

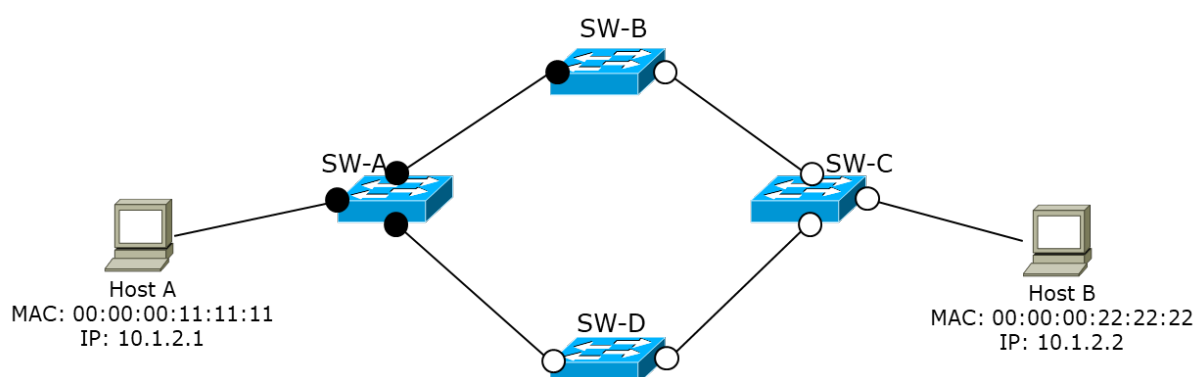
Computer Networks Technologies and Services	July 3rd, 2019
First and last name	Student ID

NOTES

- 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.
- 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.
- Do not forget to write your name and student ID in each one of the marked spaces on the exam paper.
- 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.
- 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.
- When answering questions, please feel free to use drawings whenever they can help expressing and clarifying the answer. In case of ambiguity in the question, please clearly state your assumptions.
- Answers that are not understandable (for example because written badly or with bad handwriting) might be considered wrong.
- During the test, any communication with other classmates is prohibited and will cause the student to be sent away from the classroom
- 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.

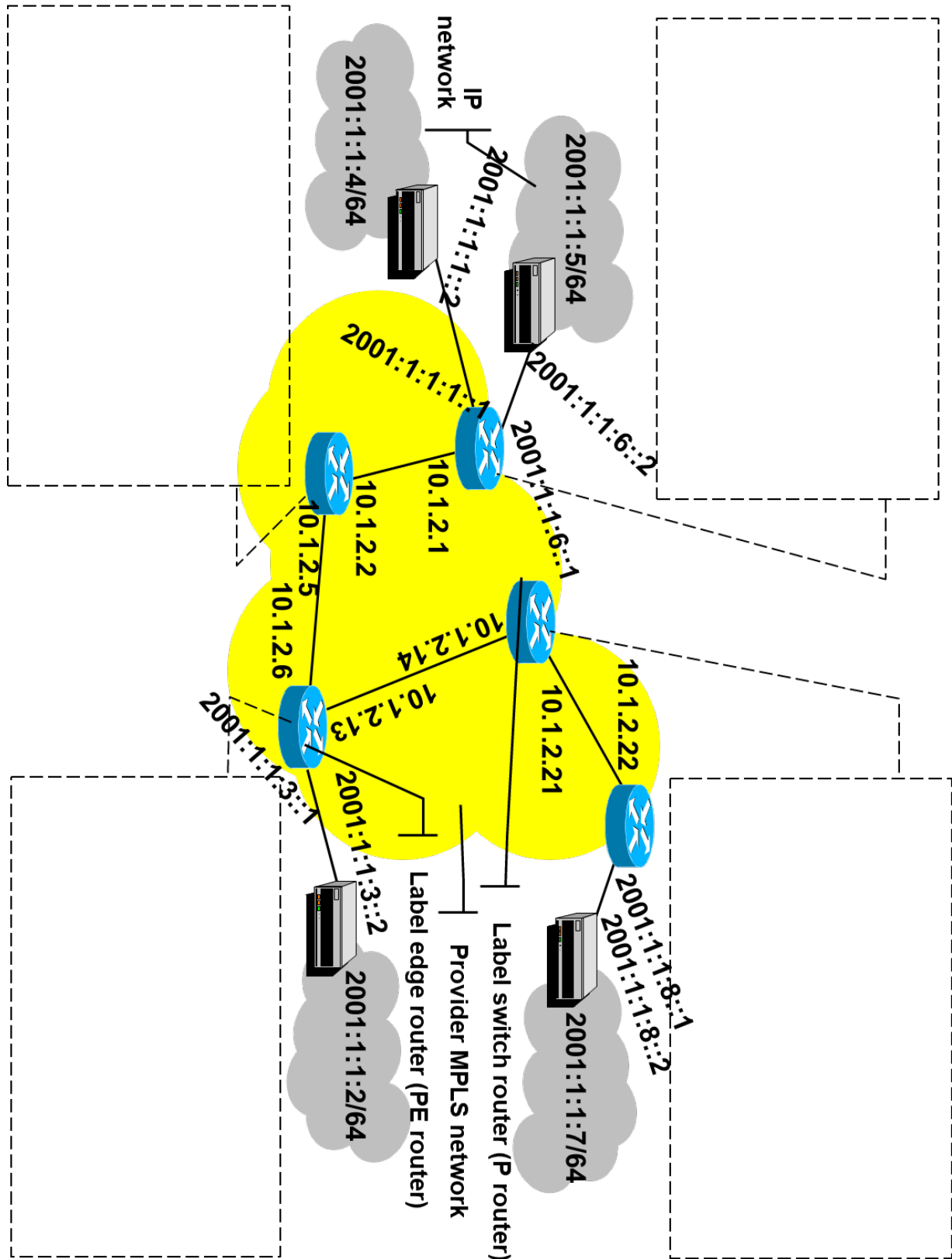
Question 1) Given the network in the following figure, select one of the options available in the table below when Host A sends a packet (e.g., an ICMP Echo Request) to Host B. In the case the third option is selected, also write the value of the most important header fields of the packet received by host B. Assume that:

