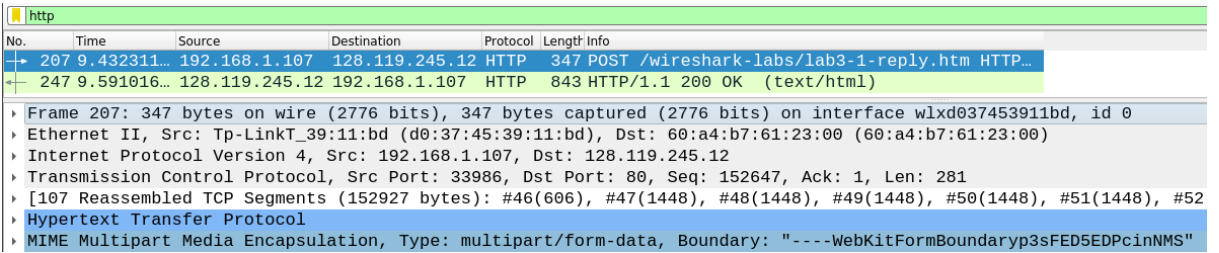
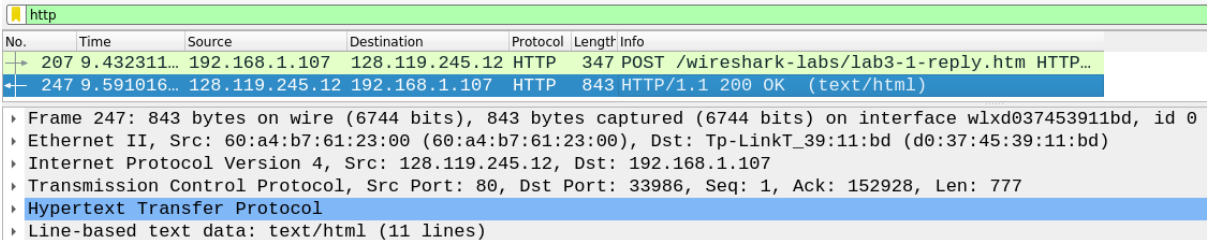
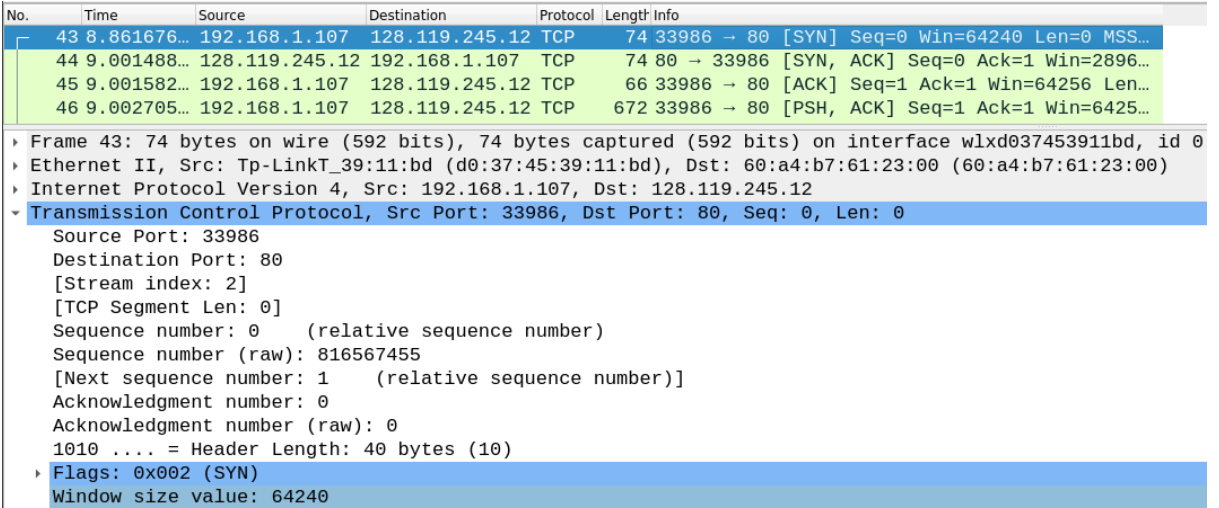


1. Wireshark: TCP

1. Перехват TCP-передачи данных от вашего компьютера удаленному серверу

- 1)
- 
- IP адрес компьютера - 192.168.1.107, порт - 33986.

- 2)
- 
- IP адрес сервера - 128.119.245.12, порт для отправки и приема - 80.

- 3)
- 
- У TCP-сегмента, который используется для установления TCP-соединения между компьютером клиента и сервером gaia.cs.umass.edu, порядковый номер 816567455. Это SYN-сегмент, так как в нем проставлен флаг SYN.

