

به نام خدا

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## تکلیف عملی اول شبکه

اسکرین شات مربوط به عملکرد برنامه با استفاده از ngrok

```
Command Prompt
ngrok
Hello World! https://ngrok.com/next-generation

Session Status      online
Account             amirreza (Plan: Free)
Version             3.0.6
Region              Europe (eu)
Latency              793ms
Web Interface        http://127.0.0.1:4040
Forwarding           tcp://4.tcp.eu.ngrok.io:10080 -> localhost:2121

Connections          ttl    opn    rt1    rt5    p50    p90
0             1     0.00   0.00   0.00   0.00
```

## Help

```
E:\in progress 2\Computer Networks 1\project\1\amirreza\Source\client>python client.py
enter command# help

welcome to ftp client.
call one of the following functions:

commands:
help      : display this manual
list      : display a list of files and their size and directories(directories start with >)
pwd       : print workspace directory
cd {file name} : change directory to {file name}
dwld {file_path} : download file_path
Exit      : close the client

enter command#
```

```
E:\in progress 2\Computer Networks 1\project\1\amirreza\Source\server>python server.py
server is ready

Welcome to the FTP server.

To get started, connect a client.
new connection start at port ('127.0.0.1', 10536)

start recive command
```

## PWD & CD & list

```
server is ready
Welcome to the FTP server.
To get started, connect a client.
new connection start at port ('127.0.0.1', 11243)

start receive command
receive list request
sending data
change directory
receive change directory request
change directory to \dir1

enter command# list
hi.txt      22
>dir1
all files size:22
enter command# cd dir1
\dir1
enter command# pwd
\dir1
enter command#
```

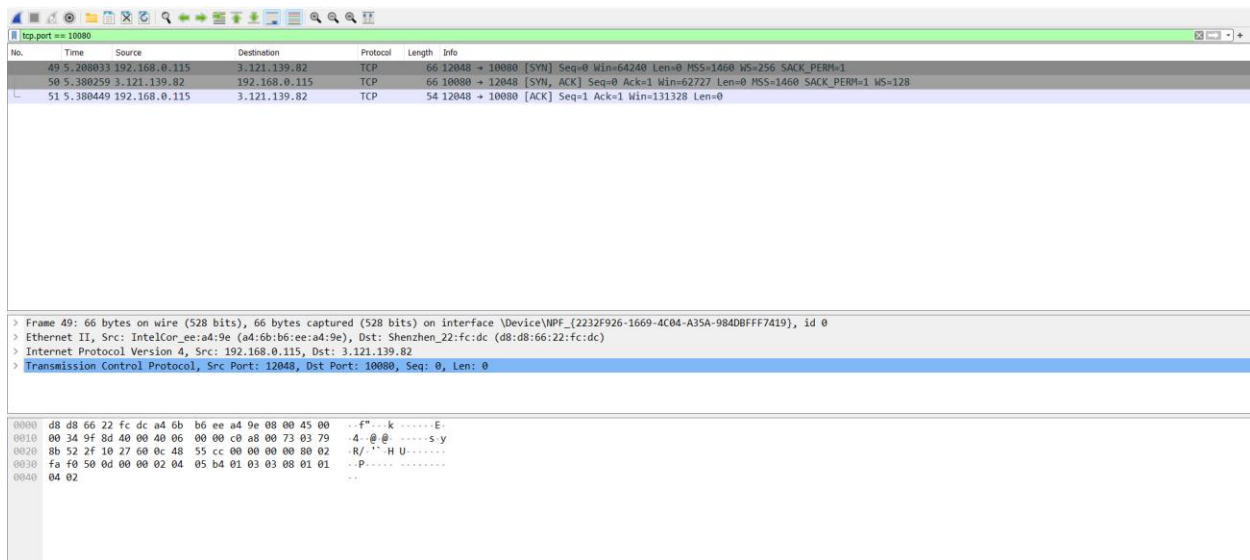
## بعد از بسته شدن کانکشن

```
Command Prompt
ngrok
Hello World! https://ngrok.com/next-generation

Session Status      online
Account             amirreza (Plan: Free)
Version             3.0.6
Region              Europe (eu)
Latency             133ms
Web Interface       http://127.0.0.1:4040
Forwarding           tcp://4.tcp.eu.ngrok.io:10080 -> localhost:2121

Connections
  ttl    opn    rt1    rt5    p50    p90
    6      0     0.00   0.00   236.18  336.26
```

## Whireshark



tcp.port == 10080

No.	Time	Source	Destination	Protocol	Length	Info
49	5.268033	192.168.0.115	3.121.139.82	TCP	66	12848 → 10080 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM=1
50	5.388259	3.121.139.82	192.168.0.115	TCP	66	10080 → 12848 [SYN, ACK] Seq=0 Ack=1 Win=62727 Len=0 MSS=1460 SACK_PERM=1 WS=128
51	5.388449	192.168.0.115	3.121.139.82	TCP	54	12848 → 10080 [ACK] Seq=1 Ack=1 Win=131328 Len=0

> Frame 49: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface \Device\NPF\_{2232F926-1669-4C04-A35A-984DBFF7419}, Id 0  
> Ethernet II, Src: IntelCor\_ee:a4:9e (a4:0b:b6:ee:a4:9e), Dst: Shenzhen\_22:fc:dc (d8:d8:66:22:fc:dc)  
> Internet Protocol Version 4, Src: 192.168.0.115, Dst: 3.121.139.82  
> Transmission Control Protocol, Src Port: 12848, Dst Port: 10080, Seq: 0, Len: 0

0000 d8 d8 66 22 fc dc a4 b6 ee a4 9e 08 00 45 00 ..f\*---k-----E:  
0010 00 34 9f 8d 40 00 40 06 00 00 c0 a8 00 73 03 79 4..@.@-----s.y  
0020 8b 52 2f 10 27 60 0c 48 55 cc 00 00 00 00 00 02 :R/..H U-----  
0030 fa f0 50 0d 00 00 02 04 05 b4 01 03 03 00 01 01 ..P-----  
0040 04 02 ..

در این حالت با توجه به مقصد بسته‌های syn میفهمیم که در واقع پکت های tcp ارسالی به سوی ngrok با پورت گفته شده میباشد و عملا به عنوان واسطه بین کلاینت و سرور قرار میگیرد اما در حالتی که از loopback استفاده شده بود، این پکت‌ها مستقیما از سرور به کلاینت ارسال میشد و بالعکس.