

1) original datagram - 5000 bytes

- Data within = 4980 bytes

20 bytes for P headers

MTU = 1420 bytes

- max data = 1400 bytes (20 bytes header)

1400 - is a multiple of 8

length = 1420 | ID = 105 | frag flag = 1 | offset = 0

length = 1420 | ID = 105 | frag flag = 1 | offset = 175

length = 1420 | ID = 105 | frag flag = 1 | offset = 350

length = 740 | ID = 105 | frag flag = 0 | offset = 525

total = 5000

2) Given that two interfaces X and Y

IP address of X = 148.76.38.19

Y = 153.52.17.80

5 PCs at home

3 - X

2 - Y

All PCs are connected to web server

- 128.119.40.50 (port 80)

Home network - 192.163.1.0/24

2 public or WAN IP are two interfaces - and for each home network IP, each WAN IP will be mapped

home network may access different webpage using different source ports

Assume random assignment of address in home network

192.163.1.1 - 192.163.1.82

192.163.1.83 - 192.163.1.164

192.163.1.165 - 192.163.1.246

192.163.1.247 - 192.163.1.254

Random assignment within the range of

192.163.1.0/24

(Network address translation)

At interface

148.76.38.19 of port no 5001

→ 192.163.1.32, 3201

148.76.38.19 eg port no 5001 → 192.163.1.64, 3202

(some other webpage)

148.76.38.19 eg port no 120500,

→ 192.163.1.96, 3203

(source / some other webpage)

At interface

153.52.17.80, 2000 → 192.163.1.128, 3204

153.52.17.80, 2001 → 192.163.1.128, 3205

Q1) 50 bytes of data every 30 m sec

→ gets encapsulated in IP segment and then in IP data form

[20 bytes header (IP) + 20 byte header (data gram) + 50 bytes data]

= 90 bytes

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over head = $40/90 \times 100 = 44.44\%$

application data = $50/90 = 55.55\%$

5.) data gram length = 3820 bytes IP header 20 bytes

3820 bytes - data within

1470 - 1400 bytes

1380 - bytes - data within

20 bytes - header

1380 nearest 8 multiple = 1376

length = 1396 | 20 = 1 | frag flag = 1 | offset = 0

length = 1396 | 20 = 2 | frag flag = 1 | offset = 12

length = 1024 | 20 = 2 | frag flag = 0 | offset = 512

total = 3820

total 3 fragments are created