

Technologie Sieciowe

lista 5

Zad1

server2.pl

- Zasada działania skryptu:
 - Uwaga, zmieniłem nazwę pliku z server3.pl na server2.pl
 - Ustawiamy przekierowanie na danym adresie (localhost) i porcie (8003)
 - Skrypt wyświetla informację pod jakim adresem nasłuchuje
 - W pętli akceptuje nowe połączenia i nasłuchuje nowych zapytań
 - Gdy otrzyma zapytanie GET w odpowiedzi wysyła plik ./index1.html – stronę główną

It is main HTML

- Gdy zapytanie nie jest typu GET, serwer wysyła w odpowiedzi error 403 Forbidden

```
[artur@artur-virtualbox ~/Technologie Sieciowe]$ curl -i -X POST http://[::1]:8003/
HTTP/1.1 403 Forbidden
Date: Wed, 03 Jun 2020 11:43:45 GMT
Server: libwww-perl-daemon/6.06
Content-Type: text/html
Content-Length: 53
```

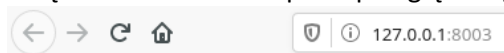
```
<title>403 Forbidden</title>
<h1>403 Forbidden</h1>
```

- Po transmisji następuje zamknięcie połączenia z klientem

Zad2

server2.pl

- Połączenie z serwerem przez przeglądarkę



It is main HTML

- Dodatkowa uwaga:
 - Można zauważyć, że ten sam skrypt za 1 razem zajął <http://127.0.0.1:8003/> a drugim razem [http://\[::1\]:8003/](http://[::1]:8003/). Jest to spowodowane ustawieniami systemowymi.
 - W ipv4 127.0.0.1 to localhost
 - W ipv6 [::1] to localhost

Zad3

server3.pl

- Serwer odsyła nagłówki otrzymanego żądania w formie text/text i wysyła HTTP 200 OK. Do wysyłania zapytań wykorzystuję curl. POST będzie szczegółowo pokazany, natomiast w reszcie jedynie odpowiedzi na zadane zapytanie
 - POST
 - curl

```
[artur@artur-virtualbox ~/Technologie Sieciowe]$ curl -i -X POST http://[::1]:8004/
HTTP/1.1 200 OK
Date: Wed, 03 Jun 2020 12:13:13 GMT
Server: libwww-perl-daemon/6.06
Content-Length: 70
Content-Type: text/text

POST / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

■ serwer

```
POST / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

■ Wireshark – pakiet do routera

```
4 0.00012418 ::1 ::1 HTTP 163 POST / HTTP/1.1
5 0.00017902 ::1 ::1 TCP 60 RR 8004 -> 52470 (ACK) Seq=1

Frame 4: 163 bytes on wire (1304 bits), 163 bytes captured (1304 bits) on interface any, id 0
Linux cooked capture
Packet type: Unicast to us (0)
Link-layer address type: 772
Link-layer address length: 6
Source: 00:00:00:00:00:00 (00:00:00:00:00:00)
Unused: 0000
Protocol: IPv6 (0x86dd)
Internet Protocol Version 6, Src: ::1, Dst: ::1
0110 .... = Version: 6
.... 0000 0000 .... = Traffic Class: 0x00 (DSCP: CS0, ECN: Not-ECT)
..... 1100 1100 1000 1010 = Flow Label: 0x1cd0a
Payload Length: 107
Next Header: TCP (6)
Hop Limit: 64
Source: ::1
Destination: ::1
Transmission Control Protocol, Src Port: 52470, Dst Port: 8004, Seq: 1, Ack: 1, Len: 75
Source Port: 52470
Destination Port: 8004
[Stream index: 0]
[TCP Segment Len: 75]
Sequence number: 1 (relative sequence number)
Sequence number (raw): 4275558604
[Next sequence number: 76 (relative sequence number)]
Acknowledgment number: 1 (relative ack number)
Acknowledgment number (raw): 3833329955
1000 .... = Header Length: 32 bytes (8)
Flags: 0x018 (PSH, ACK)
Window size value: 512
[Calculated window size: 65536]
[Window size scaling factor: 128]
Checksum: 0x0073 [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
[SEQ/ACK analysis]
[Timestamps]
TCP payload (75 bytes)
Hypertext Transfer Protocol
POST / HTTP/1.1\r\n
Host: [::1]:8004\r\n
User-Agent: curl/7.70.0\r\n
Accept: */*\r\n
\r\n
[Full request URI: http://[::1]:8004/]
[HTTP request 1/1]
[Response in frame: 8]
```

