FTP Server

—— *Final Project*

BUPT/QMUL

2021-5-13

Agenda

- Project description
- Demonstration
- Timesheet

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Project description - 1

- **Subject: FTP Server**

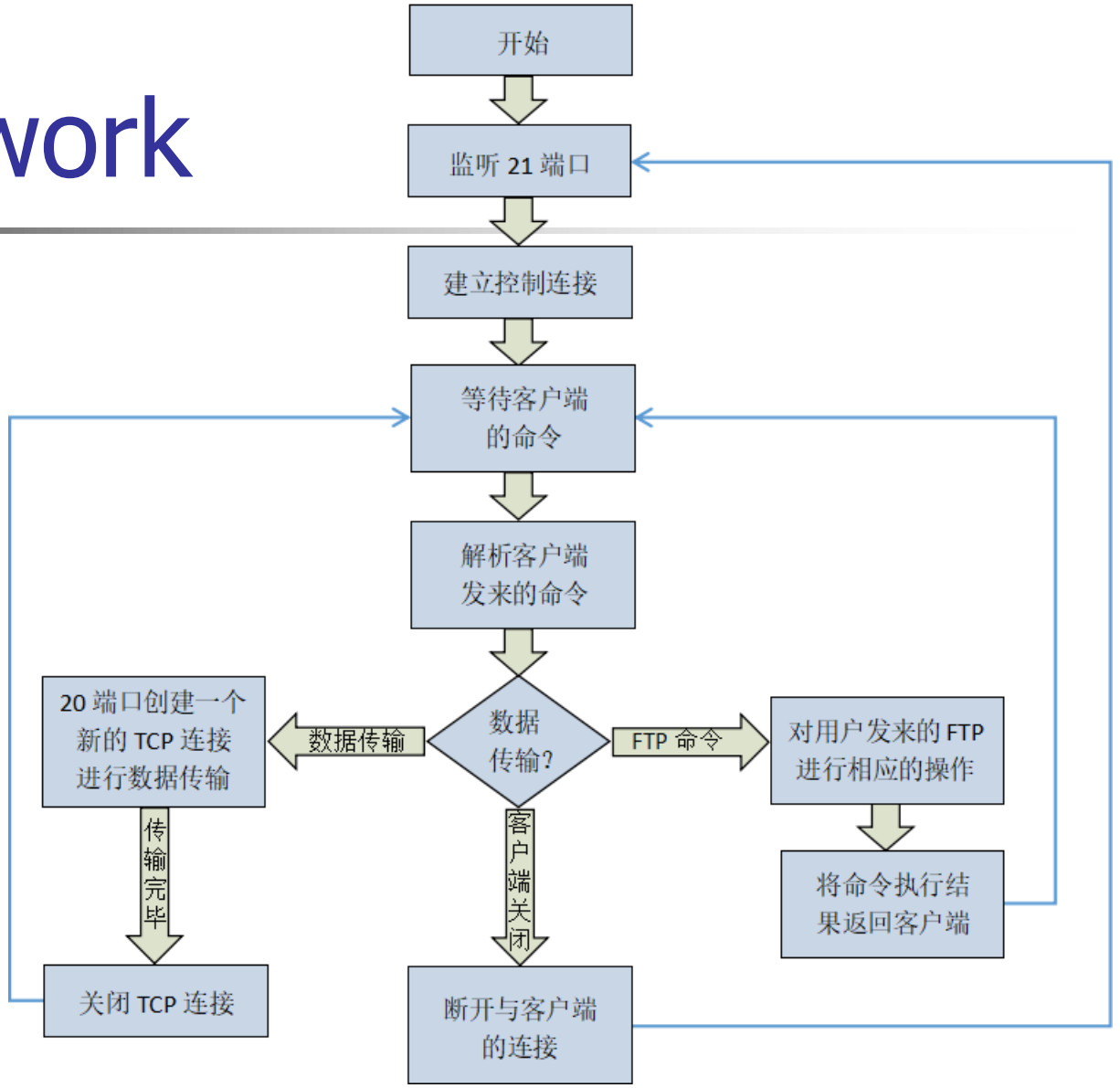
- Goals
  - Understanding FTP
  - Implement an FTP server program
  - Using ftp command as client, and the communication between client and server could be captured by Wireshark

