

-
- The screenshot displays the PyCharm IDE interface. The top toolbar includes menus for File, Edit, View, Navigate, Code, Refactor, Run, Tools, VCS, Window, and Help. The title bar indicates the current file is client.py in a project named client, with the path C:\Users\15147\Spring-2022\CN\assignment\socketlab\UDP\client\client.py.
- The main editor window shows the code for client.py. The code is as follows:
- ```

1 from socket import *
2
3 serverName = "127.0.0.1"
4 serverPort = 5000
5 clientSocket = socket(AF_INET, SOCK_DGRAM)
6
7 def transferSignalFile(fileName):
8 f = open(fileName, 'rb')
9 while True:
10 data = f.read(1024)
11 if len(data) != 0:
12 clientSocket.sendto(data, (serverName, serverPort))
13 else:
14 clientSocket.sendto('end'.encode('utf-8'), (serverName, serverPort))
15 break
16 data, server_addr = clientSocket.recvfrom(1024)
17
18 transferSignalFile(fileName)

```
- The bottom toolbar shows the Run button, which has been clicked. The output console at the bottom displays the message: "Process Finished with exit code 0".

The screenshot shows the PyCharm IDE with a Python script named `server.py` in the editor. The script is a simple socket server that listens on port 8080 and receives data from a client. The console output shows the server is ready to receive and then receives the file `1.pdf`.

```

1 from socket import *
2
3 serverName = "127.0.0.1"
4 serverPort = 8080
5 serverSocket = socket(AF_INET, SOCK_STREAM)
6 serverSocket.bind(('', serverPort))
7 print("The server is ready to receive")
8
9 def receiveSingleFile(fileName):
10 f = open(fileName, "wb")
11 while True:
12 data, addr = serverSocket.recvfrom(1024)
13 if str(data) != "b'end'":
14 f.write(data)
15 else:
16 break
17 serverSocket.sendto("ok".encode('utf-8'), addr)
18
19 f.close()
20
21 receiveSingleFile("1.pdf")

