CSE421

Lab-02

Homework Questions on

*HTTP, ARP, TCP, Email and DNS*

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1. What is the main difference between ARP and DNS requests?

Ans: ARP is used to get the MAC Addresses of devices in a network. On the contrary, DNS request is used to get the IP address of a domain name.

2. By checking which section of a TCP packet one can identify if it is a TCP packet for opening the connection or closing the connection? Explain how?

Ans: TCP Header section can be checked. If we get SYN enabled then it is connection opening, if we see FIN enabled then it is for connection close.

3. How can you resolve an ARP IP Address to an Ethernet MAC address?

Ans: The ARP request is broadcast within the network. It contains the Source MAC, IP and Destination IP. Now, when the target device is found through the IP address, it sends a reply that contains the MAC address of that target device.

4. How does a router help the communication and interchange of information between a pc from a network with a web server from a different network?

Ans: The router enables the possibility of connecting to the Internet/Access Link. The packets are being transferred as it knows where to send it. And also gets the reply from that server from another network to its own network.

5. Suppose, you want to access facebook.com and your PC does not know its local DNS server. Which protocol between ARP and DNS will be executed first and why?

Ans: ARP will be executed first as it needs the MAC address of Local DNS Server first. Then the DNS will be executed to resolve facebook.com to its corresponding IP Address.

6. For the same scenario mentioned above, what will be the destination/target IP address?

Ans: At first the destination IP address will be the IP address of the DNS Server, then it will be the IP address of facebook.com from DNS Query request result seen on Lab Tasks.

7. After establishing a connection with the local DNS server PC1 now knows the IP and MAC addresses of PC2. Suppose PC1 [IP Address: 192.168.2.1, MAC Address: 0010.1191.A946] is sending an ARP packet to PC2 [IP Address: 192.168.2.2, MAC Address: 0110.1290.AD23]. What will be written in the target MAC address before the packet reaches PC2.

Ans: If it is sending an ARP Packet, that means it does not know the target MAC Address yet. So, it would be a demo/default address or unknown address. Considering, it knows the MAC Address, it will be of PC2s 0110.1290.AD23.

8. How can you tell the difference between an ARP request packet and an ARP reply packet as the Ethernet type field on both packets is identical?

Ans: It can be identified by checking the opcode field. For request it is 1, for reply it is 2.

9. What is HTTP response and in which layer of OSI model does HTTP work?

Ans: HTTP Response has the status or reply of the HTTP Request. HTTP works in Application Layer as other Protocols.

10. If the flag section of the TCP packet contains 00010000, what type of TCP packet will that be?

Ans: ACK = 1, it will be an acknowledgement packet.

11. How many TCP packets does the Client PC send to the server in the process of an HTTP request?

Ans: It can be variable amount depending on situations, but it should be at least 1 for connection start and 1 for connection close.

12. Why does email need both SMTP and POP3 protocols? And how do they work together?

Ans: SMTP is used to Send emails, POP3 is used to retrieve emails. So, they work together to complete the process as when an email is being sent, SMTP is used and while retrieving emails POP3 protocol is being used.

13. In a TCP packet coming back from the server, the sequence number is written as 1 and the acknowledgement is written as 1. What do you understand from this scenario? Explain.

Ans: It is most likely the first received byte. As sequence number 1 is the data byte that it sent, and acknowledgement means the data is expecting which is 1. So, in this scenario, the sent data has sequence number 1 and it is acknowledged that 1 is being received.

14. Why is it necessary to map an IP address to a MAC address? Why can't the Ip address be used to represent the MAC address?

Ans: In a same network, MAC Address is required to send data from one device to another. IP addresses are limited, specially Ipv4, so it is not possible to get each device on this planet a unique IP address thus we need physical unique address.

15. In an outbound PDU packet, what does source port: 1025 and destination port: 80 means?

Ans: Source port 1025 means the packet was sent from a process that had 1025 as port number. The destination port 80 means, the packet will be sent via HTTP to a most likely web server.

16. How does your laptop know it’s local DNS server?

Ans: Normally the local DNS server address is set in the OS. Also, as we mostly use PPPoE/DHCP Connections, the DNS Server is assigned by our ISPs by default. We can also change/set it up from settings.