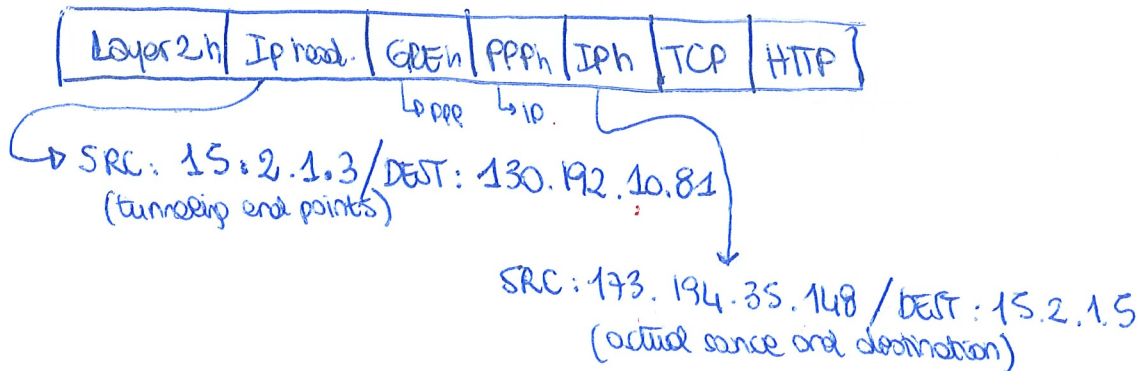sent away from the classroom

viii. The instructors and the assistants that are present during the test are there for the sole purpose of verifying proper progress of the exam. Their role is not giving any support to the interpretation of the text, neither helping the students to correctly formulate the answers. Please avoid any such request.

Question 1) The employees of a company can connect to their corporate network through a VPN software, which terminates all its traffic on a VPN gateway with address 15.2.1.3. Through that connection, employees have access to all the services available on the corporate network. The student should describe (briefly) a packet that transports a web page coming from Google (IP address 173.194.35.148), captured on the link that connects the employee (that uses the VPN service) to the Internet, Assume a centralized Internet access. The IP address of the client is 130.192.10.81, while the IP address assigned to the client within the VPN is 15.2.1.5. (6 points)

Access is centralised so all traffic going to and from the Internet pass through the corporate VPN gateway. I suppose a PPTP tunnel between the client and VPN gateway.

Layer 2 h	Ip head.	GREh	PPPh	IPh	TCP	HTTP

↳ PPP   ↳ IP.

↳ SRC: 15.2.1.3 / DEST: 130.192.10.81
(tunneling end points)

SRC: 173.194.35.148 / DEST: 15.2.1.5
(actual source and destination)

Question 2) Given the following capture file with SIP messages, answer the following questions: (7 points)

A. List the usernames, IP addresses and port numbers used by the caller and called UA.
B. What is the (SIP) role of the host with IP address `130.192.16.23`?
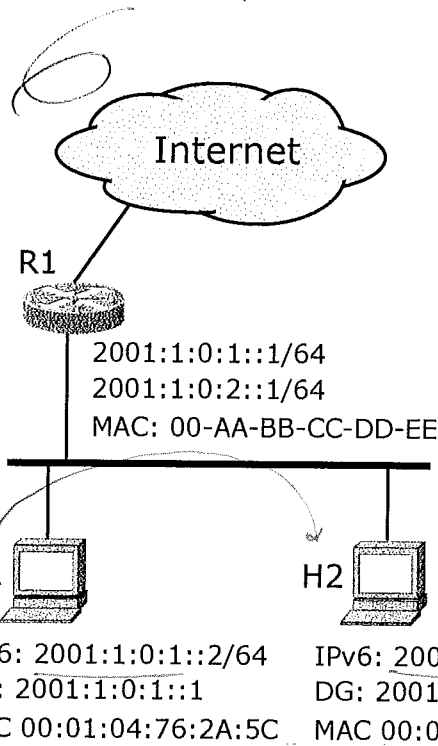C. Is record routing enabled? (Please motivate the answer)