No.	Time	Source	Destination	Protocol	Length	Info
43	8.861676...	192.168.1.107	128.119.245.12	TCP	74	33986 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS...
44	9.001488...	128.119.245.12	192.168.1.107	TCP	74	80 → 33986 [SYN, ACK] Seq=0 Ack=1 Win=2896...
45	9.001582...	192.168.1.107	128.119.245.12	TCP	66	33986 → 80 [ACK] Seq=1 Ack=1 Win=64256 Len...
▶ Frame 44: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface wlx037453911bd, id 0 ▶ Ethernet II, Src: 60:a4:b7:61:23:00 (60:a4:b7:61:23:00), Dst: Tp-LinkT_39:11:bd (d0:37:45:39:11:bd) ▶ Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.107 ▶ Transmission Control Protocol, Src Port: 80, Dst Port: 33986, Seq: 0, Ack: 1, Len: 0 Source Port: 80 Destination Port: 33986 [Stream index: 2] [TCP Segment Len: 0] Sequence number: 0 (relative sequence number) Sequence number (raw): 3409920232 [Next sequence number: 1 (relative sequence number)] Acknowledgment number: 1 (relative ack number) Acknowledgment number (raw): 816567456 1010 = Header Length: 40 bytes (10) ▶ Flags: 0x012 (SYN, ACK) Window size value: 28960						

4)

У SYNACK-сегмента, отправленного сервером gaia.cs.umass.edu на компьютер клиента в ответ на SYN-сегмент, порядковый номер 3409920232. В поле подтверждения хранится значение 816567456, это на 1 больше порядкового номера полученного TCP-сегмента. Это SYNACK-сегмент, так как в нем проставлены флаги SYN и ACK.

No.	Time	Source	Destination	Protocol	Length	Info
46	9.002705...	192.168.1.107	128.119.245.12	TCP	672	33986 → 80 [PSH, ACK] Seq=1 Ack=1 Win=6425...
47	9.002712...	192.168.1.107	128.119.245.12	TCP	15	33986 → 80 [ACK] Seq=607 Ack=1 Win=64256 Len...
▶ Frame 46: 672 bytes on wire (5376 bits), 672 bytes captured (5376 bits) on interface wlx037453911bd, id 0 ▶ Ethernet II, Src: Tp-LinkT_39:11:bd (d0:37:45:39:11:bd), Dst: 60:a4:b7:61:23:00 (60:a4:b7:61:23:00) ▶ Internet Protocol Version 4, Src: 192.168.1.107, Dst: 128.119.245.12 ▶ Transmission Control Protocol, Src Port: 33986, Dst Port: 80, Seq: 1, Ack: 1, Len: 606 Source Port: 33986 Destination Port: 80 [Stream index: 2] [TCP Segment Len: 606] Sequence number: 1 (relative sequence number) Sequence number (raw): 816567456 [Next sequence number: 607 (relative sequence number)]						
0020	f5 0c 84 c2 00 50 30 ab	d4 a0 cb 3f 40 e9 80 18	...P0. ...?@...			
0030	01 f6 4d e3 00 00 01 01	08 0a 65 de 32 83 f5 54	.M.... .e.2..T			
0040	5a 38 50 4f 53 54 20 2f	77 69 72 65 73 68 61 72	Z8POST / wireshar			
0050	6b 2d 6c 61 62 73 2f 6c	61 62 33 2d 31 2d 72 65	k-labs/l ab3-1-re			
0060	70 6c 79 2e 68 74 6d 20	48 54 54 50 2f 31 2e 31	ply.htm HTTP/1.1			

5)

У TCP-сегмента, содержащего команду POST протокола HTTP, порядковый номер 816567456.

6)

Порядковый номер	Отправлен, с	Получен ACK-пакет, с	RTT, с
816567456	0.141028213	0.280135117	0.139106904
816568062	0.141436149	0.280141272	0.138705123
816569510	0.141464907	0.280525428	0.139060521
816570958	0.141497362	0.283224900	0.141727538
816572406	0.141506366	0.283246791	0.141740425
816573854	0.141531836	0.283526623	0.141994787