■ Wireshark – pakiet z routera

```
0 0.00042022 ::1 ::1 HTTP 270 HTTP/1.1 200 OK (text/text)

.... 0000 0000 .... = Traffic Class: 0x00 (DSCP: CS0, ECN: Not-ECT)
..... 1110 1100 1001 0101 = Flow Label: 0xc7c95
Payload Length: 230
Next Header: TCP (6)
Hop Limit: 64
Source: ::1
Destination: ::1
Transmission Control Protocol, Src Port: 8004, Dst Port: 52470, Seq: 18, Ack: 76, Len: 187
Source Port: 8004
Destination Port: 52470
[Stream index: 0]
[TCP Segment Len: 187]
Sequence number: 18 (relative sequence number)
Sequence number (raw): 3833329972
[Next sequence number: 205 (relative sequence number)]
Acknowledgment number: 76 (relative ack number)
Acknowledgment number (raw): 4275558679
1000 .... = Header Length: 32 bytes (8)
Flags: 0x018 (PSH, ACK)
Window size value: 512
[Calculated window size: 65536]
[Window size scaling factor: 128]
Checksum: 0x00d3 [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
[SEQ/ACK analysis]
[Timestamps]
TCP payload (187 bytes)
TCP segment data (187 bytes)
[2 Reassembled TCP Segments (204 bytes): #6(17), #8(187)]
Hypertext Transfer Protocol
HTTP/1.1 200 OK\r\n
Date: Wed, 03 Jun 2020 12:13:13 GMT\r\n
Server: libwww-perl-daemon/6.06\r\n
Content-Length: 70\r\n
Content-Type: text/text\r\n
\r\n
[HTTP response 1/1]
[Time since request: 0.000430294 seconds]
[Request in frame: 4]
[Request URI: http://[::1]:8004/]
File Data: 70 bytes

Media Type
100 40 54 54 50 2f 31 2e 31 20 32 30 30 20 4f 4b 0d HTTP/1.1 200 OK
101 0a 44 61 74 65 3a 20 57 65 64 2c 20 30 33 20 4a Date: Wed, 03 J
102 70 6e 20 32 30 32 30 20 31 32 3a 31 33 3a 31 33 un 2020 12:13:13
103 20 47 4d 54 00 0a 53 65 72 78 65 72 3a 20 6c 69 GMT-Ser: lib
104 62 77 77 77 2d 70 65 72 6c 2d 84 61 65 6d 6f 6e bww-per l-daemon
105 2f 2e 20 30 30 0d 0a 43 6f 5a 74 65 6e 74 2d 4c /6.06 Content-L
106 65 6e 67 74 68 3a 20 37 39 0d 0a 43 6f 6e 74 65 engh: 7 0 Conte
107 6e 74 2d 54 70 70 65 3a 20 74 65 70 74 2f 74 65 nt-Type: text/te
108 70 74 0d 0a 0d 0a Content-Length: 70\r\n\r\n
200 2f 31 2e 31 0a 41 63 63 65 70 74 3a 20 2a 37 /1.1 Ac:pt: */
201 20 0a 48 6f 72 74 2d 20 0a 3a 21 54 2d 20 30 Host: [::1]:80
202 30 34 0a 55 73 65 72 2d 41 67 65 6e 74 3a 20 63 4-User-Agent: c
203 70 72 6c 2f 37 2e 27 20 2e 20 0a 6e curl/7.70.0\r\n
```

