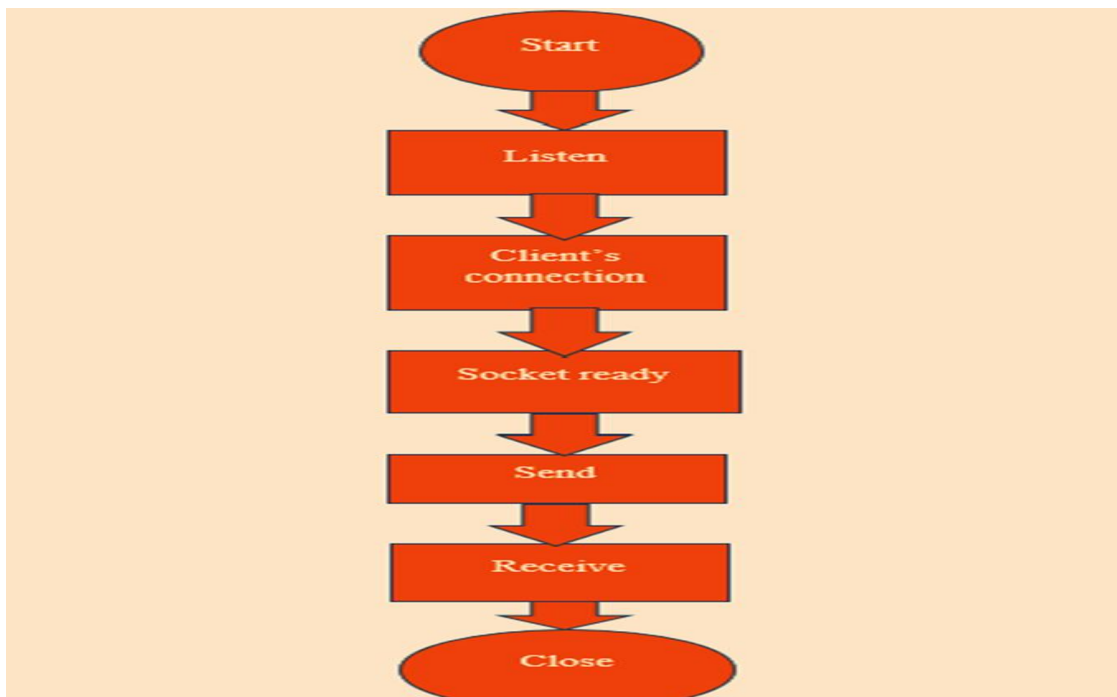


Fig. 2 flow chat of server detailed

In the creation of the socket and the communication process, will use many functions to deal with the relevant events, the specific function:

- (1) *At SocketInit: this function in the application function to initialize the call, used to determine the Winsock version and do some of the initialization of the socket.*
- (2) *Create: create a socket; in the creation of the listener socket must be couple with the port number.*
- (3) *Listen: listen to the socket, used to monitor the socket to send commands to monitor the port.*
- (4) *Connect: client socket dedicated, to send a connection request to the server.*
- (5) *Accept: listen to the socket dedicated, to accept the client to send through the network connection request, establish a connection.*
- (6) *Send: used to send data to the socket.*
- (7) *Receive: used for socket receiving data.*
- (8) *Close: close the socket, the destructor calls.*

Using C Socket to establish the communication system has two main modules: client and server. In the server software interface, a monitor button, click this button, lock we set the parameters, and load parameters into memory, and processing, the software prompts connection status, whether to create a successful connection, otherwise popup error message is printed, or appear error parameters, a pop-up window and print parameter error information. In the whole communication process, when an event is trigger the application framework will receive some messages, which will automatically call the response function.

