**深 圳 大 学 实 验 报 告**

**课程名称：­ 计算机网络（Computer Networks）**

**实验名称： Datalink Layer Assignment**

**学院： 电子与信息工程学院**

**专业： 电子信息工程**

**指导教师： 毕宿志**

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**实验时间： 2023 12 25**

**实验报告提交时间： 2023 12 26**

**教务部制**

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| 1. **Purpose of experiment：**   **①Research Ethernet protocol and ARP protocol;**  **②Be skilled in using wireshark to capture packets；**  **③Master the basic principles of packet capture at the link layer.** |
| 1. **Experimental principle：**   （1）以太网协议 |
| 1. **Content：**   **如下是以太网协议分析实验的问题以及回答：**  Q1: What is the 48-bit Ethernet address of your computer?  Q2: What is the 48-bit destination address in the Ethernet frame? Is this the Ethernet  address of gaia.cs.umass.edu? (Hint: the answer is no). What device has this as its  Ethernet address? [Note: this is an important question, and one that students  sometimes get wrong. Re-read pages 468-469 in the text and make sure you  understand the answer here.]  Q3. Give the hexadecimal value for the two-byte Frame type field. What upper layer  protocol does this correspond to?  Q4. How many bytes from the very start of the Ethernet frame does the ASCII “G” in “GET” appear in the Ethernet frame?  Next, answer the following questions, based on the contents of the Ethernet frame containing the first byte of the HTTP response message.  Q5. What is the value of the Ethernet source address? Is this the address of your  computer, or of gaia.cs.umass.edu (Hint: the answer is no). What device has this  as its Ethernet address?  Q6. What is the destination address in the Ethernet frame? Is this the Ethernet address  of your computer?  Q7. Give the hexadecimal value for the two-byte Frame type field. What upper layer  protocol does this correspond to?  Q8. How many bytes from the very start of the Ethernet frame does the ASCII “O” in “OK” (i.e., the HTTP response code) appear in the Ethernet frame?  **（1）对于file ethernet-ethereal-trace-1 的抓包：**  问题回答：  A1: The MAC address of my computer is 00:06:25:da:af:73;    A2: The destination MAC address of an Ethernet frame is 00:d0:59:a9:3d:68; Not gaia.cs.umass.edu's Ethernet address, which is my computer's virtual routing address;  A3: IPV4: (0x0800);  A4： From byte 14 to byte 54, total54-14=40 bytes: (G is in the 54th byte)    A5：The Ethernet source address is 00:d0:59:a9:3d:68；No, it's not the address of my computer; Is the virtual routing address of my computer；    A6：The destination address is the Ethernet address of my computer, which is 00:06:25:da:af:73；    A7：IPV4: (0x0800);  A8：489 + 13 = 501 bits.    **（2）对于http://gaia.cs.umass.edu/wireshark-labs/HTTP-ethereal-lab-file3.html 的抓包：**  A1: The MAC address of my computer is 70:a8:d3:92:d4:66；    A2：The destination MAC address of an Ethernet frame is 34:58:40:35:72:16; ; Not gaia.cs.umass.edu's Ethernet address, which is my computer's virtual routing address;  A3：IPV4: (0x0800);    A4：From byte 14 to byte 54, total54-14=40 bytes: (G is in the 54th byte)  A5：The Ethernet source address is 34:58:40:35:72:16；No, it's not the address of my computer; Is the virtual routing address of my computer；  A6：The destination address is the Ethernet address of my computer, which is 70:a8:d3:92:d4:66；  A7：IPV4: (0x0800);  A8: 489 + 13 = 501 bits.  **如下是ARP协议分析实验的问题以及回答：**  Q1：What are the hexadecimal values for the source and destination addresses in the  Ethernet frame containing the ARP request message?  Q2: Give the hexadecimal value for the two-byte Ethernet Frame type field. What  upper layer protocol does this correspond to?  Q3：Now find the ARP reply that was sent in response to the ARP request.  a) How many bytes from the very beginning of the Ethernet frame does the  ARP opcode field begin?  b) What is the value of the opcode field within the ARP-payload part of the  Ethernet frame in which an ARP response is made?  c) Where in the ARP message does the “answer” to the earlier ARP request  appear – the IP address of the machine having the Ethernet address whose  corresponding IP address is being queried?  Q4：What are the hexadecimal values for the source and destination addresses in the  Ethernet frame containing the ARP reply message?  **（1）对于file ethernet-ethereal-trace-1 的抓包：**  A1: Source: AmbitMicrosy\_a9:3d:68 (00:d0:59:a9:3d:68)  Destination: Broadcast (ff:ff:ff:ff:ff:ff)    A2: Type: ARP (0x0806)    A3:  A)ARP request: 21 bytes:    B)the value of the opcode field within the ARP-payload part of the  Ethernet frame in which an ARP response is made is 1;    C)As shown in the picture box below:  1703562850260  A4: Destination: AmbitMicrosy\_a9:3d:68 (00:d0:59:a9:3d:68)  Source: LinksysGroup\_da:af:73 (00:06:25:da:af:73)    **（2）对于dhcp-ethereal-trace-1 的抓包：**  A1: Source: LinksysGroup\_da:af:73 (00:06:25:da:af:73)  Destination: Broadcast (ff:ff:ff:ff:ff:ff)    A2:Type: ARP (0x0806)  A3:  a)ARP request: 21 bytes:    B)the value of the opcode field within the ARP-payload part of the  Ethernet frame in which an ARP response is made is 1;    C)As shown in the picture box below:    A4: Destination: LinksysGroup\_da:af:73 (00:06:25:da:af:73)  Source: Dell\_4f:36:23 (00:08:74:4f:36:23) |
| 1. **Conclusion and discussion**   **Conclusion：**  **In this experiment, Dijkstra algorithm and distance vector algorithm are used to calculate the routing table corresponding to the network topology. And the path corresponding to the shortest distance of each node;**  **Discussion:**  **Both algorithms have their own advantages and disadvantages:**  **Dijkstra's algorithm:**  **The node advertises an incorrect local link cost**  **Each node computes only its own routing table**  **The impact of error messages is small, local, and the route is robust**  **Distance vector algorithm:**  **A node may advertise an incorrect path cost to all nodes in the network**  **The routing table of each node may be used by other nodes** |
| 指导教师批阅意见：  成绩评定：  指导教师签字：  年 月 日  备注： |

注：1、报告内的项目或内容设置，可根据实际情况加以调整和补充。

2、教师批改学生实验报告时间应在学生提交实验报告时间后10日内。