```

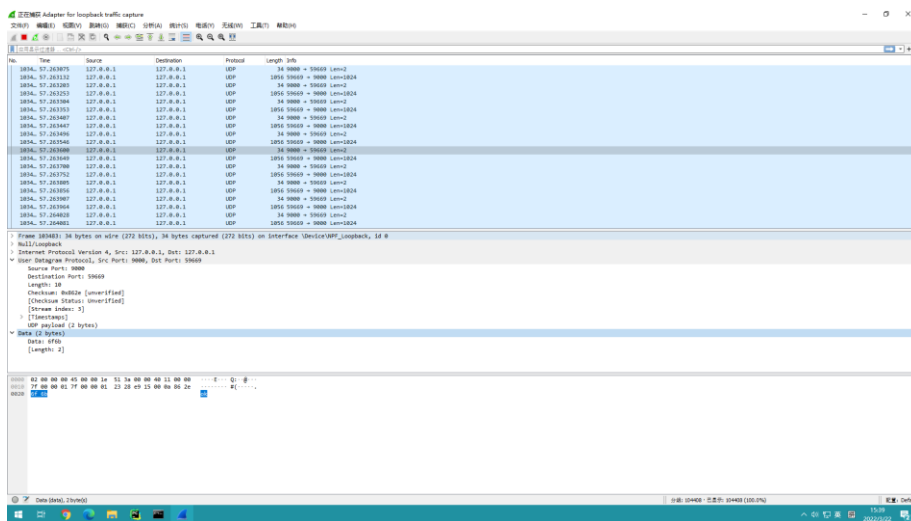
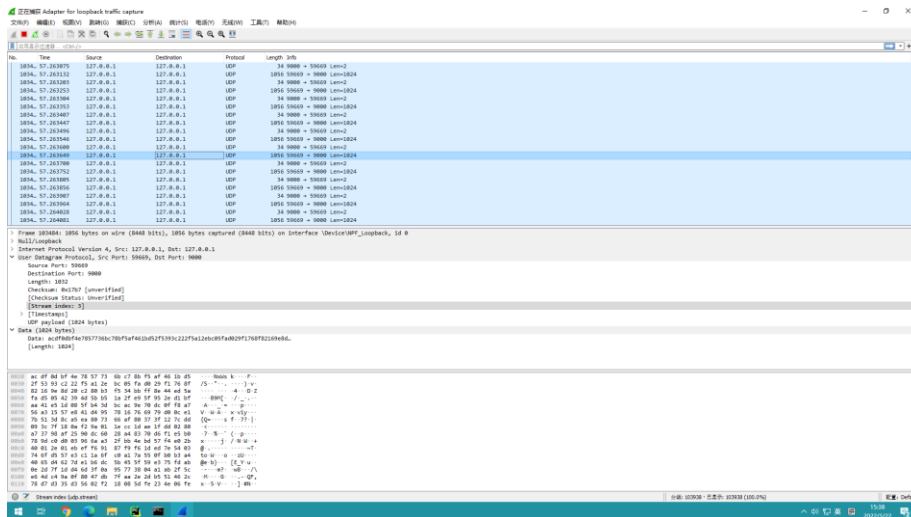
The console output shows the server is ready to receive and then receives the file `1.pdf`:

```

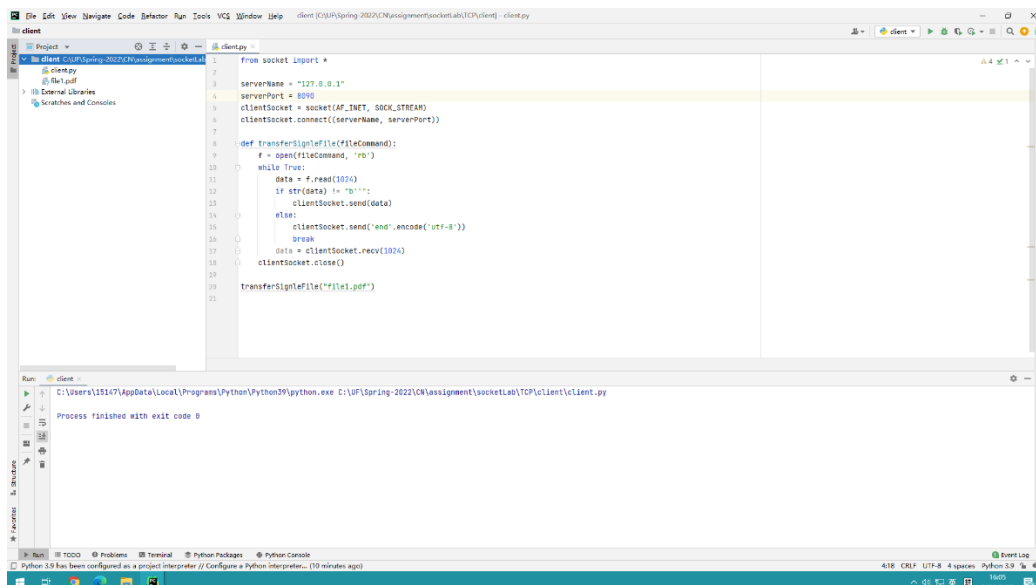
Run: server
C:\Users\15147\AppData\Local\Programs\Python\Python39\python.exe C:\Users\15147\AppData\Local\Programs\Python\Python39\python.exe C:\Users\15147\AppData\Local\Programs\Python\Python39\python.exe C:\Users\15147\AppData\Local\Programs\Python\Python39\python.exe
The server is ready to receive
Process finished with exit code 0

```

The following are two screenshots of using wireshark to monitor the packets sent.



2. TCP packets send. Using wireshark to monitor the packet transfer. The program also uses the client to transfer a file1.pdf (which is more than 50MB) to server by using TCP protocol. The following are the screenshot of the code of client and server.