### 2.3- DETAILED DESIGN OF CLIENT MODULES

In detailed design of client the communication process, will use many functions to deal with the relevant events. The specific function that built the client module as:

- (1) *Accept: the listener socket in the port to hear the connection request application framework automatically called to inform you can accept the request or refused to connect. Can call Accept to connect the request, establish a connection.*
- (2) *Connect: when the client socket for connection request is completed, the application framework calls the function, and it is successful.*
- (3) *Send: the framework calls this function to notify the socket can now call the Send function to send data.*

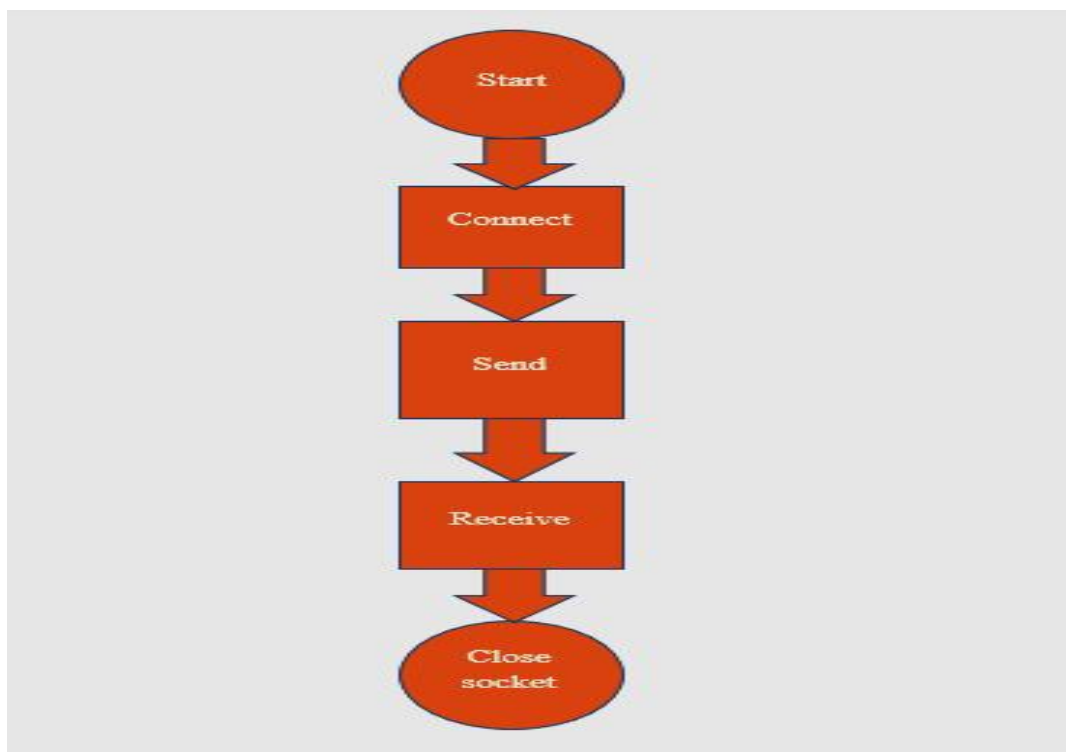


Fig.3 flow chat of client detailed

- (4) Receive: the framework calls this function to tell the socket can now call the Receive function to retrieve data from the data buffer.
- (5) Close: the framework calls this function to inform the socket has been disconnect from the other side of the socket

Client is mainly dividing into three windows. The first is connection window, need to enter the connection to the server settings information; the second is chat information display window, the window display since the login server send and received the messages; the third is message editing and sending window opening and need to input you want to send information content then send. In the whole communication process, when an event is trigger, the application framework will receive some messages, which will automatically call the response function.<sup>12</sup>

#### 2.4- DETAILED DESIGN OF MESSAGE PROTOCOLS

The clients and server act by some kinds of protocols .The protocols that may use at designed of client and server system (IM system). The used protocols should offer facility and skill for seeing the connected clients. This protocol should enable client for adding and removing. The used protocols should enable clients to create oral communication consistently .This protocol should separate the message from each other's. The protocol should offer the time of the incoming message from transferring peer [13]. In this study, use some protocols in designer of client and server system. We test the program using two different ways: one is the LAN network; the second is connecting to the network server. The used protocols of UDP should offer facility and skill for seeing the connected clients [14].

#### 2.5- HEART BEATING TEST BETWEEN SERVER AND CLIENTS

In my heart-beating test between server and clients, we improve that if server does not receive the message at 20 seconds for example. The server must send message to appear that no think received.

