

Computer Networks Technologies and Services	March 3rd, 2017
First and last name	Student ID

NOTES

- i. Nothing else than what is needed to write (pen, eraser), a piece of ID, and possibly water and food can be taken to the seat where you take your exam. Please leave any other item you might have (coat, bag, phone, calculator, and any other object) at the front or back of the classroom.
- ii. The answers to each question must be written exclusively on the same page of the question, which is the only material that will be graded.
- iii. Do not forget to write your name and student ID in each one of the marked spaces on the exam paper.
- iv. In case you will use part of pages containing the questions as a scratch pad, please indicate it clearly and possibly cross out such parts before handing in the exam.
- v. The score assigned to answers varies from zero to the maximum score reported at the end of the question. Please notice that the maximum scores of all questions do not necessarily sum up to 30.
- vi. When answering questions, please feel free to use drawings whenever they can help expressing and clarifying the answer.
- vii. Answers that are not understandable (for example because written badly or with bad handwriting) might be considered wrong.
- viii. During the test, any communication with other classmates is prohibited and will cause the student to be sent away from the classroom
- ix. 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.

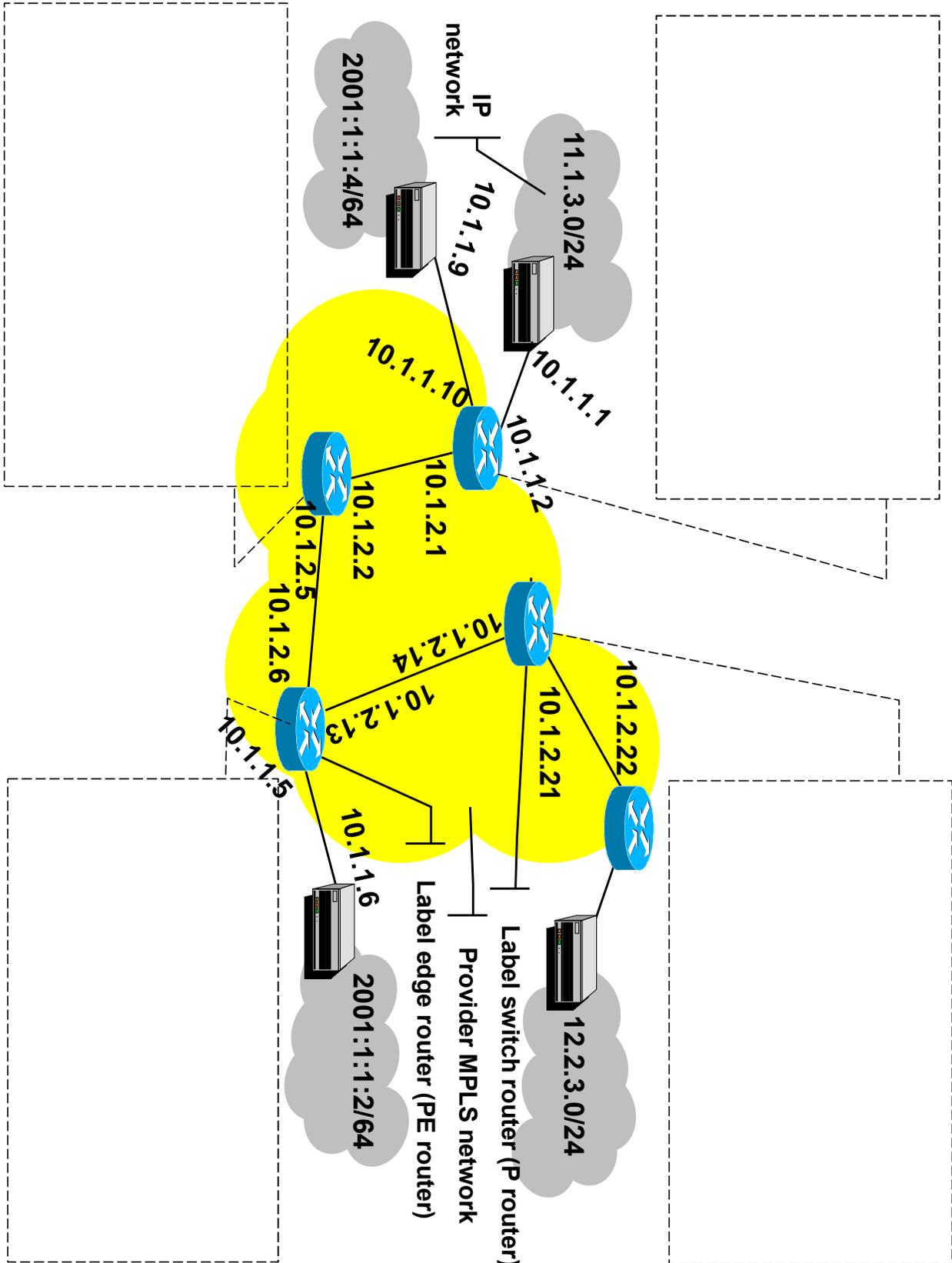
Question 1) Given the following capture file with SIP messages, answer the following questions: (12 points)