### 3. ARP table

The first interface is for the wi-fi connection, and the second interface is for the Ethernet connection. Both of the tables have three columns, Internet address, physical address and type.

```
C:\Windows\system32\CMD.exe
C:\Users\15147>arp -a

Interface: 10.20.0.170 --- 0x0
Internet Address Physical Address Type
10.20.0.1 b8-69-f4-d9-51-42 dynamic
10.20.0.202 3e-30-5f-e2-ae-a2 dynamic
10.20.0.239 b0-22-7a-9b-f1-04 dynamic
10.20.0.246 cc-6d-ab-fb-b8-23 dynamic
10.20.0.255 ff-ff-ff-ff-ff-ff static
224.0.0.2 01-00-5e-00-00-02 static
224.0.0.22 01-00-5e-00-00-10 static
224.0.0.251 01-00-5e-00-00-fb static
224.0.0.252 01-00-5e-00-00-fc static
239.255.255.250 01-00-5e-7f-ff-fa static
255.255.255.255 ff-ff-ff-ff-ff-ff static

Interface: 24.170.200.4 --- 0x11
Internet Address Physical Address Type
10.20.0.1 70-6b-b9-01-8c-19 dynamic
24.170.200.1 70-6b-b9-01-8c-19 dynamic
24.170.207.255 ff-ff-ff-ff-ff-ff static
169.254.255.255 70-6b-b9-01-8c-19 dynamic
224.0.0.2 01-00-5e-00-00-02 static
224.0.0.22 01-00-5e-00-00-10 static
224.0.0.251 01-00-5e-00-00-fb static
224.0.0.252 01-00-5e-00-00-fc static
239.255.255.250 01-00-5e-7f-ff-fa static
255.255.255.255 ff-ff-ff-ff-ff-ff static

C:\Users\15147>
```

### 4. Ipconfig:

```
C:\Windows\system32\CMD.exe
Microsoft Windows [Version 10.0.19043.1586]
(c) Microsoft Corporation. All rights reserved.

C:\Users\15147>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

 Connection-specific DNS Suffix . :
 IPv6 Address. : 2600:8807:df00:500:809:2066:e03c:db2f
 Link-local IPv6 Address : fe80:a07d:880e:e007:f030%17
 IPv4 Address. : 24.170.200.4
 Subnet Mask : 255.255.248.0
 Default Gateway : fe80:72ab:109ff:fe01:8c19%17
 24.170.200.1

Wireless LAN adapter Local Area Connection* 8:

 Media State : Media disconnected
 Connection-specific DNS Suffix . :

Wireless LAN adapter Local Area Connection* 10:

 Media State : Media disconnected
 Connection-specific DNS Suffix . :

Wireless LAN adapter Wi-Fi:

 Connection-specific DNS Suffix . :
 Link-local IPv6 Address : fe80:4c3d:4de4:dbfc:ed95%4
 IPv4 Address. : 10.20.0.170
 Subnet Mask : 255.255.255.0
 Default Gateway : 10.20.0.1

Ethernet adapter Bluetooth Network Connection:

 Media State : Media disconnected
 Connection-specific DNS Suffix . :

C:\Users\15147>
```

