

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАВЧАЛЬНО-НАУКОВИЙ КОМПЛЕКС
«ІНСТИТУТ ПРИКЛАДНОГО СИСТЕМНОГО АНАЛІЗУ»
НАЦІОНАЛЬНОГО ТЕХНІЧНОГО УНІВЕРСИТЕТУ УКРАЇНИ
«КИЇВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ»
КАФЕДРА МАТЕМАТИЧНИХ МЕТОДІВ СИСТЕМНОГО
АНАЛІЗУ

Завдання лабораторної роботи №2
З дисципліни «Комп'ютерні мережі»

Виконав: студент 3-го курсу

гр. КА-71

Островський З.Ю.

Прийняв: Кухарєв С.О.

Київ 2020

http						
No.	Time	Source	Destination	Protocol	Length	Info
8	0.035138	192.168.0.105	77.47.130.214	HTTP	442	GET /student/index.php?mode=studysheet HTTP/1.1
10	0.085900	77.47.130.214	192.168.0.105	HTTP	493	HTTP/1.1 302 Found (text/html) (text/html)
11	0.101136	192.168.0.105	77.47.130.214	HTTP	419	GET //login.php HTTP/1.1
12	0.141831	77.47.130.214	192.168.0.105	HTTP	661	HTTP/1.1 200 OK (text/html)
44	6.123678	192.168.0.105	128.119.245.12	HTTP	578	GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1
48	6.245400	128.119.245.12	192.168.0.105	HTTP	552	HTTP/1.1 200 OK (text/html)
62	9.309959	192.168.0.105	128.119.245.12	HTTP	510	GET /favicon.ico HTTP/1.1
66	9.439800	128.119.245.12	192.168.0.105	HTTP	550	HTTP/1.1 404 Not Found (text/html)

> Frame 44: 578 bytes on wire (4624 bits), 578 bytes captured (4624 bits) on interface \Device\NPF_{B6F802D0-58AE-4796-82E0-18ADB9212290}, id 0

> Ethernet II, Src: IntelCor_7e:a3:ce (08:d4:0c:7e:a3:ce), Dst: D-LinkIn_2c:c0:b0 (1c:af:f7:2c:c0:b0)

> Internet Protocol Version 4, Src: 192.168.0.105, Dst: 128.119.245.12

> Transmission Control Protocol, Src Port: 17927, Dst Port: 80, Seq: 1, Ack: 1, Len: 512

▼ Hypertext Transfer Protocol

▼ GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n

▼ [Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]

[GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]

[Severity level: Chat]

[Group: Sequence]

Request Method: GET

Request URI: /wireshark-labs/HTTP-wireshark-file1.html

Request Version: HTTP/1.1

Host: gaia.cs.umass.edu\r\n

Connection: keep-alive\r\n

Upgrade-Insecure-Requests: 1\r\n

DNT: 1\r\n

User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.163 Safari/537.36\r\n

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9\r\n

Accept-Encoding: gzip, deflate\r\n

Accept-Language: ru-RU,ru;q=0.9,en-US;q=0.8,en;q=0.7,uk;q=0.6,de;q=0.5\r\n

\r\n

[Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file1.html]

[HTTP request 1/2]

[Response in frame: 48]

[Next request in frame: 62]