Jak widać dane odnośnie zapytania rzeczywiście są zwracane

- Reszta

- curl

```
[artur@artur-virtualbox ~/Technologie Sieciowe]$ curl -i -X GET http://[::1]:8004/
HTTP/1.1 200 OK
Date: Wed, 03 Jun 2020 12:32:17 GMT
Server: libwww-perl-daemon/6.06
Content-Length: 69
Content-Type: text/text

GET / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0

[artur@artur-virtualbox ~/Technologie Sieciowe]$ curl -i -X DELETE http://[::1]:8004/
HTTP/1.1 200 OK
Date: Wed, 03 Jun 2020 12:32:32 GMT
Server: libwww-perl-daemon/6.06
Content-Length: 72
Content-Type: text/text

DELETE / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0

[artur@artur-virtualbox ~/Technologie Sieciowe]$ curl -i -X PUT http://[::1]:8004/
HTTP/1.1 200 OK
Date: Wed, 03 Jun 2020 12:35:43 GMT
Server: libwww-perl-daemon/6.06
Content-Length: 69
Content-Type: text/text

PUT / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0

[artur@artur-virtualbox ~/Technologie Sieciowe]$ curl -i -X PATCH http://[::1]:8004/
HTTP/1.1 200 OK
Date: Wed, 03 Jun 2020 12:36:12 GMT
Server: libwww-perl-daemon/6.06
Content-Length: 71
Content-Type: text/text

PATCH / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

- serwer

```
POST / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

```
GET / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

```
DELETE / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

```
PUT / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