Mac address:

```
Microsoft Windows [Version 10.0.19043.1500]
(c) Microsoft Corporation. All rights reserved.

C:\Users\15147>ipconfig /all

Windows IP Configuration

Host Name : DESKTOP-ERVAN65
Primary Dns Suffix :
Node Type : Hybrid
IP Routing Enabled : No
WINS Proxy Enabled : No

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . :
Description : Total(B) Ethernet Connection (7) I219-V
Physical Address : AB-A1-59-4B-F2-F2
Dhcp Enabled : Yes
Autoconfiguration Enabled : Yes
IPv6 Address : 2600:8807:df00:500:809:2066:e03c:db2f(Preferred)
Lease Obtained : 2022/03/22 14:02:53
Lease Expires : 2022/03/28 9:15:24
Link-local IPv6 Address : fe80::487d:e850:e087:f030%17(Preferred)
IPv4 Address : 24.170.204.4(Prefereed)
Subnet Mask : 255.255.248.0
Lease Obtained : 2022/03/22 14:02:54
Lease Expires : 2022/03/28 14:02:53
Default Gateway : fe80::726b:b9ff:fe01:8c19%17
24.170.204.4
DHCP Server : 172.19.17.117
DHCPv6 IAID : 279486809
DHCPv6 Client DUID : 00-01-e8-03-1b-64-AB-A1-59-4B-F2-F2
DNS Servers : 2001:578:3f::30
2001:578:3f::1:30
68.105.28.11
68.105.29.11
68.105.28.12
NetBIOS over Tcpip. : Enabled

Wireless LAN adapter Local Area Connection* 0:

Media State : Media disconnected
Connection-specific DNS Suffix . :
Description : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address : 36-CF-F6-2E-C6-93
Dhcp Enabled : Yes
Autoconfiguration Enabled : Yes

Wireless LAN adapter Local Area Connection* 10:

Media State : Media disconnected
Connection-specific DNS Suffix . :
Description : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address : 36-CF-F6-2E-C6-92
Dhcp Enabled : Yes
Autoconfiguration Enabled : Yes

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . :
Description : Intel(R) Wireless-AC 9462
Physical Address : 36-CF-F6-2E-C6-92
```

Routing table:

```
C:\Windows\system32\CMD.exe
Microsoft Windows [Version 10.0.19043.1500]
(c) Microsoft Corporation. All rights reserved.

C:\Users\15147>netstat -r

Interface List
17...a8 a1 59 4b f2 f2Intel(R) Ethernet Connection (7) I219-V
12...34 cf f6 2e c6 93Microsoft Wi-Fi Direct Virtual Adapter
12...36 cf f6 2e c6 92Microsoft Wi-Fi Direct Virtual Adapter #2
4...34 cf f6 2e c6 92Intel(R) Wireless-AC 9462
8...34 cf f6 2e c6 96Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1

IPv4 Route Table
=====
Active Routes:
Network Destination Netmask Gateway Interface Metric
0.0.0.0 0.0.0.0 24.170.204.1 24.170.204.4 25
0.0.0.0 0.0.0.0 10.20.0.1 10.20.0.176 35
10.20.0.0 255.255.255.0 On-link 10.20.0.176 291
10.20.0.176 255.255.255.255 On-link 10.20.0.176 291
10.20.0.255 255.255.255.255 On-link 10.20.0.176 291
24.170.200.0 255.255.248.0 On-link 24.170.204.4 281
24.170.204.4 255.255.255.255 On-link 24.170.204.4 281
24.170.207.255 255.255.255.255 On-link 24.170.204.4 281
127.0.0.0 255.0.0.0 On-link 127.0.0.1 331
127.0.0.1 255.255.255.255 On-link 127.0.0.1 331
127.255.255.255 255.255.255.255 On-link 127.0.0.1 331
224.0.0.0 240.0.0.0 On-link 24.170.204.4 281
224.0.0.0 240.0.0.0 On-link 10.20.0.176 291
255.255.255.255 255.255.255.255 On-link 127.0.0.1 331
255.255.255.255 255.255.255.255 On-link 24.170.204.4 281
255.255.255.255 255.255.255.255 On-link 10.20.0.176 291

Persistent Routes:
None

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination Gateway
17 281 ::/0 fe80::726b:b9ff:fe01:8c19
1 331 ::1/128 On-link
17 281 2600:8807:df00:500:809:2066:e03c:db2f/128 On-link
17 281 fe80::/64 On-link
4 291 fe80::/64 On-link
17 281 fe80::487d:e850:e087:f030/128 On-link
4 291 fe80::4c2d:4de4:dbfc:ed95/128 On-link
1 331 ffe0::/8 On-link
17 281 ffe0::/8 On-link
4 291 ffe0::/8 On-link

Persistent Routes:
None

C:\Users\15147>
```