**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 відвовіді. Які складаються з полів Data length, Class,Type, Time to live, Adress,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.dscb.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]

1. 53,53
2. 192.168.01 Так
3. АААА-запит, так
4. 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]

1. 192.168.01 Так
2. Ns, Так
3. [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]

1. Спочатку на 192.168.01, а потім на 18.0.72.3, ні, bitsy.mit.edu
2. A, так
3. Name, Type, Class, Time to live, Data length, Adress

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