- ARP caches are empty on the two hosts
 - NO instance of the Spanning Tree Protocol is running on the switches
 - VLANs are configured in the network in access mode, according to the schema depicted in the figure
- (5 points)

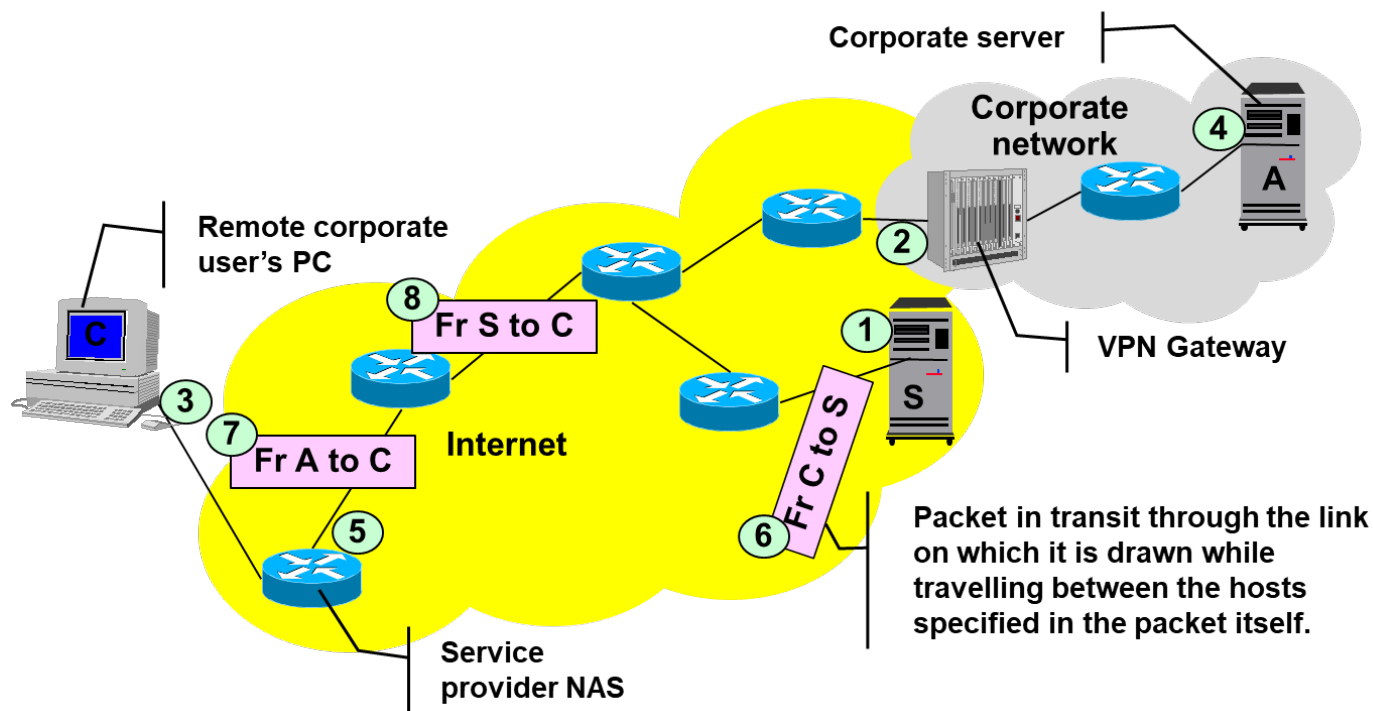


	Communication is not possible due to a broadcast storm generated in the network when the ARP Request is sent by host A				
	Communication is not possible due to a wrong VLAN configuration				
	Communication is possible				
	MAC SRC	MAC DST	VLAN TAG	IP SRC	IP DST

Question 2) With reference to the MPLS network depicted in the following figure, specify, directly in the dashed boxes, (i) all of the information needed by the corresponding routers to forward MPLS frames (i.e., forwarding table) containing packets from hosts in network 2001:1:1:4::/64 to hosts in network 2001:1:1:5::/64 and from hosts in network 2001:1:1:4::/64 to hosts in network 2001:1:1:2::/64 and (ii) the bindings performed by the corresponding routers to enable the same packet exchanges. The IP addresses near the MPLS router interfaces should be interpreted as the IP addresses of the interface. (10 points)



Question 3) Given the customer provisioned access VPN with centralized Internet access scenario depicted in the following figure, indicate (directly in the table below) the IP addresses assigned to the interfaces and included in the packets marked with a number. Interface addresses can be chosen freely as long as they are compatible with the operating principles of IP and the common deployment practices of this specific access VPN solution. As far as packets are concerned, please explicitly provide both source and destination IP addresses and, in case multiple IP headers be deployed (tunneling), explicitly list the IP address pair (source and destination) within each of the headers, clearly specifying the header (i.e., internal or external) they belong to. As far as interfaces are concerned, please list all IP addresses assigned to them if the specific VPN deployment scenario requires them to have more than one address. (8 points)



1)	2)
3)	4)
5)	
6)	
7)	
8)	

Question 4) Considering the network in the figure below, assign an IP address to each interface of each host and network device (writing it directly on the figure, close to the interface itself) so that any two hosts in the figure can exchange IPv6 packets, while minimizing the number of entries in the routing tables of all routers shown in the figure. Write, directly in the dashed box, the routing table of the corresponding router. (8 points)

