

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

Практична робота №3
з курсу «Комп'ютерні мережі»

Виконав студент 3 курсу
групи КА-71
Чоловський С. О.
Прийняв Кухарєв С.О.

Київ – 2020 р.

No. Time Source Destination Protocol Length Info
17 9.579873 192.168.0.102 192.168.0.1 DNS 72 Standard query 0xf677 A www.ietf.org
Frame 17: 72 bytes on wire (576 bits), 72 bytes captured (576 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E},
id
0 Ethernet II, Src: AzureWav_89:a0:8f (f0:03:8c:89:a0:8f), Dst: Tp-LinkT_2c:6b:d0 (30:b5:c2:2c:6b:d0)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
User Datagram Protocol, Src Port: 55584, Dst Port: 53
Source Port: 55584
Destination Port: 53
Length: 38
Checksum: 0x8bd7 [unverified]
[Checksum Status: Unverified]
[Stream index: 0]
[Timestamps]
Domain Name System (query)
Transaction ID: 0xf677
Flags: 0x0100 Standard query
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
Queries
[Response In: 32]
No. Time Source Destination Protocol Length Info
32 9.752347 192.168.0.1 192.168.0.102 DNS 149 Standard query response 0xf677 A www.ietf.org CNAME
www.ietf.org.cdn.cloudflare.net A 104.20.0.85 A 104.20.1.85
Frame 32: 149 bytes on wire (1192 bits), 149 bytes captured (1192 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E},
id 0
Ethernet II, Src: Tp-LinkT_2c:6b:d0 (30:b5:c2:2c:6b:d0), Dst: AzureWav_89:a0:8f (f0:03:8c:89:a0:8f)
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
User Datagram Protocol, Src Port: 53, Dst Port: 55584
Source Port: 53
Destination Port: 55584
Length: 115
Checksum: 0x4584 [unverified]
[Checksum Status: Unverified]
[Stream index: 0]
[Timestamps]
Domain Name System (response)
Transaction ID: 0xf677
Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 3
Authority RRs: 0
Additional RRs: 0
Queries
Answers
www.ietf.org: type CNAME, class IN, cname www.ietf.org.cdn.cloudflare.net
www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.20.0.85
www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.20.1.85
[Request In: 17]
[Time: 0.172474000 seconds]

No. Time Source Destination Protocol Length Info
19 9.659647 192.168.0.102 172.217.20.196 TCP 62 55673 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460
SACK_PERM=1
Frame 19: 62 bytes on wire (496 bits), 62 bytes captured (496 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E},
id
0 Ethernet II, Src: AzureWav_89:a0:8f (f0:03:8c:89:a0:8f), Dst: Tp-LinkT_2c:6b:d0 (30:b5:c2:2c:6b:d0)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 172.217.20.196
Transmission Control Protocol, Src Port: 55673, Dst Port: 443, Seq: 0, Len: 0
Source Port: 55673
Destination Port: 443
[Stream index: 4]
[TCP Segment Len: 0]
Sequence number: 0 (relative sequence number)
Sequence number (raw): 954417059
[Next sequence number: 1 (relative sequence number)]
Acknowledgment number: 0
Acknowledgment number (raw): 0
0111 = Header Length: 28 bytes (7)
Flags: 0x002 (SYN)
Window size value: 64240

[Calculated window size: 64240]
Checksum: 0xb1c7 [unverified]
[Checksum Status: Unverified]
Urgent pointer: 0
Options: (8 bytes), Maximum segment size, No-Operation (NOP), No-Operation (NOP), SACK permitted
TCP Option - Maximum segment size: 1460 bytes
TCP Option - No-Operation (NOP)
TCP Option - No-Operation (NOP)
TCP Option - SACK permitted
[Timestamps]

1. UDP. N53,N53.
2. 192.168.01 так
3. Типу А. так.
4. 3 відповіді. Які складаються з полів Data length, Class,Type, Time to live, Address,Name
5. Ні, не використовує жодного.
6. Так

