

A Study on Network Game Based on Client/Server

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Abstract - A server is simply a computer that is running software that enables it to serve specific requests from other computers, called "clients." Distributed systems are considered by some to be the "next wave" of computing. A collection of probably heterogeneous distribution systems is transparent to the user so that the system appears as one local machine. This paper is going to search about whole of Client/Server distributed systems environment through network game. This paper presents game by one example of network game. The ladder game uses JAVA and embody to do random every time using Random function and remainder operation repeatedly. Analyze execution principle of network game through this game and investigate about Client/Server's distributed environment through this.

Key Words : Client, Server, Distributed Environment, Java, Ladder Game

1. INTRODUCTION

Today, according to a network development and fast supply of Internet, the influence of the Internet is fast growing. The distributed environment of the Client/Server and Client/Server environment can be said as main element of computing environment. Also, the market of network game is growing quickly with introduction of multimedia and it is also known by the fact the game market have shown a growth of 15.8 % higher than in 2003 and the network game occupies 66.3% of the market[1]. In general, the network game is maintaining the structure method of distributed environment. The distributed environment technique is the space of imagination designed to interact each other by real-time for the users who are not in some place.

Study about this distributed environment technology may ultimately change present Internet environment and state of operating system[8]. In this paper, we try to find out Client/Server structure for distributed processing and distributed environment of which we want to comprehend through ladder game developed by JAVA that is

independent from platform. This paper is organized as follows. Section 2 shows the background of distributed environment. Section 3 describes distributed network Client/Server function. Network ladder game is presented in Section 4. Finally, conclusions are given in Section 5.

2. BACKGROUND OF DISTRIBUTED ENVIRONMENT

In beginning, enterprise's electronic computing system could be connected to network and input at far away terminal but it was the concentrated system. That is, system of primitive enterprises was a thing which is possible individual processing that communication is impossible mutually by system that depend on processor of high efficiency mainframe computer. But, distributed processing system is several processors and network itself that is linked each other by network. This system is planned with special objective. The form of the system is combined with each other. That is, distributed processing system exists at the different position and is designed by form that the processors are connected each other by telecommunication.

2.1 Distributed System Introduction

Distributed system with parallel processing, distributed object, object Management System and P2P offers scattered resource, partially. The supplied extent of distributed resource is different slightly in every systems, and mostly shared resource is CPU. Though this occupied

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接受日字 : 2005年 12月 5日

最終完了 : 2006年 3月 27日

major resource on computer, if store system also is used, user can secure more storage spaces. It is necessary to understand the concept of basis programming and distributed environment to use present distributed resource and full knowledge about special quality of specification system and programming module[7]. Static computer resource and expense that can operate it happen at programming and executing the program.

Therefore when users want to use distributed resource, certainly user needs to familiarize the concept and library of system and module well. Like what the paper suggests above, if distributed resource can be used independently and general programming concept can be made, other person can use and offer his own resource when their computers were not used. Then, there may be no expense that cost in space and administration for specification system and work that user wants to use the scattered resource easily by oneself and handle it[2].

Table 1 Distributed system

	Currently embodiment system
Programming language	C, C++, JAVA, ADA
Composition form	Library
distributed resources concept	Need
Support resource	CPU
Program server/client	Need

3. DISTRIBUTED NETWORK CLIENT/SERVER FUNCTION

Client requests service to other programs, and the server responds to the request. Client/Server concept has better function in network environment although it can be applied in single computer. Client/Server model in network provides expedient means that attach programs scattered over several other areas in network. Client/Server model became network computing main concept. Programs for most businesses forming today are applying client/server model and TCP/IP, main program of the internet, is also same[9]. For example of Internet, Web browser is a client program that demands transmission of Web page or file through Internet.

In general Client/Server model, when server program called daemon is activated first, and waits client's requirement, one server program is shared by many clients.

3.1 Client/Server Environment

Client/Server environment is multiprocessing environment shared by both processor(client) and public ownership host processor(server). Intending open-end, it is working mutually as well as independently. Information island where information is isolated does not happen. Network game is largely divided into IPX(Internet Packet Exchange) base game and TCP/IP base game[6]. First, network game of IPX base is a game for over 10 persons on local area network operated by the connection intention type protocol for game for user. It needs more than one server.

