

DESIGNING AN APPLICATION FOR REMOTE COMPUTER MANAGEMENT USING AN ANDROID DEVICE

I. SHUMYANTSEV, A. OSKIN
Polotsk State University, Belarus

The article discusses the design of a system for working with a computer using an android device. The analysis of the most suitable technologies for the application development is performed. Research on the relevance of this application development has been carried out.

Keywords: information technology, android, network, computer management.

Introduction. Remote computer management programs allow you to distantly control another computer over the Internet or a local network. This is useful when you need to help a user who is not very experienced, such as a relative or a friend who is not well versed in the computer to do something on it. Such programs are also convenient to use for remote work, for example, to connect to the office from home and, conversely – to access your home PC, for system administration of a whole fleet of computers and servers.

Remote computer control allows you to get full control of the remote machine, as well as applications and files. The most common functions for many remote PC management programs are file Manager, voice or text chat, and, directly, remote computer management.

The remote PC connection technology opens up a wide range of opportunities for both corporate and private users who want to stay active and mobile and at the same time have a quick access to their work and home computers from anywhere in the world.

These days, remote access to a computer and the benefits it provides have long gone beyond simple convenience. Now it is a necessity, and the business of more and more companies depends on remote connection technologies. Remote technical support, system administration, online business conferences, and distance learning are the broadest applications of this technology.

While developing the application, image broadcasting from the computer monitor to the phone screen and control of the cursor and mouse buttons from the phone were implemented.

Analysis of the application's relevance. We will conduct a comparative analysis of remote management programs, highlight their advantages and disadvantages.

TeamViewer.

It is one of the most popular programs for remote access. It can be quickly downloaded and installed or immediately run without installation. Even a very inexperienced user can cope with this. At startup, the program displays a window with the ID and password for accessing this computer, and TeamViewer allows you to connect to another computer by setting its ID and password. An example of the user interface is shown in figure 1.

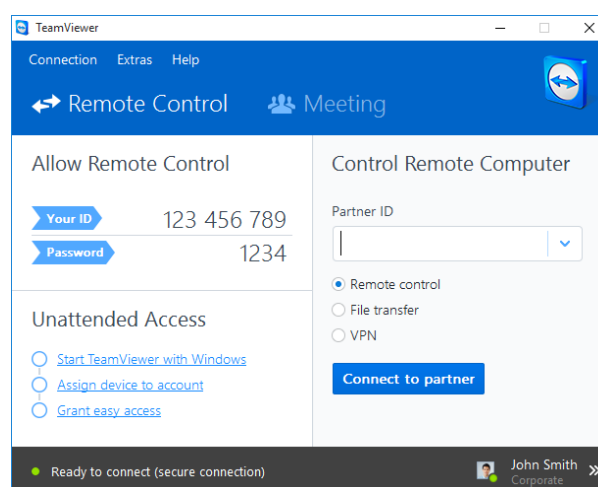


Figure 1. – User interface of the "TeamViewer" app

Advantages: the program has several main modes of operation: remote management, file transfer, chat, demonstration of your desktop. The program allows you to configure round-the-clock access to your computer, which will be convenient for system administration. The speed of work is quite decent, there are versions for all mobile platforms, for various operating systems, which is very pleasing. A simple and intuitive interface, plus a number of additional utilities to expand the program's functionality, will be useful for remote support services.

Disadvantages: although the program is free, it's only for non-commercial use, but also, when working with it for more than 5 minutes, a number of difficulties arise, for example, TV can block a remote connection session, recognizing it as commercial use. For round-the-clock remote access or administration of multiple computers, computer network, you have to pay for additional program modules. The cost of the program is high.

LiteManager.

It is a simple, but quite powerful program. It consists of two parts, the first is the Server that you need to install or run on a remote computer and the Viewer, which allows you to manage another computer. To work, the program requires a little more skills and experience from the Manager, although working with the server is even easier than in TeamViewer, the server can be installed once and no more actions are needed from the user, the ID will always be constant, it can even be set manually, which is very convenient for remembering. The LiteManager Free version is free for personal and commercial use. An example of the user interface is shown in figure 2.