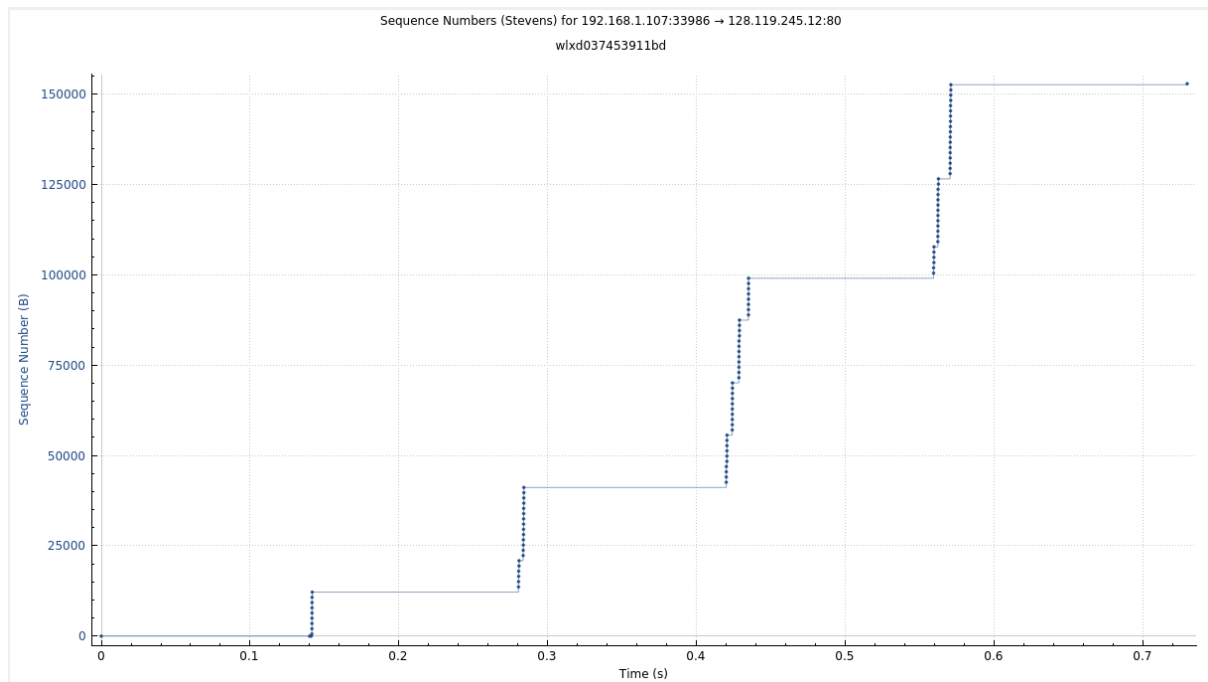
7)

Пропускная способность соединения примерно равна 209.67 Кбайт / с.

Формула для расчета пропускной способности соединения:

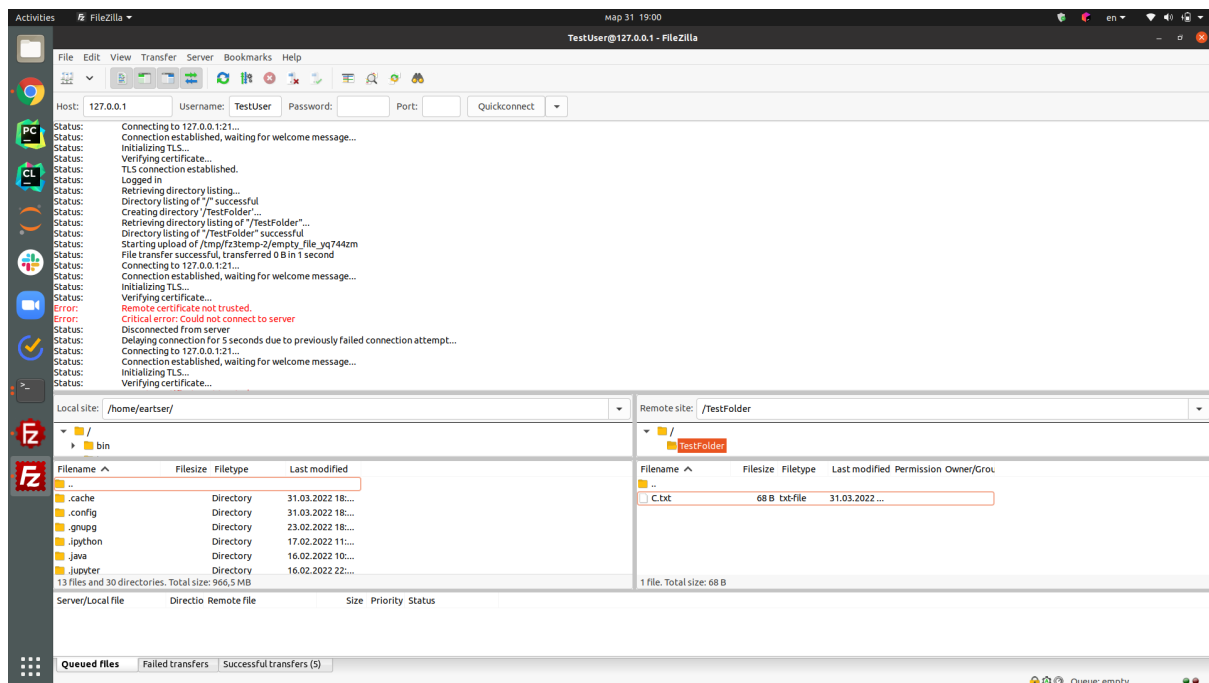
$$\frac{\langle \text{Порядковый номер последнего пакета} \rangle - \langle \text{Порядковый номер первого пакета} \rangle}{\langle \text{Разность времен отправки/получения пакетов} \rangle} = \frac{816720383 - 816567455}{0.729369971} \approx 209671 \frac{\text{байт}}{\text{с}}.$$