No. Time Source Destination Protocol Length Info
116 14.081604 192.168.0.102 192.168.0.1 DNS 71 Standard query 0x0003 AAAA www.mit.edu
Frame 116: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E}, id 0
Ethernet II, Src: AzureWav_89:a0:8f (f0:03:8c:89:a0:8f), Dst: Tp-LinkT_2c:6b:d0 (30:b5:c2:2c:6b:d0)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
User Datagram Protocol, Src Port: 56159, Dst Port: 53
Source Port: 56159
Destination Port: 53
Length: 37
Checksum: 0x34a9 [unverified]
[Checksum Status: Unverified]
[Stream index: 2]
[Timestamps]
Domain Name System (query)
Transaction ID: 0x0003
Flags: 0x0100 Standard query
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
Queries
www.mit.edu: type AAAA, class IN
[Response In: 120]
No. Time Source Destination Protocol Length Info
120 14.112167 192.168.0.1 192.168.0.102 DNS 200 Standard query response 0x0003 AAAA www.mit.edu CNAME
www.mit.edu.edgekey.net CNAME e9566.dsca.akamaiedge.net AAAA 2a02:26f0:d200:19e::255e AAAA 2a02:26f0:d200:191::255e
Frame 120: 200 bytes on wire (1600 bits), 200 bytes captured (1600 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E}, id 0
Ethernet II, Src: Tp-LinkT_2c:6b:d0 (30:b5:c2:2c:6b:d0), Dst: AzureWav_89:a0:8f (f0:03:8c:89:a0:8f)
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
User Datagram Protocol, Src Port: 53, Dst Port: 56159
Source Port: 53
Destination Port: 56159
Length: 166
Checksum: 0x7624 [unverified]
[Checksum Status: Unverified]
[Stream index: 2]
[Timestamps]
Domain Name System (response)
Transaction ID: 0x0003
Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 4
Authority RRs: 0
Additional RRs: 0
Queries
www.mit.edu: type AAAA, class IN
Answers
www.mit.edu: type CNAME, class IN, cname www.mit.edu.edgekey.net
Name: www.mit.edu
Type: CNAME (Canonical NAME for an alias) (5)
Class: IN (0x0001)

Time to live: 1534 (25 minutes, 34 seconds)
 Data length: 25
 CNAME: www.mit.edu.edgekey.net
 www.mit.edu.edgekey.net: type CNAME, class IN, cname e9566.dscb.akamaiedge.net
 Name: www.mit.edu.edgekey.net
 Type: CNAME (Canonical NAME for an alias) (5)
 Class: IN (0x0001)
 Time to live: 36 (36 seconds)
 Data length: 24
 CNAME: e9566.dscb.akamaiedge.net
 e9566.dscb.akamaiedge.net: type AAAA, class IN, addr 2a02:26f0:d200:19e::255e
 Name: e9566.dscb.akamaiedge.net
 Type: AAAA (IPv6 Address) (28)
 Class: IN (0x0001)
 Time to live: 20 (20 seconds)
 Data length: 16
 AAAA Address: 2a02:26f0:d200:19e::255e
 e9566.dscb.akamaiedge.net: type AAAA, class IN, addr 2a02:26f0:d200:191::255e
 Name: e9566.dscb.akamaiedge.net
 Type: AAAA (IPv6 Address) (28)
 Class: IN (0x0001)
 Time to live: 20 (20 seconds)
 Data length: 16
 AAAA Address: 2a02:26f0:d200:191::255e
 [Request In: 116]
 [Time: 0.030563000 seconds]

7. 53,53

8. 192.168.01 Так

9. AAAA-запит, так

10. 4 Відповіді. Name, Type, Class, Time to live, Data length, CNAME

No. Time Source Destination Protocol Length Info
 151 9.102788 192.168.0.102 192.168.0.1 DNS 67 Standard query 0x0002 NS mit.edu
 Frame 151: 67 bytes on wire (536 bits), 67 bytes captured (536 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E}, id 0
 Ethernet II, Src: AzureWav_89:a0:8f (f0:03:8c:89:a0:8f), Dst: Tp-LinkT_2c:6b:d0 (30:b5:c2:2c:6b:d0)
 Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
 User Datagram Protocol, Src Port: 64615, Dst Port: 53
 Source Port: 64615
 Destination Port: 53
 Length: 33
 Checksum: 0xa898 [unverified]
 [Checksum Status: Unverified]
 [Stream index: 1]
 [Timestamps]
 Domain Name System (query)
 Transaction ID: 0x0002
 Flags: 0x0100 Standard query
 Questions: 1
 Answer RRs: 0
 Authority RRs: 0
 Additional RRs: 0
 Queries
 [Response In: 152]
 No. Time Source Destination Protocol Length Info
 152 9.146610 192.168.0.1 192.168.0.102 DNS 234 Standard query response 0x0002 NS mit.edu NS use5.akam.net NS ns1-37.akam.net NS asia1.akam.net NS use2.akam.net NS eur5.akam.net NS usw2.akam.net NS asia2.akam.net NS ns1-173.akam.net
 Frame 152: 234 bytes on wire (1872 bits), 234 bytes captured (1872 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E}, id 0
 Ethernet II, Src: Tp-LinkT_2c:6b:d0 (30:b5:c2:2c:6b:d0), Dst: AzureWav_89:a0:8f (f0:03:8c:89:a0:8f)
 Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
 User Datagram Protocol, Src Port: 53, Dst Port: 64615
 Source Port: 53
 Destination Port: 64615
 Length: 200
 Checksum: 0x6287 [unverified]
 [Checksum Status: Unverified]
 [Stream index: 1]
 [Timestamps]
 Domain Name System (response)