0040	aa 0d 47 45 54 20 2f 77	69 72 65 73 68 61 72 6b	..GET /w ireshark
0050	2d 6c 61 62 73 2f 48 54	54 50 2d 77 69 72 65 73	-labs/HT TP-wires
0060	68 61 72 6b 2d 66 69 6c	65 31 2e 68 74 6d 6c 20	hark-fil e1.html
0070	48 54 54 50 2f 31 2e 31	0d 0a 48 6f 73 74 3a 20	HTTP/1.1 · Host:
0080	67 61 69 61 2e 63 73 2e	75 6d 61 73 73 2e 65 64	gaia.cs. umass.ed
0090	75 0d 0a 43 6f 6e 6e 65	63 74 69 6f 6e 3a 20 6b	u · Conne ction: k
00a0	65 65 70 2d 61 6c 69 76	65 0d 0a 55 70 67 72 61	ee p-aliv e · Upgra
00b0	64 65 2d 49 6e 73 65 63	75 72 65 2d 52 65 71 75	de-Insec ure-Requ
00c0	65 73 74 73 3a 20 31 0d	0a 44 4e 54 3a 20 31 0d	ests: 1 · DNT: 1 ·
00d0	0a 55 73 65 72 2d 41 67	65 6e 74 3a 20 4d 6f 7a	· User-Ag ent: Moz
00e0	69 6c 6c 61 2f 35 2e 30	20 28 57 69 6e 64 6f 77	illa/5.0 (Window
00f0	73 20 4e 54 20 31 30 2e	30 3b 20 57 69 6e 36 34	s NT 10. 0; Win64
0100	3b 20 78 36 34 29 20 41	70 70 6c 65 57 65 62 4b	; x64) A ppleWebK
0110	69 74 2f 35 33 37 2e 33	36 20 28 4b 48 54 4d 4c	it/537.3 6 (KHTML
0120	2c 20 6c 69 6b 65 20 47	65 63 6b 6f 29 20 43 68	, like G ecko) Ch
0130	72 6f 6d 65 2f 38 30 2e	30 2e 33 39 38 37 2e 31	rome/80. 0.3987.1
0140	36 33 20 53 61 66 61 72	69 2f 35 33 37 2e 33 36	63 Safar i/537.36
0150	0d 0a 11 03 c3 69 70 74	3a 20 74 65 73 74 2f 0b	· Accept : text/
0160	74 64 6c 2c 61 70 70 6c	69 63 61 74 69 6f 6e 2f	tml,appl ication/
0170	78 68 74 6d 6c 2b 78 6d	6c 2c 61 70 70 6c 69 63	xhtml+xml ,applic

Hypertext Transfer Protocol (request)

```

GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
[Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-
file1.html HTTP/1.1\r\n]
[GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]
[Severity level: Chat]
[Group: Sequence]
Request Method: GET
Request URI: /wireshark-labs/HTTP-wireshark-file1.html
Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
Upgrade-Insecure-Requests: 1\r\n
DNT: 1\r\n
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/80.0.3987.163 Safari/537.36\r\n
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*
;q=0.8,application/signed-exchange;v=b3;q=0.9\r\n
Accept-Encoding: gzip, deflate\r\n
Accept-Language: ru-RU,ru;q=0.9,en-US;q=0.8,en;q=0.7,uk;q=0.6,de;q=0.5\r\n
\r\n
[Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-
file1.html]
[HTTP request 1/2]
[Response in frame: 48]
[Next request in frame: 62]

```

Hypertext Transfer Protocol (response)

```
HTTP/1.1 200 OK\r\n
  [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
    [HTTP/1.1 200 OK\r\n]
    [Severity level: Chat]
    [Group: Sequence]
  Response Version: HTTP/1.1
  Status Code: 200
  [Status Code Description: OK]
  Response Phrase: OK
Date: Mon, 20 Apr 2020 10:59:51 GMT\r\n
Server:      Apache/2.4.6      (CentOS)      OpenSSL/1.0.2k-fips      PHP/5.4.16
mod_perl/2.0.11 Perl/v5.16.3\r\n
Last-Modified: Mon, 20 Apr 2020 05:59:02 GMT\r\n
ETag: "80-5a3b29894adbe"\r\n
Accept-Ranges: bytes\r\n
Content-Length: 128\r\n
  [Content length: 128]
Keep-Alive: timeout=5, max=100\r\n
Connection: Keep-Alive\r\n
Content-Type: text/html; charset=UTF-8\r\n
\r\n
[HTTP response 1/2]
[Time since request: 0.121722000 seconds]
[Request in frame: 44]
[Next request in frame: 62]
[Next response in frame: 66]
[Request   URI:      http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-
file1.html]
File Data: 128 bytes
```