- A. Indicate the IP address of at least one SIP proxy
- B. Indicate the IP address of the caller UA.
- C. Knowing that the capture was taken on the interface of one of the systems involved in the message exchange, please indicate which one.
- D. Is record routing enabled? (Please motivate the answer)

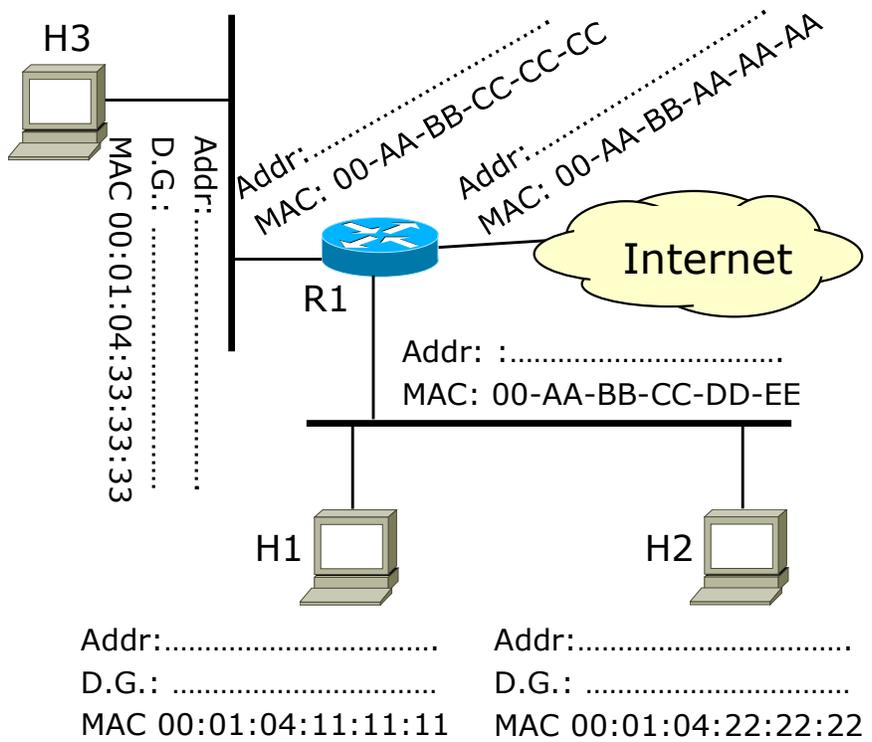
Source IP	Destination IP	Protocol	Description
120.149.210.3	128.192.16.62	SIP/SDP	INVITE SIP:mario@130.192.18.23:7234
128.192.16.62	120.149.210.3	SIP	Status: 180 RINGING
128.192.16.62	120.149.210.3	SIP/SDP	Status: 200 OK
120.149.210.3	130.192.18.23	SIP/SDP	ACK SIP:mario@130.192.18.23:7234
130.192.18.23	120.149.210.3	SIP	BYE SIP:lina@120.149.210.3:6734
120.149.210.3	130.192.18.23	SIP	Status: 200 OK

- A.
- B.
- C.
- D.