- Environment
  - Installed Linux system in VM environment: VirtualBox+Xshell+Xming
  - TCP-based socket programing
  - C language

Project description - 2

- Basic functions (required)
  - User login
  - Support commands such as : PWD, CWD, LIST, MKD, DELE, RNFR/RNTO.
  - Provide download and upload services in active mode.
  - Display user's info such as : IP, actions, speed, total traffic.
- Advanced functions (optional)
  - Provide download and upload in passive mode.
  - Limit download and upload speed as specified.
  - Limit users with specified access rights.

Framework


开始
监听 21 端口
建立控制连接
等待客户端的命令
解析客户端发来的命令
数据传输?
数据传输
20 端口创建一个新的 TCP 连接进行数据传输
传输完毕
关闭 TCP 连接
FTP 命令
对用户发来的 FTP 进行相应的操作
将命令执行结果返回客户端
客户端关闭
断开与客户端的连接

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Demonstration - 1

1. start server

```
student@BUPTIA:~/final$ sudo ./server 0
[sudo] password for student:
```

2. client connect server

```
student@BUPTIA:~$ ftp 127.0.0.1 21
Connected to 127.0.0.1.
220 please enter username
Name (127.0.0.1:student): zhaoyuqi3
331 please enter password
Password:
```

```
Accept client 127.0.0.1 on TCP Port 54020
Receive username: zhaoyuqi3
```

Client side: using ftp command

Server side

Demonstration - 2

3. client list remote files

```
ftp> ls
200 PORT command successful
150 Here comes the directory listing
total 60
-rw-rw-r-- 1 student student    57 May  6 09:06 auth.txt
drwxrwxr-x 3 student student  4096 May  6 09:10 ftp
-rwxrwxr-x 1 student student 21424 May  7 17:21 server
-rw-rw-r-- 1 student student 22944 May  7 17:21 server.c
-rwxrwxr-x 1 student student    27 May  6 09:12 test1.txt
WARNING! 5 bare linefeeds received in ASCII mode
File may not have transferred correctly.
226 Directory send OK
```

Client side: using ftp command

```
Active Mode On
Connect client 127.0.0.1 on TCP Port 35404
zhaoyuqi3       /home/student/final       execute LIST
zhaoyuqi3       /home/student/final       execute LIST successfully
```

Server side

4. client download "auth.txt"

```
ftp> get auth.txt
local: auth.txt remote: auth.txt
200 PORT command successful
150 Opening data connection
226 Transfer complete
57 bytes received in 0.00 secs (13.8 kB/s)
```

Client side: using ftp command

```
Active Mode On
Connect client 127.0.0.1 on TCP Port 46875
zhaoyuqi3       /home/student/final       execute RETR
auth.txt
zhaoyuqi3       /home/student/final       execute RETR successfully
```

Server side

Demonstration - 3

5. client upload "lseek.c"

```
ftp> put lseek.c
local: lseek.c remote: lseek.c
200 PORT command successful
150 Ok to send data
226 Transfer complete
477 bytes sent in 0.58 secs (0.8 kB/s)
```

Client side: using ftp command

```
Active Mode On
Connect client 127.0.0.1 on TCP Port 54696
zhaoyuqi3      /home/student/final       execute STOR
zhaoyuqi3      /home/student/final       execute STOR successfully
```

Server side

6. client disconnect

```
ftp> exit
221 GoodBye
student@BUPTIA:~$
```

Client side: using ftp command

```
zhaoyuqi3      /home/student/final       execute QUIT
zhaoyuqi3      /home/student/final       execute QUIT successfully
```

Server side

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Timesheet

- Deadline of evaluation
  - Lab time in the 16th week
- Deadline of submission
  - 2021-06-20 22:00
- Teamwork
  - Two students as a group
  - Decide your group members now
- Submission
  - Report (*.pdf) and Source code (*.c, *.h, makefile) per group
  - All files should be packed as a single file named as follows