Figure 2. – User interface of the "LiteManager" application

Advantages: in addition to the main remote access modes: remote management, file transfer, chat, task Manager, registry editor, there are also unique functions in the program, such as inventory, screen recording, and remote installation. The program is free to use on 30 computers, it can be used for round-the-clock access without any additional modules. There are no restrictions on working hours. You can configure your own server ID to configure the corporate support service. The program does not have any time limits and locks.

Disadvantages: there are no mobile platforms or versions for other systems, there are restrictions on 30 computers in the free version, to administer more, you need to purchase a license. Some specific operating modes are only available in the Pro version.

RAdmin.

It is one of the first remote management programs and well-known in its circle and I cannot but mention it. It is designed rather for system administration and the main focus is on security. The program consists of two components: a server component and a client component. It requires installation, it wouldn't be easy for an inexperienced user to deal with it, the program is designed to work via the IP address mainly, which is not very convenient for providing technical support via the Internet. The program is paid, but has a free test period. An example of the user interface is shown in figure 3.

Advantages: the program has a high speed of operation, especially in a good network, there is an increased reliability and security thanks to the video capture driver of the desktop. There is a built-in Intel AMT technology, which allows you to connect to the BIOS of a remote computer and configure it. Only the main modes of operation are implemented: remote management, file transfer, chat, etc.

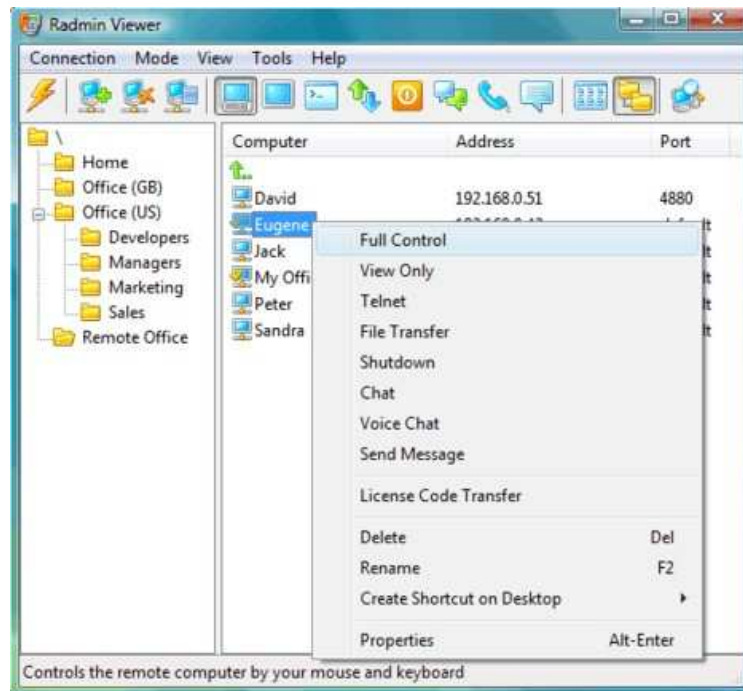


Figure 3. – User interface of the "RAdmin" application

Disadvantages: there is almost no way to work without an IP address, i.e. to connect by ID. There is no client for mobile systems. There is no free version, only a test period of 30 days. To work with the program, you need the skills of an experienced user. When connecting a video, the driver may disable the Aero graphical shell, sometimes the screen flashes.

The considered analogs do not fully satisfy the optimal functionality of the application being developed. The advantageous difference between the developed application and its analogues is that in this application the load on the network is much lower than that of the above-mentioned analogues. It is also worth noting that this application uses much less computer resources (processor, RAM).

Tools for solving the problem. You must select the Protocol for network communication between the server program and the client program.

Network sockets are divided into two main types – TCP and UDP. The choice of socket depends entirely on the functionality of the application and the tasks it will solve.

TCP is a Protocol that uses the secure connection principle. This means that you establish a connection between two computers, and then send data between them just as if you were writing information to a file on one computer and reading it from the same file on the other. In this case, the connection is considered reliable and consistent – that is, all information that you send is guaranteed to reach the recipient in the same order in which it was sent. Also, a TCP connection can be considered a continuous data stream – the Protocol itself takes care of splitting data into packets and sending them over the network [1].

