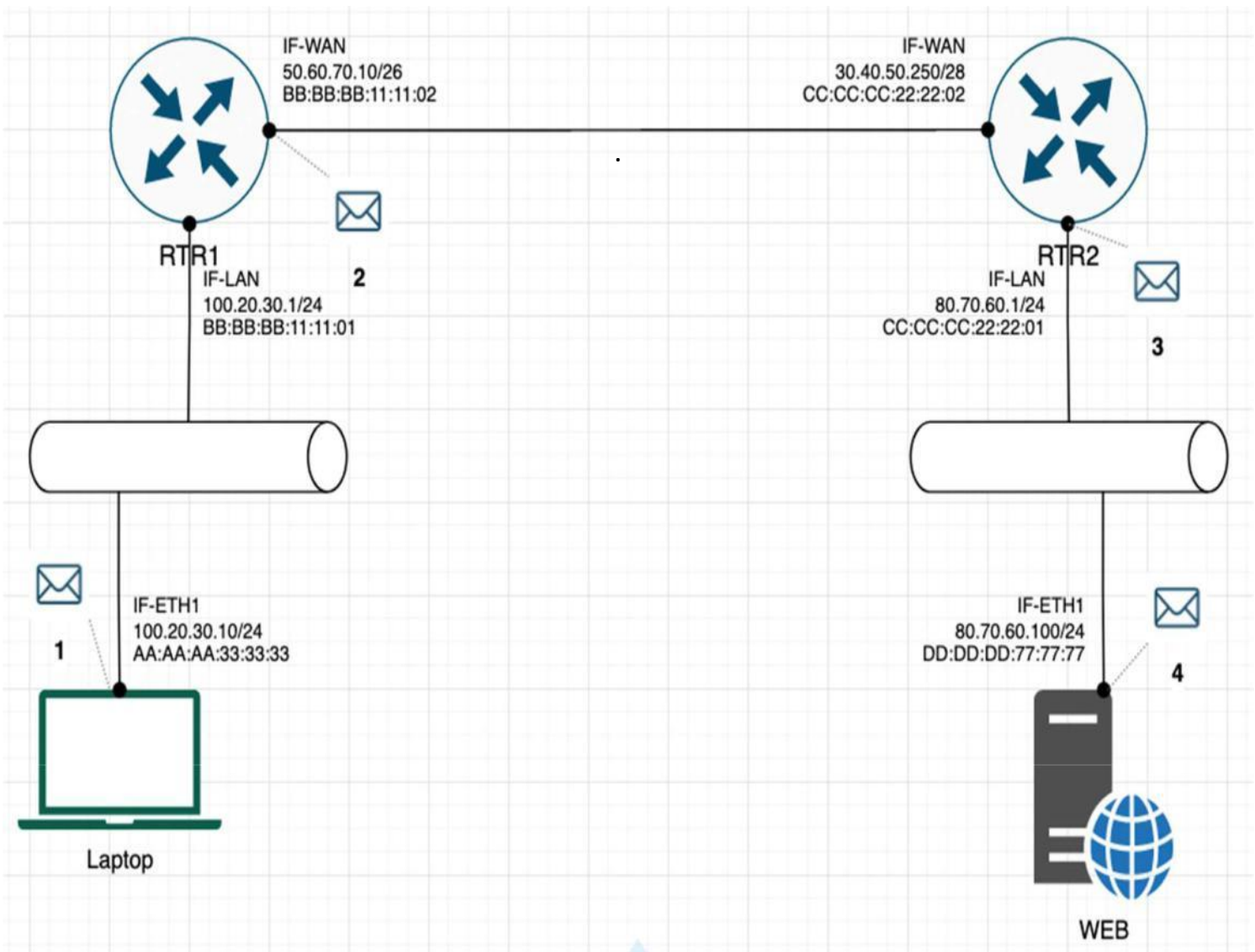# Exercise 2 – TCP/IP Basics

Difficulty: Medium

Refer to the exhibit and answer the questions below.

The letter symbol ✉, represents the IP packet as it travels across the network.

In the example shown, the laptop attempts to communicate with the web server in

question. During its travel the packet will be forwarded across the network nodes and will

eventually end up across six network interfaces before it reaches the web server. Eachpacket as part of the TCP/IP Stack contains fields for the source and destination MAC

Address, IP Address and the TCP/UDP Port

IF-WAN
50.60.70.10/26
BB:BB:BB:11:11:02

IF-WAN
30.40.50.250/28
CC:CC:CC:22:22:02

RTR1
IF-LAN
100.20.30.1/24
BB:BB:BB:11:11:01

2

RTR2
IF-LAN
80.70.60.1/24
CC:CC:CC:22:22:01

3

IF-ETH1
100.20.30.10/24
AA:AA:AA:33:33:33

1

IF-ETH1
80.70.60.100/24
DD:DD:DD:77:77:77

4

Laptop

WEB

For each of the packet locations shown, 1 to 4 write down the source and

destination MAC addresses of the packet as it travels across the network
interfaces.

1. The laptop initiates communication with the web server and prepares a packet.
What would the

packet look like at this stage?

SRC IP : Laptop`s IP address

DST IP : WEB IP address

SRC MAC : Laptop`s MAC address

DST MAC : RTR1 IF-LAN MAC address

2. RTR1 receives the packet on its IF-LAN interface, prepares it accordingly and
forwards it out its IF-WAN. What would the packet look like at this stage?

SRC IP : Laptop`s IP address

DST IP :WEB IP address

SRC MAC :RTR1 IF-WAN MAC address

DST MAC :RTR2 IF-WAN MAC address

3. RTR2 receives the packet on its IF-WAN interface, prepares it accordingly and
forwards it out via IF-LAN. What would the packet look like at this stage?

SRC IP : Laptop`s IP address

DST IP : WEB IP address

SRC MAC :RTR2 IF-LAN MAC address

DST MAC: WEB MAC address

4. The web server receives the packet and prepares a response packet back. What would the packet

look like at this stage?

SRC IP :WEB IP address

DST IP : Laptop`s IP address

SRC MAC : WEB MAC address

DST MAC :RTR2 IF- LAN MAC address

Since we are talking about web traffic (www) in the example, which transport layer

protocol will most probably be used?

TCP

If we do a traffic analysis with a network packet monitoring tool like WireShark, what

can we expect to see for the source and destination ports when the laptop sends

the packet?

SRC PORT: random port above 1023

DST PORT: 80

Similarly, and vice versa, what can we expect to see as destination ports when the

Web server sends a response packet back?

SRC PORT: 80

DST PORT: port generated by the request from the client

How many broadcast domains are there in the exhibit shown? 2

In terms of current popular technologies, any computer connected to the same Ethernet repeater or switch is a member of the same broadcast domain. Further, any computer connected to the same set of interconnected switches/repeaters is a member of the same broadcast domain.