2. Wireshark: Работа с Time-Sequence-Graph (Stevens)



2. Программирование. FTP

1. FileZilla сервер и клиент



Activities FileZilla Map 31 19:00 TestUser@127.0.0.1 - FileZilla

File Edit View Transfer Server Bookmarks Help

Host: 127.0.0.1 Username: TestUser Password: Port: Quickconnect

Error: Remote certificate not trusted.
Critical error: Could not connect to server
Status: Disconnected from server
Status: Delaying connection for 5 seconds due to previously failed connection attempt...
Status: Connecting to 127.0.0.1:21...
Status: Connection established, waiting for welcome message...
Status: Initializing TLS...
Status: Verifying certificate...
Status: TLS connection established.
Status: Logged in
Status: Starting download of /TestFolder/A.txt
Status: Retrieving directory listing of "/TestFolder"...
Status: File transfer successful, transferred 0 B in 1 second
Status: Starting download of /TestFolder/A.txt
Status: File transfer successful, transferred 0 B in 1 second
Status: Starting upload of /tmp/rx3temp-2/A.txt
Status: File transfer successful, transferred 25 B in 1 second
Status: Retrieving directory listing of "/TestFolder"...
Status: Directory listing of "/TestFolder" successful
Status: Starting upload of /tmp/rx3temp-2/empty_file_yq744zm
Status: File transfer successful, transferred 0 B in 1 second
Status: Renaming /TestFolder/B.txt to /TestFolder/C.txt
Status: Starting download of /TestFolder/C.txt
Status: Retrieving directory listing of "/TestFolder"...
Status: File transfer successful, transferred 0 B in 1 second

Local site: /home/eartser/ Remote site: /TestFolder

Filename	Filesize	Filetype	Last modified
..			
.cache		Directory	31.03.2022 18:...
.config		Directory	31.03.2022 18:...
.gnupg		Directory	23.02.2022 18:...
.ipython		Directory	17.02.2022 11:...
.java		Directory	16.02.2022 10:...
.jupyter		Directory	16.02.2022 22:...

13 files and 30 directories. Total size: 966,5 MB

Server/Local file	Directio	Remote file	Size	Priority	Status
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Queued files Failed transfers Successful transfers (5) Queue: empty

Activities FileZilla Map 31 19:01 TestUser@127.0.0.1 - FileZilla

File Edit View Transfer Server Bookmarks Help

Host: 127.0.0.1 Username: TestUser Password: Port: Quickconnect

Status: Initializing TLS...
Status: Verifying certificate...
Status: TLS connection established.
Status: Logged in
Status: Starting download of /TestFolder/A.txt
Status: Retrieving directory listing of "/TestFolder"...
Status: File transfer successful, transferred 0 B in 1 second
Status: Starting download of /TestFolder/A.txt
Status: File transfer successful, transferred 0 B in 1 second
Status: Starting upload of /tmp/rx3temp-2/A.txt
Status: File transfer successful, transferred 25 B in 1 second
Status: Retrieving directory listing of "/TestFolder"...
Status: Directory listing of "/TestFolder" successful
Status: Starting upload of /tmp/rx3temp-2/empty_file_yq744zm
Status: File transfer successful, transferred 0 B in 1 second
Status: Renaming /TestFolder/B.txt to /TestFolder/C.txt
Status: Starting download of /TestFolder/C.txt
Status: Retrieving directory listing of "/TestFolder"...
Status: File transfer successful, transferred 0 B in 1 second
Status: Starting upload of /tmp/rx3temp-2/C.txt
Status: File transfer successful, transferred 68 B in 1 second
Status: Retrieving directory listing of "/TestFolder"...
Status: Directory listing of "/TestFolder" successful
Status: Disconnected from server
Status: Deleting "/TestFolder/A.txt"

Local site: /home/eartser/ Remote site: /TestFolder

Filename	Filesize	Filetype	Last modified
..			
.cache		Directory	31.03.2022 18:...
.config		Directory	31.03.2022 18:...
.gnupg		Directory	23.02.2022 18:...
.ipython		Directory	17.02.2022 11:...
.java		Directory	16.02.2022 10:...
.jupyter		Directory	16.02.2022 22:...

13 files and 30 directories. Total size: 966,5 MB

Server/Local file	Directio	Remote file	Size	Priority	Status
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Queued files Failed transfers Successful transfers (5) Queue: empty