Question 2) With reference to the MPLS network depicted in the following figure, specify (directly in the dashed boxes) all of the information needed by the corresponding router to forward MPLS frames containing packets from hosts in network 11.1.3.0/24 to hosts in the networks 12.2.3.0/24 and from hosts in the network 2001:1:1:4::/64 to hosts in the network 2001:1:1:2::/64. The IP addresses near the MPLS router interfaces should be interpreted as the IP addresses of the interface. (12 points)

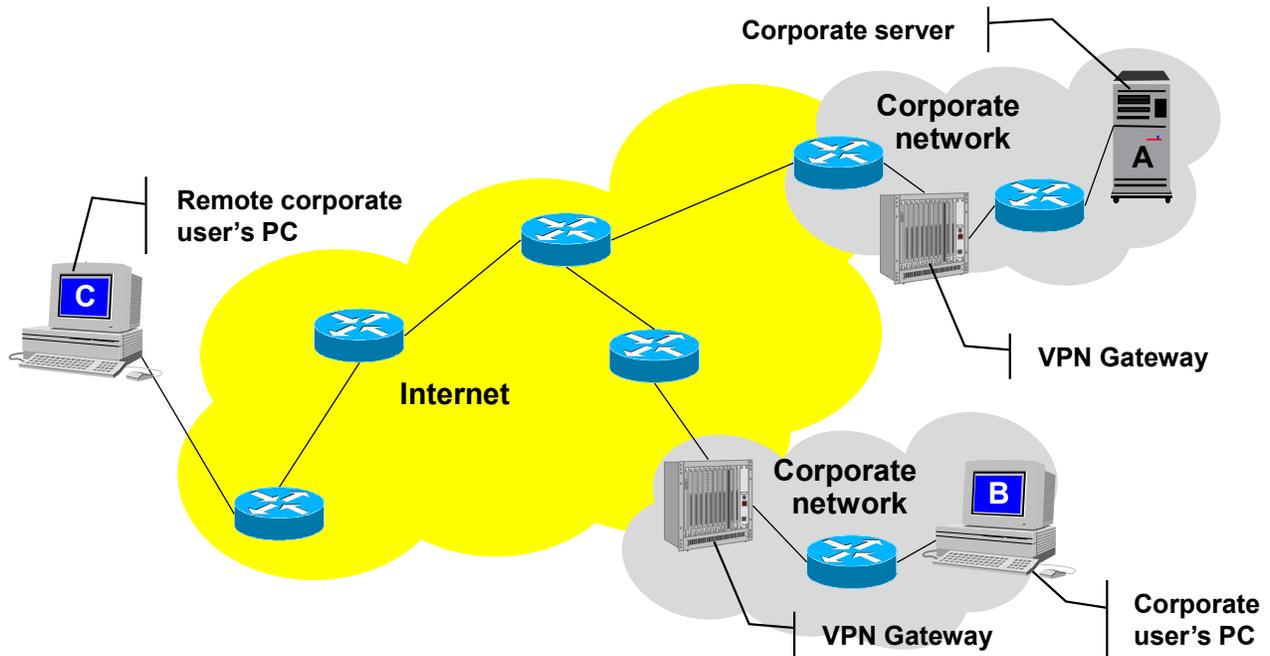


Question 3) After filling out the blanks in the picture with the proper IPv6 addresses (that enable all stations to communicate with each other and with Internet servers), write, directly in the table below, relevant information in packets exchanged on the network when the user of H1 executes the program ping to the address of H3. Use the “Upper layers” cells to specify information related to protocols encapsulated inside IP packets that are relevant in this scenario. Please list at most 6 packets; in case fewer are generated, it is not necessary to use all the rows in the table below. Assume H1 and H3 never exchanged packets before. (12 points)



Pkt. 1	MAC src.	MAC dest.
	IP src.	IP dest.
	Upper layers	
Pkt. 2	MAC src.	MAC dest.
	IP src.	IP dest.
	Upper layers	
Pkt. 3	MAC src.	MAC dest.
	IP src.	IP dest.
	Upper layers	
Pkt. 4	MAC src.	MAC dest.
	IP src.	IP dest.
	Upper layers	
Pkt. 5	MAC src.	MAC dest.
	IP src.	IP dest.
	Upper layers	
Pkt. 6	MAC src.	MAC dest.
	IP src.	IP dest.
	Upper layers	

Question 4) Given the corporate network scenario depicted in the figure below, provide a schematic description of a packet transiting through the Internet from A to B and one from A to C. Please indicate relevant headers and their fields to make the communication possible and, if there are any, to make clear the difference between the two packets. (12 points)



Packet from A to B:

Packet from A to C: