

JK LAKSHMIPAT UNIVERSITY JAIPUR
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End-Term Examination, December 2024
B. Tech., Odd Semester, 2024-25

Roll No.

CS1241: IPv6

Time: 1 hour

You may provide solution to as many problems as you want. To pass this course, five of those solutions need to be correct.

1. Assume an Intranet with only IPv4 machines. No machine, router, server or even DNS understands IPv6. I have upgraded my PC to dual stack and I can get a global IPv6 address for myself. For simplicity, let us assume that I have configured my PC with an external DNS server that can fetch IPv6 addresses for machines that have IPv6 running. Let us also assume that all machines in my Intranet as well as in the Internet have global IPv4 addresses. So no worries about Private IP addresses, or NAT, etc. Now, I want to connect to a server using IPv6. Note that my machine has an IPv6 address and I can get the server's IPv6 address. What is the mechanism to establish this connection?
2. For a specific IPv6 destination, the Path MTU (Maximum Transmission Unit) is 2000. I receive an ICMP message (Packet Too Large hence dropped) that suggests that the Path MTU be reduced to 1500, which I do, and start sending packets whose sizes are less than or equal to 1500 bytes. Then I received an ICMP message (Packet Too Large hence dropped) that suggests that the Path MTU be reduced to 1800. But it is already 1500. How could I possibly get this error message?
3. How can a diskless machine with no permanent memory acquire an IPv6 address without any prior communication with any other node (neither incoming nor any outgoing messages allowed)?
4. What is the utility of the rate limiting feature of ICMPv6?
5. What needs to change in an UDP implementation if it is running over IPv6?
6. Anycast messaging over Internet is extremely expensive to implement. But Anycast groups are indeed used over a LAN. In a broadcast or point-to-multipoint network, how would you ensure that a packet addressed to an anycast address is delivered only to one member of the group?
7. Assume that all nodes in an IPv6 network assign their addresses through neighbour discovery protocol. Such a network changes its ISP (Internet Service Provider). Consequently, all IPv6 addresses need to change in the network. How is this change managed so that there is no disruption of IP connectivity to the Internet? In fact, the users don't even realize that a change of this magnitude has taken place.
8. IPv6 defines for all its extension headers a specific order in which these extension headers be placed in the packet (if they are present). Through an example, explain how specifying this order improves packet processing at a router.
9. How is 128-bit address better than a 96-bit address? (Don't tell me that larger is better. Both are effectively infinite addresses.)
10. Flow labels solve just one of the many issues in providing Guaranteed Quality of Service (QoS) in the network. Based on our discussion in the class, state at least three problems that are needed to be solved to provide QoS (other than flow identification).