计算机网络第三次作业：

1. 在熟悉以太网帧（Frame）结构、IP分组（IP Packet）结构、TCP报文（TCP Segment）结构的基础上，针对下表中列出的六条以太网帧进行分析：
2. 下列哪三条以太网帧中包含了一个TCP连接建立过程的三次握手过程？TCP连接的服务器端和客户端选定的初始序列号（ISN：Initial Sequence Number）各是多少（以16进制表示）？三次握手过程中的第三条TCP报文的序列号（Sequence Number）是多少（以16进制表示）？
3. 请写出这条TCP连接的服务器端的IP地址、客户端的IP地址。IP地址以点分十进制表示。
4. 这条TCP连接的客户端、服务器的端口号各是多少？
5. 第5个以太网帧中TCP报文的序列号是多少（以16进制表示）？携带的数据（Payload）的长度是多少字节？设发出第5个以太网帧的一方为主机A，主机A的TCP协议在发出第五个帧中的TCP报文后接着发送后续数据，这个接下来发出的TCP报文的序列号是多少（以16进制表示）？

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Index | Frame | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | ec | 6c | 9f | | 05 | | 3e | | 5c | | 00 | | 0e | | c6 | | c2 | | 79 | | 48 | | 08 | | 00 | | 45 | 00 |
| 00 | 34 | 55 | | ac | | 40 | | 00 | | 80 | | 06 | | 00 | | 00 | | ac | | 10 | | 01 | | da | | 6a | 0b |
| d1 | 1d | c5 | | 05 | | 00 | | 50 | | ee | | 8d | | d6 | | c5 | | 00 | | 00 | | 00 | | 00 | | 80 | 02 |
| fa | f0 | e9 | | 39 | | 00 | | 00 | | 02 | | 04 | | 05 | | b4 | | 01 | | 03 | | 03 | | 08 | | 01 | 01 |
| 04 | 02 |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |
| 2 | ec | 6c | | 9f | | 05 | | 3e | | 5c | | 00 | | 0e | | c6 | | c2 | | 79 | | 48 | | 08 | | 00 | 45 | 00 |
| 00 | 34 | | 5c | | bb | | 40 | | 00 | | 80 | | 06 | | 00 | | 00 | | ac | | 10 | | 01 | | da | db | ee |
| 04 | 09 | | c5 | | 3a | | 00 | | 50 | | 90 | | c6 | | ee | | 73 | | 00 | | 00 | | 00 | | 00 | 80 | 02 |
| fa | f0 | | 8e | | 08 | | 00 | | 00 | | 02 | | 04 | | 05 | | b4 | | 01 | | 03 | | 03 | | 08 | 01 | 01 |
| 04 | 02 | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |
| 3 | 00 | 0e | | c6 | | c2 | | 79 | | 48 | | ec | | 6c | | 9f | | 05 | | 3e | | 5c | | 08 | | 00 | 45 | 00 |
| 00 | 34 | | 00 | | 00 | | 40 | | 00 | | 3a | | 06 | | b2 | | e2 | | db | | ee | | 04 | | 09 | ac | 10 |
| 01 | da | | 00 | | 50 | | c5 | | 3a | | 3c | | 44 | | 0c | | c2 | | 90 | | c6 | | ee | | 74 | 80 | 12 |
| 39 | 08 | | 1a | | 49 | | 00 | | 00 | | 02 | | 04 | | 05 | | b4 | | 01 | | 01 | | 04 | | 02 | 01 | 03 |
| 03 | 09 | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |
| 4 | ec | 6c | | 9f | | 05 | | 3e | | 5c | | 00 | | 0e | | c6 | | c2 | | 79 | | 48 | | 08 | | 00 | 45 | 00 |
| 00 | 28 | | 5c | | bc | | 40 | | 00 | | 80 | | 06 | | 00 | | 00 | | ac | | 10 | | 01 | | da | db | ee |
| 04 | 09 | | c5 | | 3a | | 00 | | 50 | | 90 | | c6 | | ee | | 74 | | 3c | | 44 | | 0c | | c3 | 50 | 10 |
| 01 | 00 | | 8d | | fc | | 00 | | 00 | |  | |  | |  | |  | |  | |  | |  | |  |  |  |
| 5 | ec | 6c | | 9f | | 05 | | 3e | | 5c | | 00 | | 0e | | c6 | | c2 | | 79 | | 48 | | 08 | | 00 | 45 | 00 |
| 02 | a3 | | 5c | | bd | | 40 | | 00 | | 80 | | 06 | | 00 | | 00 | | ac | | 10 | | 01 | | da | db | ee |
| 04 | 09 | | c5 | | 3a | | 00 | | 50 | | 90 | | c6 | | ee | | 74 | | 3c | | 44 | | 0c | | c3 | 50 | 18 |
| 01 | 00 | | 90 | | 77 | | 00 | | 00 | | 47 | | 45 | | 54 | | 20 | | 2f | | 20 | | 48 | | 54 | 54 | 50 |
| 2f | 31 | | 2e | | 31 | | 0d | | 0a | | 48 | | 6f | | 73 | | 74 | | 3a | | 20 | | 77 | | 77 | 77 | 2e |
| 73 | 69 | | 6e | | 61 | | 2e | | 63 | | 6f | | 6d | | 2e | | 63 | | 6e | | 0d | | 0a | | 55 | 73 | 65 |