    FtpServer_01_ 2018111111李宁& 02_ 2018222222张安.zip
  - iClass Platform

Tips

- 1-Installing FTP server in Linux to learn about interaction between FTP client and server
  - Installing FTP server (*vsftpd*)
  - Using *ftp* command to access the installed ftp server, and using Wireshark to capture client-server interactions
  - Implementing your program as what the installed FTP server done

Install FTP Server (vsftpd) in Linux

安装vsftpd服务：sudo apt-get install vsftpd

```
student@BUPTIA:~$ sudo apt-get install vsftpd
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libfile-copy-recursive-perl openbsd-inetd pure-ftpd-common update-inetd
Use 'apt-get autoremove' to remove them.
The following NEW packages will be installed:
  vsftpd
0 upgraded, 1 newly installed, 0 to remove and 235 not upgraded.
Need to get 0 B/114 kB of archives.
After this operation, 368 kB of additional disk space will be used.
Preconfiguring packages ...
Selecting previously unselected package vsftpd.
(Reading database ... 67533 files and directories currently installed.)
Preparing to unpack .../vsftpd_3.0.2-1ubuntu2.14.04.1_i386.deb ...
Unpacking vsftpd (3.0.2-1ubuntu2.14.04.1) ...
Processing triggers for man-db (2.6.7.1-1ubuntu1) ...
Processing triggers for ureadahead (0.100.0-16) ...
Setting up vsftpd (3.0.2-1ubuntu2.14.04.1) ...
vsftpd start/running, process 4904
student@BUPTIA:~$
```

Install FTP Server (vsftpd) in Linux

查看服务运行情况：sudo service vsftpd status

```
student@BUPTIA:~$ sudo service vsftpd status
vsftpd start/running, process 4904
student@BUPTIA:~$
```

打开vsftpd服务：sudo service vsftpd start
（首次安装成功时 服务自动开启 无需此命令）

```
student@BUPTIA:~$ sudo service vsftpd start
vsftpd start/running, process 4944
student@BUPTIA:~$
```

Install FTP Server (vsftpd) in Linux

设置主配置文件：sudo vi /etc/vsftpd.conf

```
student@BUPTIA:~$ sudo vi /etc/vsftpd.conf
```

```
# Run standalone?  vsftpd can run either from an inetd or as a standalone
# daemon started from an initscript.
listen=YES
#
# Run standalone with IPv6?
# Like the listen parameter, except vsftpd will listen on an IPv6 socket
# instead of an IPv4 one. This parameter and the listen parameter are mutually
# exclusive.
#listen_ipv6=YES
#
# Allow anonymous FTP? (Disabled by default)
anonymous_enable=NO
#
# Uncomment this to allow local users to log in.
local_enable=YES
#
# Uncomment this to enable any form of FTP write command.
write_enable=YES
#
# Default umask for local users is 077. You may wish to change this to 022,
# if your users expect that (022 is used by most other ftpd's)
#local_umask=022
#
```

write_enable=YES
(保证可以使用put命令)

Install FTP Server (vsftpd) in Linux

重启vsftpd服务：sudo service vsftpd restart
(修改完配置文件后需重启服务)

```
student@BUPTIA:~$ sudo service vsftpd restart
vsftpd stop/waiting
vsftpd start/running, process 4970
student@BUPTIA:~$
```

Client连接：ftp 127.0.0.1

```
student@BUPTIA:/$ ftp 127.0.0.1
Connected to 127.0.0.1.
220 (vsFTPd 3.0.2)
Name (127.0.0.1:student): student
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```

User name: student
Password: 111111

Install FTP Server (vsftpd) in Linux

为了保证自己的程序能够使用FTP的well-known port number，测试自己的程序时，需关闭vsftpd服务

关闭vsftpd服务：sudo service vsftpd stop

```
student@BUPTIA:~$ sudo service vsftpd stop
vsftpd stop/waiting
student@BUPTIA:~$ sudo service vsftpd status
vsftpd stop/waiting
student@BUPTIA:~$
```