

# Exercício 1 - Laboratório de Redes de Computadores

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## 1. Exercício

Análise da estrutura dos pacotes utilizando um sniffer de rede, abaixo os dados obtidos:

PACOTE : 18:15:30.756546 ARP, Request who-has 10.32.143.115 tell 10.32.143.238, length 46  
0x0000: ffff ffff ffff a41f 72f5 9092 0806 0001  
0x0010: 0800 0604 0001 a41f 72f5 9092 0a20 8fee  
0x0020: 0000 0000 0000 0a20 8f73 0000 0000 0000  
0x0030: 0000 0000 0000 0000 0000 0000

### ETHERNET

MAC DEST : FF:FF:FF:FF:FF:FF

MAC ORIG : a4:1f:72:f5:90:92

Tipo : 0x0806

### ARP

Hardware address Type : 1 - Ethernet

Protocol Address Type : IPv4 (0x0800)

H/w Address Len : Ethernet (0x06)

Protocol Address Len : IPv4 (0x04)

Operation : Request (0x0001)

Source Hardware Address : a4:1f:72:f5:90:92

Source Protocol Address : 10.32.143.238 (0x0a208fee)

Target Hardware Address : 0000 0000 0000

Target Protocol Address : 10.32.143.115 (0x0a208f73)

PACOTE : 18:34:46.126533 IP google-public-dns-a.google.com.domain ;  
10.32.143.167.23694: 20104 NXDomain 0/0/0 (44)  
0x0000: a41f 72f5 908e 0001 0223 eaa6 0800 4500  
0x0010: 0048 0bb8 0000 3511 d016 0808 0808 0a20  
0x0020: 8fa7 0035 5c8e 0034 3d65 4e88 8183 0001  
0x0030: 0000 0000 0000 0331 3833 0331 3433 0233  
0x0040: 3202 3130 0769 6e2d 6164 6472 0461 7270  
0x0050: 6100 000c 0001

#### IPv4

Version : 4  
IHL : 5  
Type of Service : 0  
Total Length : 72 bytes (0x0048)  
Identification : 3000 (0x0bb8)  
Flags : 0  
Fragment Offset: 0  
TTL : 53 (0x35)  
Protocol : UDP (0x11)  
Header CheckSum : (0xd016)  
Source Address: 8.8.8.8 (0x08080808)  
Destination Address: 10.32.143.167 (0x0a208fa7)

#### UDP

Source Port: domain (0x0035)  
Destination Port: 23694 (0x5c8e)  
Length: 52 bytes (0x0034)  
CheckSum: (0x3d65)

PACOTE : 17:36:28.582511 IP gru09s10-in-f26.1e100.net.http 6  
10.32.143.167.47188: Flags [.), ack 1, win 347, options [nop,nop,TS val 3403432114 ecr  
4294929262], length 0  
0x0000: a41f 72f5 908e 0001 0223 eaa6 0800 4500  
0x0010: 0034 a14c 0000 3406 2774 adc2 767a 0a20  
0x0020: 8fa7 0050 b854 19e6 088c 8b6d 68f4 8010  
0x0030: 015b 70e8 0000 0101 080a cadc 40b2 ffff  
0x0040: 6b6e

#### TCP

Source Port: http (0x0050)  
Destination Port: 47188 (0xb854)  
Sequence Number: (0x19e6 088c)  
Acknowledgment Number: (0x8b6d 68f4)  
Offset: 8  
Reserved: 0  
Flags: A (0x10) 0001 0000  
Window: (0x015b)  
Checksum: (0x70e8)  
Urgent Pointer: (0x0000)

PACOTE : 17:36:28.035500 IP6 fe80::a61f:72ff:fe5:90a2.mdns , ff02::fb.mdns:  
(parte omitida por ser muito grande).

0x0000: 3333 0000 00fb a41f 72f5 90a2 86dd 6000  
0x0010: 0000 013d 11ff fe80 0000 0000 0000 a61f  
0x0020: 72ff fe5 90a2 ff02 0000 0000 0000 0000  
0x0030: 0000 0000 00fb 14e9 14e9 013d 671e 0000  
0x0040: 8400 0000 0009 0000 0000 2a6c 6162 7265  
0x0050: 6465 732d 4f70 7469 506c 6578 2d33 3033  
0x0060: 3320 5b61 343a 3166 3a37 323a 6635 3a39  
0x0070: 303a 6132 5d0c 5f77 6f72 6b73 7461 7469  
0x0080: 6f6e 045f 7463 7005 6c6f 6361 6c00 0010  
0x0090: 8001 0000 1194 0001 000b 5f75 6469 736b  
0x00a0: 732d 7373 68c0 4400 0c00 0100 0011 9400  
0x00b0: 1916 6c61 6272 6564 6573 2d4f 7074 6950  
0x00c0: 6c65 782d 3330 3333 c05b c073 0021 8001  
0x00d0: 0000 0078 001f 0000 0000 0016 166c 6162  
0x00e0: 7265 6465 732d 4f70 7469 506c 6578 2d33  
0x00f0: 3033 33c0 49c0 9e00 1c80 0100 0000 7800  
0x0100: 10fe 8000 0000 0000 00a6 1f72 fffe f590  
0x0110: a2c0 7300 1080 0100 0011 9400 0100 095f  
0x0120: 7365 7276 6963 6573 075f 646e 732d 7364  
0x0130: 045f 7564 70c0 4900 0c00 0100 0011 9400  
0x0140: 02c0 5bc0 3700 0c00 0100 0011 9400 02c0  
0x0150: 0cc0 0c00 2180 0100 0000 7800 0800 0000  
0x0160: 0000 09c0 9ec0 e000 0c00 0100 0011 9400  
0x0170: 02c0 37

#### IPV6

Version: 6

Traffic Class: 0

Flow Label: 0

Payload Length: 317(0x013d)

Next Header: 17 - UDP (0x11)

Hop Limit: (0xff)

Source Address: fe80 0000 0000 0000 a61f 72ff fe5 90a2

Destination Address: ff02 0000 0000 0000 0000 0000 0000 00fb

PACOTE: 17:55:58.789887 IP 10.32.143.237 → 10.32.143.167: ICMP echo request, id 11655, seq 7, length 64

0x0000: a41f 72f5 908e 000a f716 e093 0800 4500  
0x0010: 0054 2611 4000 4001 e0c3 0a20 8fed 0a20  
0x0020: 8fa7 0800 ab1c 2d87 0007 5c61 ca55 0000  
0x0030: 0000 31cb 0800 0000 0000 1011 1213 1415  
0x0040: 1617 1819 1a1b 1c1d 1e1f 2021 2223 2425  
0x0050: 2627 2829 2a2b 2c2d 2e2f 3031 3233 3435  
0x0060: 3637

#### ICMP

Type: 8 - Echo (0x08)

Code: 0(0x00)

Checksum: (0xab1c)

Other message-specific information : (0x2d87 0007)