Source IP	Destination IP	Protocol	Description
130.192.16.23	130.192.16.62	SIP/SDP	INVITE SIP:mario@130.192.16.62:7234
130.192.16.62	130.192.16.23	SIP	Status: 180 RINGING
130.192.16.62	130.192.16.23	SIP/SDP	Status: 200 OK
130.192.16.23	130.192.16.62	SIP/SDP	ACK SIP:mario@130.192.16.62:7234
130.192.16.62	130.192.16.23	SIP	BYE SIP:lina@120.149.210.3:6734
130.192.16.23	130.192.16.62	SIP	Status: 200 OK

A. MARIO CALLED 130.192.16.62 PORT 7234
LINA CALLER 120.149.210.3 PORT 6734

B. THE SIP ROLE OF THE IP ADDRESS 130.192.16.23
IS THE SIP SERVER

C. YES IS ENABLED BECAUSE FROM THE ACK MESSAGE, THAT IS
THE FIRST THAT CAN BE SEND DIRECTLY TO THE UA, ALL
MESSAGE PASS THROUGH THE SIP SERVER 130.192.16.23

Question 3) Write, directly in the table below, relevant information in packets exchanged on the network when H1 sends an ICMP Echo Request message to H2. Use the "Upper layers" cell to specify information related to upper layer protocols encapsulated inside IP packets that are relevant in this scenario. Please note that it is not necessary to use all the rows in the table below. (6 points)
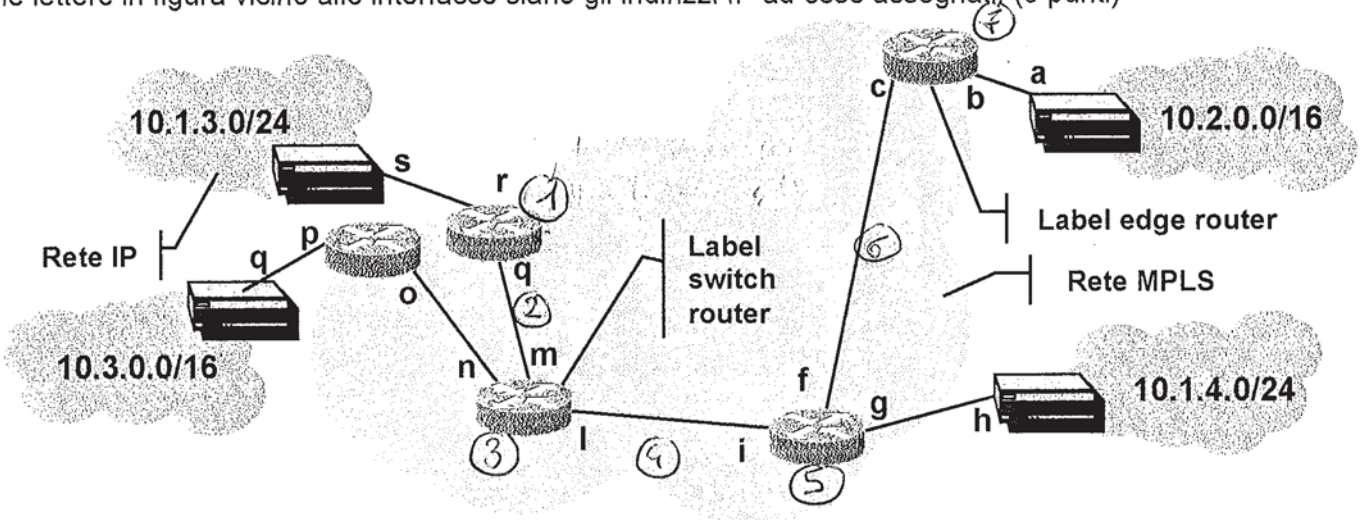
Assuming all routing cash are free.