UDP is one of the key elements of TCP / IP, a set of network protocols for the Internet [2]. With UDP, computer applications can send messages (in this case called datagrams) to other hosts over an IP network without the need for a pre-message to set up special transmission channels or data paths. The Protocol was developed by David P. Reed in 1980 [3].

In this case, the use of the TCP Protocol is not allowed, since our program is tied to real-time network interaction. For many aspects of the program, such as user clicks or changes in the state of the screen, it doesn't matter what happened a second ago, but only the most current state of the computer is important. The network part of this application are as follows: each iteration of the loop, the server sends to the client the report in the form of pictures, while the client sends the server the commands that must run without delay (pressing buttons, moving the cursor), and each iteration the server processes the received data, updating the current status of the screen and sends the screenshot to an array of bytes to the client so that the user rendered a new frame. So, in this application, if a packet is lost during transmission over the network, all server processes are suspended until the packet is delivered again. On the client side, the image freezes, and data will not reach the server either, since the server cannot accept new packets. When a lost package finally arrives, it contains outdated information

that is no longer relevant. In addition, after this, all the packets that have been accumulated in the queue during the waiting time also come, and they all need to be processed in one iteration of the cycle.

Based on the analysis performed, it was decided to use the UDP network Protocol.

Based on these characteristics, the functional structure of the software is developed, which consists of the following subsystems:

1. thread management subsystem is responsible for the correct distribution of application threads. It is designed for performing multiple tasks at the same time;
2. network socket management subsystem is responsible for opening sockets for connecting clients. Thanks to this system, the connection between the client and the server takes place;
3. subsystem of data transmission control is responsible for transferring data between a client and a server;
4. data reception management subsystem is responsible for receiving data between the client and the server;
5. connected client management subsystem is responsible for managing connected clients;
6. information output subsystem is used to display information about the server.

The functional structure of the system is shown in figure 4.

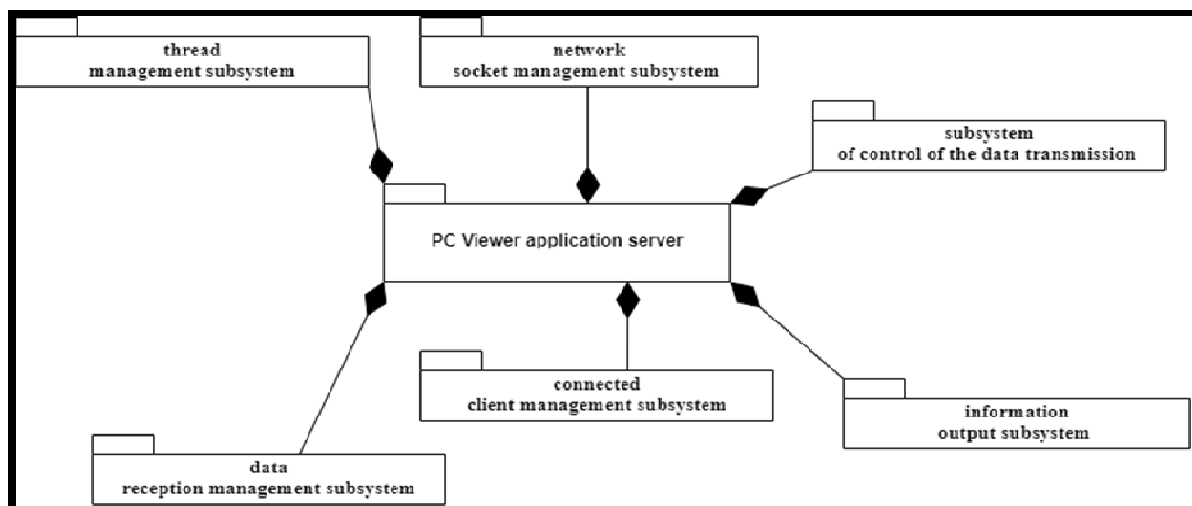


Figure 4. – Functional structure of the application

Conclusion. In the course of this study, we designed the software that is most suitable for architectural features as a basis for developing a network application for managing a personal computer using a mobile device. At the same time, the developed architecture is universal for any modern programming language, and also leaves opportunities for implementing the necessary functionality.

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