ВІДПОВІДІ НА ПИТАННЯ 1-7

- 1) HTTP 1.1. Навряд чи зараз іще використовується 1.0, оскільки 1.1 було розроблено саме для того, щоб можна було встановити постійне з'єднання в рамках якого посилалося б більше одного запиту-відповіді.
- 2) Для цього дивимось в заголовок пакета запиту Accept-Language. Мови перераховуються в порядку пріоритетності. В нашому випадку такими є російська, англійська, українська та німецька.
- 3) IP мого ПК **Source: 192.168.0.105**. Серверу **Destination: 128.119.245.12**.
- 4) Status Code: 200. Означає успішний запит.
- 5) Last-Modified: Mon, 20 Apr 2020 05:59:02 GMT
- 6) Content-Length: 128. Розмір вказується в байтах.
- 7) В пакеті на запит все відповідає байтовому представленню. У пакеті-відповіді все також відповідає байтовому представленню.

http						
No.	Time	Source	Destination	Protocol	Length	Info
44	4.078056	192.168.0.105	128.119.245.12	HTTP	578	GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1
46	4.205976	128.119.245.12	192.168.0.105	HTTP	552	HTTP/1.1 200 OK (text/html)
74	9.086404	192.168.0.105	128.119.245.12	HTTP	689	GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1
77	9.210800	128.119.245.12	192.168.0.105	HTTP	304	HTTP/1.1 304 Not Modified

> Frame 44: 578 bytes on wire (4624 bits), 578 bytes captured (4624 bits) on interface \Device\NPF_{B6F802DD-58AE-4796-82E0-18ADB9212290}, id 0
 > Ethernet II, Src: IntelCor_7e:a3:ce (08:d4:0c:7e:a3:ce), Dst: D-LinkIn_2c:c0:b0 (1c:af:f7:2c:c0:b0)
 > Internet Protocol Version 4, Src: 192.168.0.105, Dst: 128.119.245.12
 > Transmission Control Protocol, Src Port: 18118, Dst Port: 80, Seq: 1, Ack: 1, Len: 512
 > Hypertext Transfer Protocol

GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
 [Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]
 [GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]
 [Severity level: Chat]
 [Group: Sequence]
 Request Method: GET
 Request URI: /wireshark-labs/HTTP-wireshark-file1.html
 Request Version: HTTP/1.1
 Host: gaia.cs.umass.edu\r\n
 Connection: keep-alive\r\n
 DNT: 1\r\n
 Upgrade-Insecure-Requests: 1\r\n
 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.163 Safari/537.36\r\n
 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9\r\n
 Accept-Encoding: gzip, deflate\r\n
 Accept-Language: ru-RU,ru;q=0.9,en-US;q=0.8,en;q=0.7,uk;q=0.6,de;q=0.5\r\n
 \r\n
 [Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file1.html]
 [HTTP request 1/2]
 [Response in frame: 46]

Hypertext Transfer Protocol (1st request)

```

GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
[Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-
file1.html HTTP/1.1\r\n]
[GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]
[Severity level: Chat]
[Group: Sequence]
Request Method: GET
Request URI: /wireshark-labs/HTTP-wireshark-file1.html
Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
DNT: 1\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/80.0.3987.163 Safari/537.36\r\n
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*
;q=0.8,application/signed-exchange;v=b3;q=0.9\r\n
Accept-Encoding: gzip, deflate\r\n
Accept-Language: ru-RU,ru;q=0.9,en-US;q=0.8,en;q=0.7,uk;q=0.6,de;q=0.5\r\n
\r\n
[Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-
file1.html]
[HTTP request 1/2]
[Response in frame: 46]
[Next request in frame: 74]