Internet

R1

2001:1:0:1::1/64
2001:1:0:2::1/64
MAC: 00-AA-BB-CC-DD-EE

H1

H2

IPv6: 2001:1:0:1::2/64
DG: 2001:1:0:1::1
MAC 00:01:04:76:2A:5C

IPv6: 2001:1:0:2::2/64
DG: 2001:1:0:2::1
MAC 00:01:04:78:8D:2B

Pkt. 1	MAC src. 00 : 01 : 04 : 76 : 2A : 5C	MAC dest. 33:33:FF:00:00:01
	IP src. 2001 : 1 : 0 : 1 :: 2	IP dest. FF02::1:FF00:1 (Multicast)
	Upper layers ICMP6 Neibour solicitation who is 2001 : 1 : 0 : 1 :: 1 ?	
Pkt. 2	MAC src. 00 : AA : BB : CC : DD : EE	MAC dest. 00 : 01 : 04 : 76 : 2A : 5C
	IP src. 2001 : 1 : 0 : 1 :: 1	IP dest. 2001 : 1 : 0 : 1 :: 2
	Upper layers ICMP6. Neibour advertisement I am 2001 : 1 : 0 : 1 :: 1 @ MAC 00 : AA : BB : CC : DD : EE	
Pkt. 3	MAC src. 00 : 01 : 04 : 76 : 2A : 5C	MAC dest. 00 : AA : BB : CC : DD : EE
	IP src. 2001 : 1 : 0 : 1 :: 2	IP dest. 2001 : 1 : 0 : 2 :: 2
	Upper layers ICMP6 . Echo request .	
Pkt. 4	MAC src. 00 : AA : BB : CC : DD	MAC dest. 33 : 33 : FF : 00 : 00 : 02
	IP src. 2001 : 1 : 0 : 2 :: 1	IP dest. FF02::1:FF00:2
	Upper layers ICMP6 Neibourg solicitation ? who is 2001 : 1 : 0 : 2 :: 2 ?	
Pkt. 5	MAC src. 00 : 01 : 04 : 78 : 8D	MAC dest. 00 : AA : BB : CC : DD : EE
	IP src. 2001 : 1 : 0 : 2 :: 2	IP dest. 2001 : 1 : 0 : 2 :: 1
	Upper layers ICMP6 Neibourg advertisement I am 2001 : 1 : 0 : 2 :: 2 @ MAC : 00 : 01 : 04 : 78 : 8D : 2B	
Pkt. 6	MAC src 00 : AA : BB : CC : DD : EE	MAC dest. 00 : 01 : 04 : 78 : 8D : 2B
	IP src. 2001 : 1 : 0 : 1 :: 2	IP dest. 2001 : 1 : 0 : 2 :: 2
	Upper layers ICMP6 Echo request	
Pkt. 7	MAC src.	MAC dest.
	IP src.	IP dest.
	Upper layers	

Domanda 4) Data la rete in figura, si indichino i passi necessari per la creazione di un LSP per portare traffico dal label edge router in alto a destra alla destinazione 10.1.3.0/24. Si indichi ogni azione eseguita direttamente sulla figura (riportando ogni azione in prossimità dell'apparato di rete che la esegue o del link su cui un messaggio viene trasferito) o nello spazio sottostante (indicando chiaramente quale apparato esegue ogni azione o tra quali apparati vengono scambiati i messaggi), usando la seguente notazione:

- binding: `B, <FEC>, <label>`
- distribution: `D, <FEC>, <label>`
- mapping: `M, <input label or FEC>, <output label>, <next hop>`

dove la prima lettera identifica un'azione e quelli che seguono sono i rispettivi parametri. Si consideri che le lettere in figura vicino alle interfacce siano gli indirizzi IP ad esse assegnati. (9 punti)

① B, 10.1.3.0/24, 10
M, 10, / , 5

② D, 10.1.3.0/24, 10

③ B, 10.1.3.0/24, 11
M, 11, 10, q

④ D, 10.1.3.0/24, 11

⑤ B, 10.1.3.0/24, 12
M, 12, 11, l

⑥ D, 10.1.3.0/24, 12

⑦ B, 10.1.3.0/24, 13
M, 10.1.3.0/24, 12, f