```
PATCH / HTTP/1.1
Accept: */*
Host: [::1]:8004
User-Agent: curl/7.70.0
```

Zad4

server4.pl

- Serwer potrafi obsłużyć poprawne przekierowania (takie pliki istnieją w katalogu skryptu)
- HTML posiada podstawowe przekierowania do innych plików

It is main HTML It is page1 HTML It is page2 HTML

- [Main](#)
- [Page 1](#)
- [Page 2](#)

- [Main](#)
- [Page 1](#)
- [Page 2](#)

- [Main](#)
- [Page 1](#)
- [Page 2](#)

Zad5

server4.pl || server3.pl

- Wireshark
 - Pakiety nie wychodzą poza komputer – są przechwytywane i obsługiwane przez system

Filtr ustawiony jest jedynie na: tcp.port == 8005

No.	Time	Source	Destination	Protocol	Length	Info
113	102.810546521	127.0.0.1	127.0.0.1	TCP	76	59740 → 8005 [SYN] Seq=0 Win=65495 Len=0 MSS=65495 SACK_PERM=1 TSval=2501205962 TSecr=0 WS=128
114	102.810556013	127.0.0.1	127.0.0.1	TCP	76	8005 → 59740 [SYN, ACK] Seq=0 Ack=1 Win=65483 Len=0 MSS=65495 SACK_PERM=1 TSval=2501205962 TSecr=2501205962 WS=128
115	102.810563874	127.0.0.1	127.0.0.1	TCP	68	59740 → 8005 [ACK] Seq=1 Ack=1 Win=65536 Len=0 TSval=2501205962 TSecr=2501205962
116	102.704231976	127.0.0.1	127.0.0.1	HTTP	495	GET / HTTP/1.1
117	102.704267109	127.0.0.1	127.0.0.1	TCP	68	8005 → 59740 [ACK] Seq=1 Ack=428 Win=65152 Len=0 TSval=2501206055 TSecr=2501206055
118	102.714332895	127.0.0.1	127.0.0.1	TCP	85	8005 → 59740 [PSH, ACK] Seq=1 Ack=428 Win=65536 Len=17 TSval=2501206055 TSecr=2501206055 [TCP segment of a reassembled PDU]
119	102.714345754	127.0.0.1	127.0.0.1	TCP	68	59740 → 8005 [ACK] Seq=428 Ack=18 Win=65536 Len=0 TSval=2501206055 TSecr=2501206055
120	102.714378052	127.0.0.1	127.0.0.1	TCP	105	8005 → 59740 [PSH, ACK] Seq=18 Ack=428 Win=65536 Len=37 TSval=2501206055 TSecr=2501206055 [TCP segment of a reassembled PDU]
121	102.714386125	127.0.0.1	127.0.0.1	TCP	68	59740 → 8005 [ACK] Seq=428 Ack=55 Win=65536 Len=0 TSval=2501206055 TSecr=2501206055
122	102.714398062	127.0.0.1	127.0.0.1	TCP	101	8005 → 59740 [PSH, ACK] Seq=55 Ack=428 Win=65536 Len=33 TSval=2501206055 TSecr=2501206055 [TCP segment of a reassembled PDU]
123	102.714408191	127.0.0.1	127.0.0.1	TCP	68	59740 → 8005 [ACK] Seq=428 Ack=88 Win=65536 Len=0 TSval=2501206055 TSecr=2501206055
124	102.714405799	127.0.0.1	127.0.0.1	TCP	93	8005 → 59740 [PSH, ACK] Seq=88 Ack=428 Win=65536 Len=25 TSval=2501206055 TSecr=2501206055 [TCP segment of a reassembled PDU]
125	102.714407541	127.0.0.1	127.0.0.1	TCP	68	59740 → 8005 [ACK] Seq=428 Ack=113 Win=65536 Len=0 TSval=2501206055 TSecr=2501206055
126	102.714413998	127.0.0.1	127.0.0.1	TCP	93	8005 → 59740 [PSH, ACK] Seq=113 Ack=428 Win=65536 Len=21 TSval=2501206055 TSecr=2501206055 [TCP segment of a reassembled PDU]
127	102.714415581	127.0.0.1	127.0.0.1	TCP	68	59740 → 8005 [ACK] Seq=428 Ack=134 Win=65536 Len=0 TSval=2501206055 TSecr=2501206055
128	102.714425717	127.0.0.1	127.0.0.1	TCP	114	8005 → 59740 [PSH, ACK] Seq=134 Ack=428 Win=65536 Len=46 TSval=2501206055 TSecr=2501206055 [TCP segment of a reassembled PDU]
129	102.714427613	127.0.0.1	127.0.0.1	TCP	65	59740 → 8005 [ACK] Seq=428 Ack=180 Win=65536 Len=0 TSval=2501206055 TSecr=2501206055
130	102.714432195	127.0.0.1	127.0.0.1	TCP	70	8005 → 59740 [PSH, ACK] Seq=180 Ack=428 Win=65536 Len=2 TSval=2501206055 TSecr=2501206055 [TCP segment of a reassembled PDU]
131	102.714433971	127.0.0.1	127.0.0.1	TCP	68	59740 → 8005 [ACK] Seq=428 Ack=182 Win=65536 Len=0 TSval=2501206055 TSecr=2501206055
132	102.714461648	127.0.0.1	127.0.0.1	HTTP	371	HTTP/1.1 200 OK (text/html)
133	102.714463841	127.0.0.1	127.0.0.1	TCP	65	59740 → 8005 [ACK] Seq=428 Ack=485 Win=65280 Len=0 TSval=2501206066 TSecr=2501206066
197	112.740970112	127.0.0.1	127.0.0.1	TCP	68	[TCP Keep-Alive] 59740 → 8005 [ACK] Seq=427 Ack=485 Win=65536 Len=0 TSval=2501210697 TSecr=2501206066