```

Hypertext Transfer Protocol (1st response)

```
HTTP/1.1 200 OK\r\n
  [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
    [HTTP/1.1 200 OK\r\n]
    [Severity level: Chat]
    [Group: Sequence]
  Response Version: HTTP/1.1
  Status Code: 200
  [Status Code Description: OK]
  Response Phrase: OK
Date: Mon, 20 Apr 2020 12:12:18 GMT\r\n
Server:      Apache/2.4.6      (CentOS)      OpenSSL/1.0.2k-fips      PHP/5.4.16
mod_perl/2.0.11 Perl/v5.16.3\r\n
Last-Modified: Mon, 20 Apr 2020 05:59:02 GMT\r\n
ETag: "80-5a3b29894adbe"\r\n
Accept-Ranges: bytes\r\n
Content-Length: 128\r\n
Keep-Alive: timeout=5, max=100\r\n
Connection: Keep-Alive\r\n
Content-Type: text/html; charset=UTF-8\r\n
\r\n
[HTTP response 1/2]
[Time since request: 0.127920000 seconds]
[Request in frame: 44]
[Next request in frame: 74]
[Next response in frame: 77]
[Request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-
file1.html]
File Data: 128 bytes
```

Hypertext Transfer Protocol (2nd request)

```
GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
  [Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-
file1.html HTTP/1.1\r\n]
    [GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]
    [Severity level: Chat]
    [Group: Sequence]
  Request Method: GET
  Request URI: /wireshark-labs/HTTP-wireshark-file1.html
  Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
Cache-Control: max-age=0\r\n
DNT: 1\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36
(KHTML, like Gecko) Chrome/80.0.3987.163 Safari/537.36\r\n
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*
;q=0.8,application/signed-exchange;v=b3;q=0.9\r\n
Accept-Encoding: gzip, deflate\r\n
Accept-Language: ru-RU,ru;q=0.9,en-US;q=0.8,en;q=0.7,uk;q=0.6,de;q=0.5\r\n
If-None-Match: "80-5a3b29894adbe"\r\n
If-Modified-Since: Mon, 20 Apr 2020 05:59:02 GMT\r\n
```

```
\r\n
[Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-
file1.html]
[HTTP request 2/2]
[Prev request in frame: 44]
[Response in frame: 77]
```

Hypertext Transfer Protocol (2nd response)

```
HTTP/1.1 304 Not Modified\r\n
  [Expert Info (Chat/Sequence): HTTP/1.1 304 Not Modified\r\n]
    [HTTP/1.1 304 Not Modified\r\n]
    [Severity level: Chat]
    [Group: Sequence]
  Response Version: HTTP/1.1
  Status Code: 304
  [Status Code Description: Not Modified]
  Response Phrase: Not Modified
Date: Mon, 20 Apr 2020 12:12:23 GMT\r\n
Server:      Apache/2.4.6      (CentOS)      OpenSSL/1.0.2k-fips      PHP/5.4.16
mod_perl/2.0.11 Perl/v5.16.3\r\n
Connection: Keep-Alive\r\n
Keep-Alive: timeout=5, max=99\r\n
ETag: "80-5a3b29894adbe"\r\n
\r\n
[HTTP response 2/2]
[Time since request: 0.124396000 seconds]
[Prev request in frame: 44]
[Prev response in frame: 46]
[Request in frame: 74]
[Request      URI:      http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-
file1.html]
```

ВІДПОВІДІ НА ПИТАННЯ 8-11

8) У першому запиті заголовок IF-MODIFIED-SINCE відсутній.

9) Так повернув html:

```
<html>\n
Congratulations. You've downloaded the file \n
http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file1.html!\n
</html>\n
```

10) Так є. Значення в 2-го GET запиті для If-Modified-Since співпадає зі значенням 1-го response Last-Modified: Mon, 20 Apr 2020 05:59:02 GMT

11) В другу відповідь сервер не вертав вже файл. Він повернув код 304, який відповідає статусу, що файл не був змінений. Таким чином спрацював механізм кешування в браузері. Оскільки сторінка не була змінена з часу останнього завантаження, то не було потреби додатково навантажувати мережу і заново її передавати.