TCP/IP base game is game to which great many people of whole world can be accessed at the same time because it is constructed based on the Internet. TCP/IP base game uses connection intention protocol and handles client's connection more than one[3][4]. Classified by Client and Server largely, HTTP(hypertext transfer protocol) will be used by Middleware in the middle. Simple information can be offered to user by HTML(hypertext markup language) and complex application by Java Applet to connect in server process.

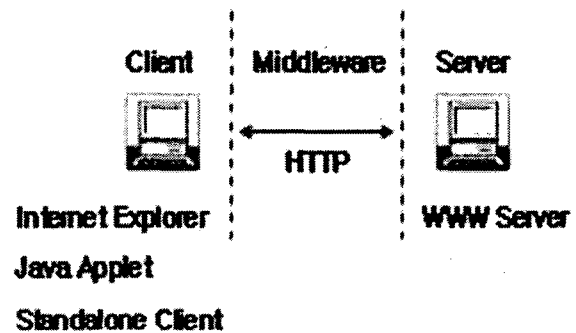


Fig. 1 Client/Server environment

4. NETWORK BASED LADDER GAME

In this paper, Network ladder game was embodied with Client/Server structure of distributed processing environment using JAVA as development language. Because JAVA offers involved library with TCP/IP protocol is achieved effectively through network, it can be said that is suitable in distributed environment.

4.1 Client/Server Environment

Socket is device that supply methodology two programs, which don't care about lower part network and communication. That is, socket offers simple mechanism that include communication concept of network all inside, and then if this socket is linked, both-way communication is achieved. Channel between two program to communicate each other are formed to exchange the data, and then both-way communication is achieved

through just this channel. Server program hears continuously the request which is entered through own port number in order to form this channel, and then accept this when the request is entered through any port number and achieves relevant the service. Networking using TCP socket is shown in Fig. 2.

At First, server heard whether there is real-time requests for port 4444. At this time, Client will request service to server through port 4444. Similarly, Server will deliver result through port 1234 which is used by client after the server achieve the service. At result, a logical channel is created by connecting the port which both the server program and the client program use[5].

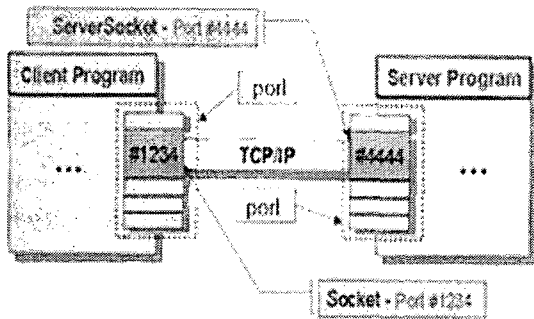


Fig. 2 Networking using TCP socket

4.2 Ladder Game Client/Server Flow

Network ladder game is basically consisted of server program and client program. If the game is executed, server socket for given port number will be produced. This server socket wait for the request, it can communicate with client socket. Client can connect to server with server's IP, port number, and ID. The ranges of port from 0 to 1023 is called well-known port which is booked to the system. The others ranges where is From 1024 until 65535 is used by the users randomly[5].

In this paper, 4001 port number was given to this ladder game. First of all, as trying to connect to server socket in side of client, Server creates server socket to communicate with client if the connection of the client socket is accepted in side of server. Server receives message from client, and then creates the thread to broadcast it to all clients. Client also creates the thread to display received message from server on screen. Server broadcasts ladder with the same shape to all clients, and then transmits the sequence to each client if clients begin to climb up ladder. Finally, that result will be displayed on frame through client's thread. Fig. 3 show the structure of ladder game.

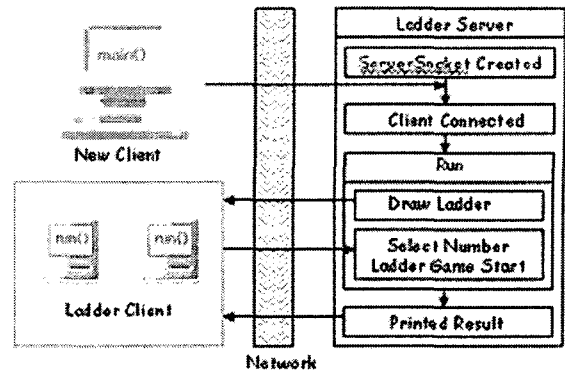


Fig. 3 Structure of ladder game

4.3 Operation of Ladder Game

It comes to be connected to server computer if client program runs. The order of ladder is decided by the order of being connected, Sever broadcast ladder to each IP. The Gamer information, IP, ID and the game result is displayed on client program. As gamer press start button, game is executed. The executed ladder game is shown in Fig. 4. There are 5 persons who are connected each other in this game.