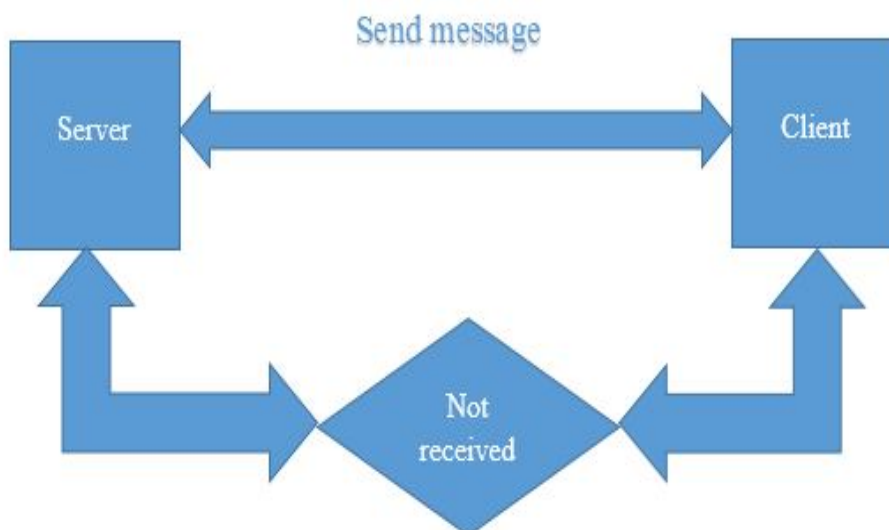


Figure 3.5 Flow chart if server not received message at 20 sec

Data packets aren't sent with each single modification created to some object; rather, snapshots (usually 20/sec) are created that contain all entity changes since the last update. What is more, not all entity changes are sent to any or all purchasers all the time: to stay the network information measure as low as attainable, solely entities that are of attainable interest for a consumer visible, audible etc. are often updated.

I initial statement of the necessity to use the function, so initialize the input box characters, this a part of the communication network, we tend to use CSocket functions usually used, that contains the communication network receives, monitor, shut connected to the network.

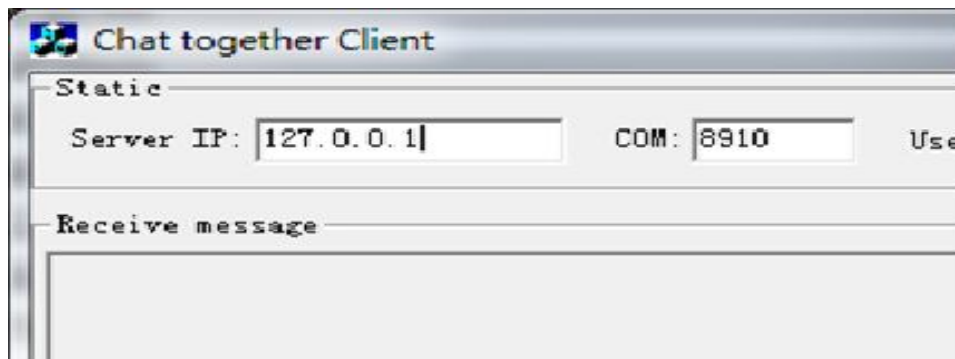
After processing, it is initial established and open monitoring; lock the input box cannot be an amendment. Then we tend to initial affirmed the variables of a personality buffer. Before receiving information, we will empty the cache information, at a constant time within the end with end labeled. Within the server to receive alternative client to the corresponding IP and COM port information, we tend to mix the received information in conjunction with the similar to the received user name combination format into a string, written on the receive window.

### III. RESULTS AND ANALYSIS

We test the program using different ways: one is the LAN network; the second is connect to the network server and external test as shown below.

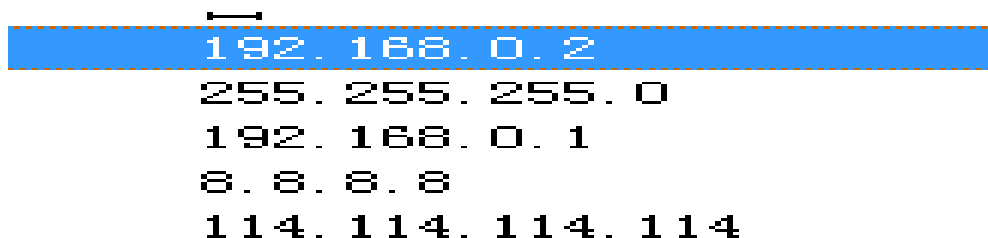
#### 1. LOCAL TEST: THE CLIENT SET THE IP ADDRESS: 127.0.0.1.

