1. A BOOTP/DHCP Packet is encapsulated in UDP Packet, which is encapsulated in IP packet, which is encapsulated in frame. Whereas RARP Packet is only encapsulated only in frame. Find the efficiency of BOOTP/DHCP Packet versus RARP Packet.

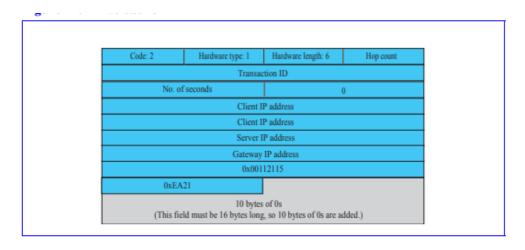Answer:

UDP Header: 20 bytes

IP Header: 20 bytes

BOOTP/DHCP Header: 236 bytes (minimum)

Throughput = (236+20+20)/236

RARP Packet: 28 bytes

2. Do as following
   a. Show the contents of all fields for a DHCP request packet sent from a client with physical address 00:11:21:15:EA:21.
   b. Encapsulate the packet in part a in a UDP user datagram. Fill all the fields.
   c. Encapsulate the packet in part b in an IP datagram. Fill all the fields.
   d. Show the contents of all fields for a DHCP reply sent in response to the request in part a.
   e. Encapsulate the packet in part d in a UDP user datagram. Fill all the fields.
   f. Encapsulate the packet in part e in an IP datagram. Fill all the fields.

Code: 2	Hardware type: 1	Hardware length: 6	Hop count
Transaction ID			
No. of seconds		0	
Client IP address			
Client IP address			
Server IP address			
Gateway IP address			
0x00112115			
0xEA21			
10 bytes of 0s (This field must be 16 bytes long, so 10 bytes of 0s are added.)			

3. A diskless client on a Class C Ethernet network uses DHCP. The DHCP server is on a Class B Ethernet network. Draw a figure of the networks with appropriate IP addresses for the client, server, and relay agent. Fill out a DHCP request and reply packet.

4. Given a DNS header with few flag value. Analyze the flag 0x8F80 & 0x0503. Which of the flags are valid?

Answer:

0x8F80 = 1000111110000000

This is a response message from an authoritative server. The request was an inverse request with recursion desired and recursion was available. The message is truncated, which means the client should open a TCP connection to receive the entire answer.

0x0503 = 0000010100000011

5. In context to DNS, Is the size of a question and resource record fixed? Justify your answer

Answer: No, size of question and resource recode is not fixed. A single packet can carry multiple records.

6. A DNS client is looking for the IP address of xxx.yyy.com. Show the query message with values for each field. Show the response message of a DNS server. Assume the IP address is 201.34.23.12.

53		Ephemeral port number	
53		Checksum	
0x1334		0x8180	
1		1	
0		0	
3	"x"	"x"	"x"
3	"y"	"y"	"y"
3	"c"	"o"	"m"
0	1		0
1	0xC00C		0
1	1		0
12000			0
4	201	34	23
12			