198	112.746135045	127.0.0.1	127.0.0.1	TCP	68	[TCP Keep-Alive ACK] 8005 → 59740 [ACK] Seq=485 Ack=428 Win=65536 Len=0 TSval=2501210697 TSecr=2501206066

- Przebieg transmisji:
 - Przeglądarka oraz serwer przesyłają sobie powitania (3-stronne)
 - Po otrzymaniu odpowiedzi następuje przesłanie właściwego zapytania (nr. 116)
 - Następuje dodatkowy przekaz pakietów
 - Następnie serwer wysyła odpowiedź do przeglądarki z załączonym plikiem który powinien zostać przetworzony
 - AD1 (ostatnia strona)
 - Przeglądarka wysyła informację, że otrzymała odpowiedź
 - Następuje próba przedłużenia połączenia pomiędzy przeglądarką a serwerem z wykorzystaniem protokołu Keep-Alive – informacja dla obu stron ile czasu ich powitanie będzie jeszcze aktywne

AD1:

Time	Source	Destination	Protocol	Length	Info
132.102.714461649	127.0.0.1	127.0.0.1	HTTP	371	HTTP/1.1 200 OK (text/html)
Frame 132: 371 bytes on wire (2968 bits), 371 bytes captured (2968 bits) on interface any, id 0					
Linux cooked capture					
Packet type: Unicast to us (0)					
Link-layer address type: 772					
Link-layer address length: 6					
Source: 00:00:00_00:00:00 (00:00:00:00:00:00)					
Unused: 0000					
Protocol: IPv4 (0x0800)					
Internet Protocol Version 4, Src: 127.0.0.1, Dst: 127.0.0.1					
Transmission Control Protocol, Src Port: 8005, Dst Port: 59740, Seq: 182, Ack: 428, Len: 303					
Source Port: 8005					
Destination Port: 59740					
[Stream index: 5]					
[TCP Segment Len: 303]					
Sequence number: 182 (relative sequence number)					
Sequence number (raw): 3366681799					
[Next sequence number: 485 (relative sequence number)]					
Acknowledgment number: 428 (relative ack number)					
Acknowledgment number (raw): 695834603					
1000 = Header Length: 32 bytes (8)					
Flags: 0x018 (PSH, ACK)					
Window size value: 512					
[Calculated window size: 65536]					
[Window size scaling factor: 128]					
Checksum: 0xff57 [unverified]					
[Checksum Status: Unverified]					
Urgent pointer: 0					
Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps					
[SEQ/ACK analysis]					
[Timestamps]					
TCP payload (303 bytes)					
TCP segment data (303 bytes)					
8 Reassembled TCP Segments (484 bytes): #118(17), #120(37), #122(33), #124(25), #126(21), #128(46), #130(
Hypertext Transfer Protocol					
HTTP/1.1 200 OK\r\n					
Date: Wed, 03 Jun 2020 14:09:18 GMT\r\n					
Server: libwww-perl-daemon/6.06\r\n					
Content-Type: text/html\r\n					
0	00 00 03 04 00 06 00 00	00 00 00 00 00 00 08 00		
0	45 00 01 63 bc ca 40 00	40 06 7e c8 7f 00 00 01	E..c..@. @.~.....		
0	7f 00 00 01 1f 45 e9 5c	c8 ab 7c c7 29 79 97 ebE.\ .. .~)y..		
0	80 18 02 00 ff 57 00 00	01 01 08 0a 95 15 60 32W..2		
0	95 15 60 31 3c 21 44 4f	43 54 59 50 45 20 68 74	..`1<!DO CTYPE ht		
0	6d 6c 3e 0a 3c 68 74 6d	6c 3e 0a 20 20 20 20 3c	ml>.<html>.. <		
0	68 65 61 64 3e 0a 20 20	20 20 20 20 20 20 3c 74	head>.. <t		
0	69 74 6c 65 3e 4d 61 69	6e 20 48 54 4d 4c 3c 2f	title>Mai n HTML</		
0	74 69 74 6c 65 3e 0a 20	20 20 20 3c 2f 68 65 61	title>.. </hea		
0	64 3e 0a 20 20 20 20 3c	62 6f 64 79 3e 0a 20 20	d>.. < body>..		
0	20 20 20 20 20 20 3c 70	3e 49 74 20 69 73 20 6d	<p >It is m		
0	61 69 6e 20 48 54 4d 4c	3c 2f 70 3e 0a 09 3c 75	ain HTML </p>...<u		
0	6c 3e 0a 20 20 20 20 20	20 20 20 3c 6c 69 3e 3c	l>.. <		
0	61 20 68 72 65 66 3d 22	69 6e 64 65 78 2e 68 74	a href=" index.ht		
0	6d 6c 22 3e 4d 61 69 6e	3c 2f 61 3e 3c 2f 6c 69	ml">Main </li		
0	3e 0a 20 20 20 20 20 20	20 20 3c 6c 69 3e 3c 61	>.. <a		
0	20 68 72 65 66 3d 22 70	61 67 65 31 2e 68 74 6d	href="p age1.htm		
0	6c 22 3e 50 61 67 65 20	31 3c 2f 61 3e 3c 2f 6c	l">Page 1</l		
0	69 3e 0a 20 20 20 20 20	20 20 20 3c 6c 69 3e 3c	i>.. <		
0	61 20 68 72 65 66 3d 22	70 61 67 65 32 2e 68 74	a href=" page2.ht		
0	6d 6c 22 3e 50 61 67 65	20 32 3c 2f 61 3e 3c 2f	ml">Page 2</		