The first way is (LAN): we are in the local area network, using a computer as a server, a computer as a client, the server and the client computer running the corresponding procedures. Client IP address of the server and we keep consistent COM port, at this point, we first will run the server program, click on the monitor, and on more than one computer running the client program, click on the link, at first the software has received data without end identification error, modified, this software has been able to normal operation.



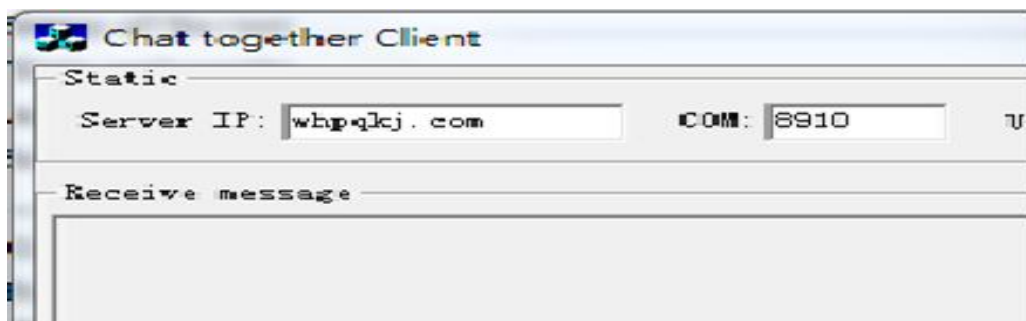
#### 2. LAN TEST: THE CLIENT TO SET THE IP ADDRESS FOR THE SERVER IP ADDRESS ON THE COMPUTER.

The second way Connected with the network server: concerning network operation of the server connection with the server. To run the server program. the remainder of us within the multiple connected to the internet pc running the client program, take a look at in ways in which are similar to the previous computer network tested over and another time discover software system incorporates an excellent work has finished the primary plan.



#### 3. EXTERNAL TEST: ON THE CLIENT IP ADDRESS FOR THE DOMAIN NAME: WHPQKJ.COM

In addition, we make external test by Connected with the network server: about network operation of the server connection with the server that's IP server (whpqqj.com) to run the server program.



As a result of studying, will implement instant messaging tool biased on server and client's program. The implementation of instant messaging (IM) system in VC++ language. The clients are a program that work when connect with server open as network connection.

The client open network connection with IM server at specify the IP Address and port number .when the connection is open ,the clients program will show the clients list interface to do the interaction .The server is a program that accept connection or not with clients, .The server should able to process and maintain a huge number of client's connection. At same time, the clients should able to connect or disconnect with server when it is possible. The server is main responsible for clients status and able to make clients request without interrupt. When the connection is accruing, the transferring begin among clients. The file or text exchange among clients at session layer. When transferring is accrue the IM system is achieve its work correctly. The exact natural of clients and server system is different may be the connection between clients or clients and server. The transferring must be instantaneously between the connection peers. When the message is arrive from client, it must display immediately. The receiver should not held the message long time without response.The following is the result of the test that show the server program execution with the client program .The result show that server can send a message appear which IP address and port number will connect. When server send messages, clients will receive that messages if the status is online or offline. The client can send and receive message to server and other clients.

The operation of results, we can see that software preliminary take a look at is a success. The facts on the variety of clients, the idea is in step with the increase in unrestricted server hardware configuration and processing performance, because of we simplest about the feature of the concern; the surface is the focus needs to be located on the management of information message. I did not longer prematurely for load test, from the above consequences, I are able to see that the features of the software program have main, have a terrific experience, software program settings, and format, fashion is quite affordable.