Transaction ID: 0x0002
Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 8
Authority RRs: 0
Additional RRs: 0
Queries
Answers
mit.edu: type NS, class IN, ns use5.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 15
Name Server: use5.akam.net
mit.edu: type NS, class IN, ns ns1-37.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 9
Name Server: ns1-37.akam.net
mit.edu: type NS, class IN, ns asia1.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 8
Name Server: asia1.akam.net
mit.edu: type NS, class IN, ns use2.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 7
Name Server: use2.akam.net
mit.edu: type NS, class IN, ns eur5.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 7
Name Server: eur5.akam.net
mit.edu: type NS, class IN, ns usw2.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 7
Name Server: usw2.akam.net
mit.edu: type NS, class IN, ns asia2.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 8
Name Server: asia2.akam.net
mit.edu: type NS, class IN, ns ns1-173.akam.net
Name: mit.edu
Type: NS (authoritative Name Server) (2)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 10
Name Server: ns1-173.akam.net
[Request In: 151]

[Time: 0.043822000 seconds]

11. 192.168.01 Так

12. Ns, Так

13. [ідентифікатор регіону].akam.net За допомогою імені сервера

No. Time Source Destination Protocol Length Info

39 4.179040 192.168.0.102 192.168.0.1 DNS 73 Standard query 0x9809 A bitsy.mit.edu

Frame 39: 73 bytes on wire (584 bits), 73 bytes captured (584 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E}, id

```

0 Ethernet II, Src: AzureWav_89:a0:8f (
f0:03:8c:89:a0:8f), Dst: Tp-LinkT_2c:6b:d0 (
30:b5:c2:2c:6b:d0)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
User Datagram Protocol, Src Port: 49922, Dst Port: 53
Domain Name System (query)
Transaction ID: 0x9809
Flags: 0x0100 Standard query
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
Queries
bitsy.mit.edu: type A, class IN
Name: bitsy.mit.edu
[Name Length: 13]
[Label Count: 3]
Type: A (Host Address) (1)
Class: IN (0x0001)
[Response In: 41]
No. Time Source Destination Protocol Length Info
41 4.219897 192.168.0.1 192.168.0.102 DNS 89 Standard query response 0x9809 A bitsy.mit.edu
A 18.0.72.3
Frame 41: 89 bytes on wire (712 bits), 89 bytes captured (712 bits) on interface \Device\NPF_{FE4A490D-1EF2-4034-8E18-5B6AA5EF580E},
id
0 Ethernet II, Src: Tp-LinkT_2c:6b:d0 (
30:b5:c2:2c:6b:d0), Dst: AzureWav_89:a0:8f (
f0:03:8c:89:a0:8f)
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
User Datagram Protocol, Src Port: 53, Dst Port: 49922
Domain Name System (response)
Transaction ID: 0x9809
Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 1
Authority RRs: 0
Additional RRs: 0
Queries
bitsy.mit.edu: type A, class IN
Name: bitsy.mit.edu
[Name Length: 13]
[Label Count: 3]
Type: A (Host Address) (1)
Class: IN (0x0001)
Answers
bitsy.mit.edu: type A, class IN, addr 18.0.72.3
Name: bitsy.mit.edu
Type: A (Host Address) (1)
Class: IN (0x0001)
Time to live: 1800 (30 minutes)
Data length: 4
Address: 18.0.72.3
[Request In: 39]
[Time: 0.040857000 seconds]

```

14. Спочатку на 192.168.01, а потім на 18.0.72.3, ні, bitsy.mit.edu

15. А, так

16. Name, Type, Class, Time to live, Data length, Address

Висновки: виконуючи роботу я познайомився з DNS, з'ясував адресу свого локального сервера DNS, ознайомився з форматом DNS-записів.