▼ [41 Reassembled TCP Segments (126525 bytes): #36(8760), #38(1460), #39(1460), #41(1460), #42(8760), #44(1460), #46(1460), #47(1460)]

[Frame: 36, payload: 0-8759 (8760 bytes)]
 [Frame: 38, payload: 8760-10219 (1460 bytes)]
 [Frame: 39, payload: 10220-11679 (1460 bytes)]
 [Frame: 41, payload: 11680-13139 (1460 bytes)]
 [Frame: 42, payload: 13140-21899 (8760 bytes)]
 [Frame: 44, payload: 21900-23359 (1460 bytes)]
 [Frame: 46, payload: 23360-24819 (1460 bytes)]
 [Frame: 47, payload: 24820-26279 (1460 bytes)]
 [Frame: 48, payload: 26280-29199 (2920 bytes)]
 [Frame: 50, payload: 29200-36499 (7300 bytes)]
 [Frame: 52, payload: 36500-37959 (1460 bytes)]
 [Frame: 54, payload: 37960-39419 (1460 bytes)]
 [Frame: 55, payload: 39420-48179 (8760 bytes)]
 [Frame: 57, payload: 48180-52559 (4380 bytes)]
 [Frame: 59, payload: 52560-54019 (1460 bytes)]
 [Frame: 60, payload: 54020-55479 (1460 bytes)]
 [Frame: 62, payload: 55480-56939 (1460 bytes)]
 [Frame: 64, payload: 56940-61319 (4380 bytes)]
 [Frame: 66, payload: 61320-62779 (1460 bytes)]
 [Frame: 67, payload: 62780-64239 (1460 bytes)]
 [Frame: 69, payload: 64240-65699 (1460 bytes)]
 [Frame: 70, payload: 65700-72999 (7300 bytes)]

Wireshark · TCP Segment (tcp.segment) · Беспроводная сеть

HTTP/1.1 200 OK
 Date: Mon, 20 Apr 2020 14:36:48 GMT
 Content-Type: image/gif
 Transfer-Encoding: chunked
 Connection: keep-alive
 Server: PWS/8.3.1.0.8
 Content-Disposition: inline; filename="dt200321.gif"
 Content-Transfer-Encoding: binary
 X-XSS-Protection: 1; mode=block
 X-Content-Type-Options: nosniff
 X-Request-Id: d719e4bf-ad35-4042-89cf-d26d78d0a22b
 ETag: W/"d34cc13a7ef8391a0869de1916541e38"
 Status: 200 OK
 Age: 175286
 Via: 1.1 VMmgzjgORD1xu80:3 (W), 1.1 m164:6 (W), 1.1 PSwkljfkBP1vw105:7 (W)
 X-Px: ht PSwkljfkBP1vw105KBP
 X-Request-Id: 5e9db380_PSwkljfkBP1co10_5637-15762
 Cache-Control: max-age=604800

7d3b
 GIF89a..... \$.../..(#.5*... ". .!"#
 ((1-,63)3.1-24434;;;987*/1.!.P..d..r.#B;<K<\$G3.RG4nS+aT.

ВІДПОВІДІ НА ПИТАННЯ 16-17

- 16) Усього було 3 GET запити, один на завантаження HTML сторінки і два на завантаження малюнків. Цільова адреса серверу 128.119.245.12, моя адреса – 192.168.0.105 .
- 17) Ресурси були отримані послідовно. Про це вказує часова послідовність запитів, де після кожного GET запиту іде запит-відповідь сервера.

*Беспроводная сеть						
Файл Редактирование Просмотр Запуск Захват Анализ Статистика Телефония Беспроводной Инструменты Помощь						
http						
No.	Time	Source	Destination	Protocol	Length	Info
142	6.272722	192.168.0.105	128.119.245.12	HTTP	578	GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1
146	6.398333	128.119.245.12	192.168.0.105	HTTP	1139	HTTP/1.1 200 OK (text/html)
148	6.522477	192.168.0.105	128.119.245.12	HTTP	510	GET /pearson.png HTTP/1.1
153	6.646459	128.119.245.12	192.168.0.105	HTTP	781	HTTP/1.1 200 OK (PNG)
160	6.893920	192.168.0.105	128.119.245.12	HTTP	524	GET /~kurose/cover_5th_ed.jpg HTTP/1.1
239	7.328556	128.119.245.12	192.168.0.105	HTTP	1472	HTTP/1.1 200 OK (JPEG JFIF image)