Research on the Design and Implementation of FTP Client Based on Java

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Abstract. Java program has the advantages of convenient operation, and has a powerful processing routine library for TCP/IP protocol. Java based utilizations can achieve efficient access to remote objects. Based on this, this paper first analyses the characteristics and functions of java development tool environment, then studies the requirement analysis of FTP client system based on Java development, and finally analyses the specific process of FTP client design and implementation based on Java development.

Keywords: Ftp Client, Java, Implementation

1. Introduction
With the iterative progress and maturity of computer software language environment, it has obtained extensive and in-depth research and popularization in many fields, especially in the utilization of client design and development, which greatly promotes the level of related client design and development represented by FTP. As a kind of service type widely used in the network, FTP client is built on the basis of FTP protocol, so as to realize the efficient transmission of files in the network environment. The current FTP client can achieve efficient transmission of a variety of file types, including but not limited to text, audio and image file types [1]. With the help of the server-side program and the client-side program to form the user interface, so as to achieve the corresponding file upload and download services.

In addition, with the iterative improvement and progress of computer network platform, a variety of network sharing platforms continue to emerge. In this context, it can not only provide file compression services based on FTP, but also provide file compression services [2]. On the other hand, Java / IP routine library has the advantage of powerful processing for TCP protocol. Therefore, it has a unique advantage to apply java development to network and distributed environment. Java based utilizations can achieve efficient access to remote objects [3]. In terms of threads, Java can effectively support multithreaded tasks, so it has high interface friendliness.

The development of FTP client based on Java can fully mobilize the sharing advantages of Internet resources and realize the efficient transmission of remote files [4]. FTP defines the standard of remote file transfer, and also realizes the formulation of file transfer attributes, and usually includes several transfer attributes as shown in Figure 1 below. In addition, Java language has the function and ability
to meet the fast platform programming, and compared with C++ language, it has some typical advantages, such as not easy error pointer, automatic garbage collection and so on.

In a word, the FTP client based on Java can get the file RETR from the server and send the file STPR to the server [5]. The former can create the input stream of the file, thus establishing the temporary connection of the client and getting the output stream. The temporary socket is realized by keeping the data in the input stream alone and sending the value to the client. The process of the latter is similar, but the flow direction of the two is different. In order to further save the transmission and storage space, we can use the FTP client developed by Java to compress the files, and further improve the efficiency of transmission. Therefore, the research on the design and implementation of FTP client based on Java has important practical value.

![Figure 1. The transmission properties of FTP file transmission.](image)

2. Features and functions of Java development tool environment

2.1. Typical features of Java development tool environment

With the iterative change of computer programming, Java language is also in constant progress and development [6]. On the one hand, Java language inherits many excellent achievements of C++ language, on the other hand, it also achieves a further breakthrough in the functional level of programming state. In addition, the rapid utilization and innovation of the Internet also provides a broad platform and carrier for the popularization of Java language. Specifically, the typical characteristics and advantages of java development tool environment mainly focus on object-oriented, interpretive, robust, multithreaded and dynamic, distributed, architecture neutral and security, as shown in Table 1 below.

| Typical features       | Detailed descriptions                                      |
|------------------------|------------------------------------------------------------|
| Simplicity             | Program design gradient, reduce the probability of error   |
| Object-oriented        | Dynamic reuse of code by inheritance and overloading machine|
| Multithreading         | Different processing operations can be performed, complete multiple tasks|
| Distribution           | Could handle TCP/IP protocol                               |
| Architecture neutral   | Completely unified language text                           |
| Security               | Prevent cheating means from accessing private members      |

2.2. Functions of Java development tools

First, the java compiler compiles the Java source code file into executable Java bytecode, and the Java source code file may compile to generate multiple class files [7]. Secondly, Java interpreter supports the running of executable programs in bytecode format, which is a command-line tool to run non-graphic Java programs. In addition, visual j++, which integrates visual interface design, interactive
debugging, code editing, online help info and other functions, can create highly interactive Internet utilizations, so it becomes an efficient java development system.

2.3. Integrated development environment
In the level of Java integrated development environment, we use Borland JBuilder as the development environment of java tools, further build Java utilization system in line with industry standards, and comprehensively develop various utilizations represented by web, XML and database [8]. Secondly, the bi-directional and visual design tool of the integrated development environment enables us to quickly build a variety of J2EE utilizations and deploy them to a variety of utilization servers.

3. Requirement analysis of FTP client system based on Java

3.1. Functional requirements of FTP client system
FTP client system must first have the function of effectively realizing the safe transmission and storage of files, which requires the construction of FTP client with graphical user interface[9]. Secondly, in order to realize the effective login of remote FTP host, the input server address, user name and password should be further set. In addition, FTP client system should also have the functions of downloading, uploading, deleting and renaming host files, and can view a series of operation log info. Based on the above basic functional requirements, the FTP client system model is as shown in Figure 2.

![Figure 2. The FTP client system model.](image-url)

3.2. Workflow design of FTP client system
FTP client system workflow mainly includes client user login, login verification, operation content list, file management and other aspects [10]. The client login needs login verification, and when the login connection fails, the server login is pushed out. Secondly, after successfully connecting to the server, it mainly includes two aspects: operation content list and file management. The operation content list mainly includes viewing the file list, renaming the file, deleting the file, turning up the file list and turning down the file list. File management is mainly focused on the management of file upload and download.
4. Design and implementation of FTP client based on Java

4.1. Design of FTP client based on Java

From the workflow design of FTP client system, it can be seen that the FTP client system based on Java has the functions of user login, user exit, file upload, file download, file naming, etc., and can realize the related operations such as file deletion, file directory up and file directory down. In addition, in the implementation level of FTP client interface, through the design of user interface with various user buttons, text input bar, status bar, the server address info, port info, user login and launch and other related operations are realized.

4.2. Realization of FTP client based on Java

In the design code level of FTP client function interface based on Java, register the listener corresponding to the relevant business logic for each button object, and call the corresponding method in FTP bean class. FTP client class library needs to write FTP bean class to realize business logic, including an object FTP client of FTP client class. As shown in the figure 3 below, it could get the specific file name list through the connection process. Among them, upload file to get file output stream, read data and write file, download file to get file input stream, read data and write file.

4.3. Implementation of FTP client system

In the implementation level of FTP client interface design based on Java development, the first need to connect to the server. Through the FTP client interface login operation, it could achieve the specified server login and connection. Secondly, after logging in to the server, get the main files and folders of the server users and display them in the status bar below, so as to get the file list. When the user needs to close the connection, the user only needs to click the disconnect option in the client interface to disconnect from the server, and the disconnection result will be displayed on the status bar. At this time, the user does not exit the client.

In addition, for file transmission, you can upload by clicking the upload dialog box in the shortcut menu, and the upload status will be displayed in the status bar during the upload process. The download operation is similar to the upload operation, and the download status will also be displayed. To rename or delete a file, select the file or folder to be renamed or deleted, and rename or delete the file in the corresponding shortcut menu.

5. Conclusion

In summary, Java language has the function and ability to meet the fast platform programming, and has the typical advantages of not easy to error pointer, automatic garbage collection and so on. The development of FTP client based on Java can fully mobilize the sharing advantages of Internet resources and realize the efficient transmission of remote files. FTP not only defines the standard of remote file transfer, but also realizes the formulation of file transfer attributes. In this paper, through
the study of the characteristics and functions of java development tool environment, the typical characteristics of java development tool environment and the functions of java development tools are analyzed. Through the requirement analysis of FTP client system based on Java, the workflow design of FTP client system is studied. Finally, the function realization of FTP client system is studied.

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