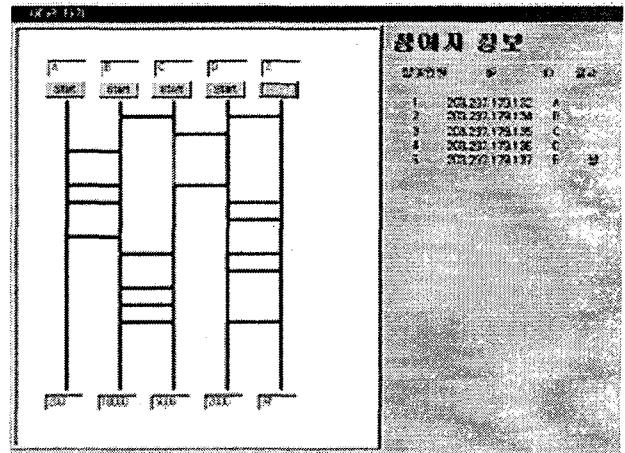


Fig. 4 Operation screen of ladder game

4.4 Client/Server Environment

We could say that most important part of ladder game is to confirm available way on left or right, and then moves to near side. Another is to solve that if there is no available way to go on left and right, and move downward. There are vertical line and horizontal line in Ladder game.

User can select vertical line, on the other side, be freely moved to right or left on horizontal line. Thus, each line must be divided into two lines, which vertical

and horizontal line have even and odd number, respectively. Horizontal line also must be drawn randomly when every games run. Availability of horizontal line is decided according to value of State [k][d], and define that make vertical line when value of d times horizontal line of k times length line is 1. Position of horizontal line is not piled up position of d times by making random number through random () and abs function here. First, adopting abs () that about remainder cost divide operate roof and generate free random number in by five as number of vertical line.

Generates random number and go roof again if value is big to compare count the number of value When State[k-2][d] value is 0 and State[k][d] value is 0 by calculated cost. Find d value lastly adopting abs () to remainder cost that divide happened random number by 15, When there is no horizontal line of left comparing with left, horizontal is maked to one by State[k][d] value. Ladder that pass through such process can not only draw other horizontal line every time but also user can play other game every time. Displayed source code that draw horizontal line to do random to Fig. 5.

5. CONCLUSION

In this paper, we investigated about distributed environment and embodied network game based on Client/Server using JAVA with simple ladder game. Data and resource could not be only shared by Client, but also Server in this game. As diffusion of internet spreads, network base on computing environment and the importance of heterogeneous distribution systems. Distributed environment is a set of integrated system services that provide an interoperable and flexible distributed environment with the primary goal of solving interoperability problems in heterogeneous, networked environments. Distributed computing between heterogenuous computer is thought as very complicated and difficult work because of variety of platform that compose each computing environment. But, JAVA developed program there is consistency to independent distribution development environment. Offer various API(Application Program Interface) for distributed computing and productivity improvement of application program and independency of platform.

This distributed environment system will be helpful to understand many kinds of applications based on client/sever system at present and make various applications at future network system based on that.

```

Random randNum = new Random();
int a,b;
int c=0;

for(int k = 1 ; k < end ; k += 2 ){
    a = randNum.nextInt() % 5;
    b = Math.abs(a)+1;

    int d = 0;

    while(c <= b) {
        d = randNum.nextInt()%15;
        d = Math.abs(d)+1;

        if(k>1) {
            if(State[k-2][d] != 1) {
                if(State[k][d] != 1) { State[k][d] = 1; c++; }
            }
            else { if(State[k][d] != 1) { State[k][d] = 1; c++; } }
        }
        a=0; b=0; c=0;
    }
}

```

Fig. 5 Code that draw horizontal line randomly

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