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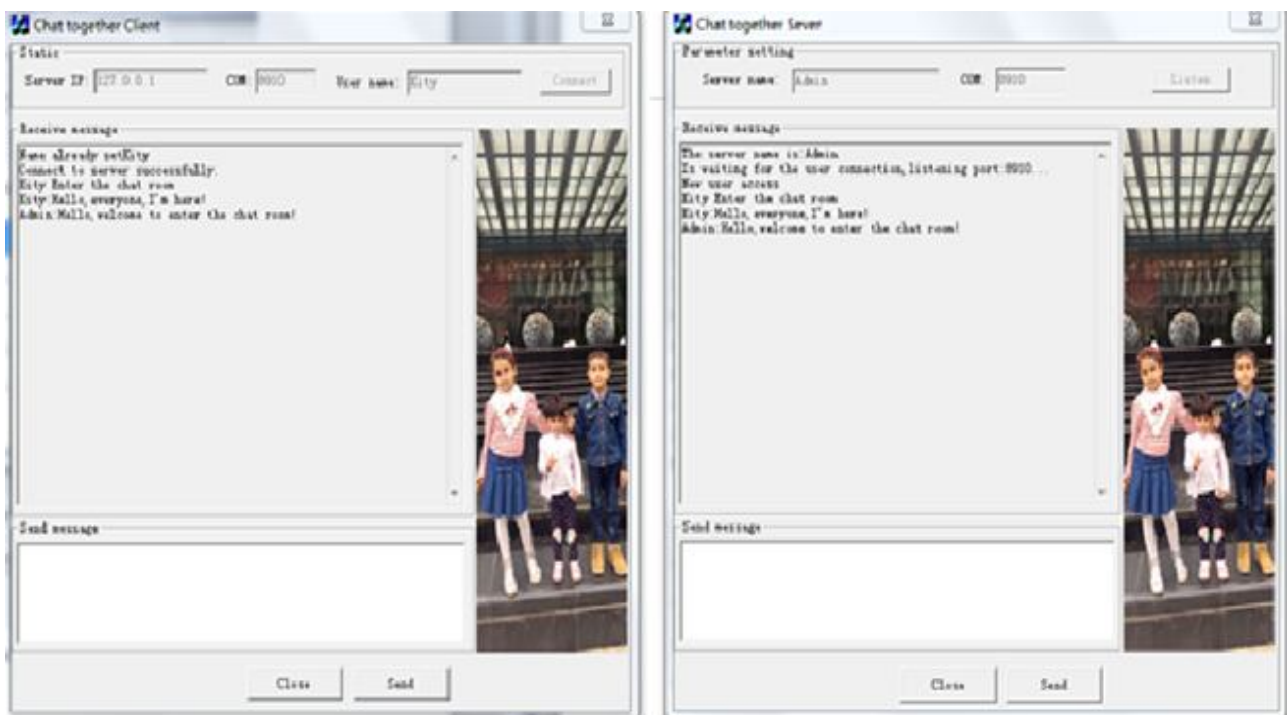


Fig. 4 server and client chatting

#### IV. CONCLUSION

The wide use of Instant Messaging made searchers to implement and design many types of instant messaging tools which supply customer's needs in real time that depend on the type of instant messaging tool and the size of message.

In the thesis, the mechanism and architecture of IM are investigated. To implement my IM tool, the UDP protocol and session control are thoroughly studied and described. I introduce a way to find chat clients like CHORD. My IM tool is then implemented with Visual Studio C++ and WINSOCK API.

Finally I test the IM tool. The major work includes: I analysed several instant message tools such as Skype and QQ. The QQ let me understand the way of network communication. Based on the way, I design the architecture of my IM tool.

I study several methods of client organization and finding. To quickly find the chat clients, I designed a mechanism similar to CHORD and design the data structure to implement the method of client storing and finding. The clients are identified by their IP address and Port number.

I Study UDP & TCP protocols that used in transmitting in layer that help to check the transferring among server and clients. Also, the structure of P2P network topology is studied. At last, I choose WINSOCK to implement the communication between sever and clients in which the UDP communication interfaces are provided.

I develop programs for server and client. Implement server program that can listen and allow clients connection, process clients request to answers, allow transition among server and clients after checking clients IP and port number. I implement the client program that can send and receive messages.

Finally, the IM software is tested on different networks with different number of clients. In the testing, the clients are entering and leaving randomly. The test results show that my IM tool can be used in different environments and the respondent sounds reliable and fast.

As the future work, I will improve my project to general-purpose instant messaging tool, increasing the communication option, adding more effective functions, and improving messaging securities.

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