| 72 | 2d | | 41 | | 67 | | 65 | | 6e | | 74 | | 3a | | 20 | | 4d | | 6f | | 7a | | 69 | | 6c | 6c | 61 |
| 2f | 35 | | 2e | | 30 | | 20 | | 28 | | 57 | | 69 | | 6e | | 64 | | 6f | | 77 | | 73 | | 20 | 4e | 54 |
| 20 | 31 | | 30 | | 2e | | 30 | | 3b | | 20 | | 57 | | 69 | | 6e | | 36 | | 34 | | 3b | | 20 | 78 | 36 |
| 34 | 3b | | 20 | | 72 | | 76 | | 3a | | 35 | | 36 | | 2e | | 30 | | 29 | | 20 | | 47 | | 65 | 63 | 6b |
| 6f | 2f | | 32 | | 30 | | 31 | | 30 | | 30 | | 31 | | 30 | | 31 | | 20 | | 46 | | 69 | | 72 | 65 | 66 |
| 6f | 78 | | 2f | | 35 | | 36 | | 2e | | 30 | | 0d | | 0a | | 41 | | 63 | | 63 | | 65 | | 70 | 74 | 3a |
| 20 | 74 | | 65 | | 78 | | 74 | | 2f | | 68 | | 74 | | 6d | | 6c | | 2c | | 61 | | 70 | | 70 | 6c | 69 |
| 63 | 61 | | 74 | | 69 | | 6f | | 6e | | 2f | | 78 | | 68 | | 74 | | 6d | | 6c | | 2b | | 78 | 6d | 6c |
| 2c | 61 | | 70 | | 70 | | 6c | | 69 | | 63 | | 61 | | 74 | | 69 | | 6f | | 6e | | 2f | | 78 | 6d | 6c |
| 3b | 71 | | 3d | | 30 | | 2e | | 39 | | 2c | | 2a | | 2f | | 2a | | 3b | | 71 | | 3d | | 30 | 2e | 38 |
| 0d | 0a | | 41 | | 63 | | 63 | | 65 | | 70 | | 74 | | 2d | | 4c | | 61 | | 6e | | 67 | | 75 | 61 | 67 |
| 65 | 3a | | 20 | | 7a | | 68 | | 2d | | 43 | | 4e | | 2c | | 7a | | 68 | | 3b | | 71 | | 3d | 30 | 2e |
| 38 | 2c | | 65 | | 6e | | 2d | | 55 | | 53 | | 3b | | 71 | | 3d | | 30 | | 2e | | 35 | | 2c | 65 | 6e |
| 3b | 71 | | 3d | | 30 | | 2e | | 33 | | 0d | | 0a | | 41 | | 63 | | 63 | | 65 | | 70 | | 74 | 2d | 45 |
| 6e | 63 | | 6f | | 64 | | 69 | | 6e | | 67 | | 3a | | 20 | | 67 | | 7a | | 69 | | 70 | | 2c | 20 | 64 |
| 65 | 66 | | 6c | | 61 | | 74 | | 65 | | 0d | | 0a | | 43 | | 6f | | 6f | | 6b | | 69 | | 65 | 3a | 20 |
| 72 | 6f | | 74 | | 61 | | 74 | | 65 | | 63 | | 6f | | 75 | | 6e | | 74 | | 3d | | 32 | | 3b | 20 | 55 |
| 5f | 54 | | 52 | | 53 | | 31 | | 3d | | 30 | | 30 | | 30 | | 30 | | 30 | | 30 | | 31 | | 31 | 2e | 33 |
| 30 | 38 | | 64 | | 33 | | 65 | | 36 | | 39 | | 2e | | 35 | | 39 | | 65 | | 65 | | 61 | | 33 | 62 | 63 |
| 2e | 66 | | 62 | | 37 | | 31 | | 66 | | 36 | | 35 | | 63 | | 3b | | 20 | | 55 | | 5f | | 54 | 52 | 53 |
| 32 | 3d | | 30 | | 30 | | 30 | | 30 | | 30 | | 30 | | 31 | | 31 | | 2e | | 33 | | 30 | | 39 | 61 | 33 |
| 65 | 36 | | 39 | | 2e | | 35 | | 39 | | 65 | | 65 | | 61 | | 33 | | 62 | | 63 | | 2e | | 62 | 32 | 37 |
| 39 | 63 | | 30 | | 39 | | 31 | | 3b | | 20 | | 55 | | 4f | | 52 | | 3d | | 77 | | 77 | | 77 | 2e | 62 |
| 69 | 6e | | 67 | | 2e | | 63 | | 6f | | 6d | | 2c | | 62 | | 6c | | 6f | | 67 | | 2e | | 73 | 69 | 6e |
| 61 | 2e | | 63 | | 6f | | 6d | | 2e | | 63 | | 6e | | 2c | | 3b | | 20 | | 53 | | 49 | | 4e | 41 | 47 |
| 4c | 4f | | 42 | | 41 | | 4c | | 3d | | 31 | | 32 | | 32 | | 2e | | 32 | | 32 | | 34 | | 2e | 35 | 32 |
| 2e | 31 | | 37 | | 5f | | 31 | | 35 | | 30 | | 38 | | 38 | | 31 | | 31 | | 37 | | 30 | | 38 | 2e | 34 |
| 30 | 32 | | 38 | | 33 | | 31 | | 3b | | 20 | | 41 | | 70 | | 61 | | 63 | | 68 | | 65 | | 3d | 31 | 32 |
| 32 | 2e | | 32 | | 32 | | 34 | | 2e | | 35 | | 32 | | 2e | | 31 | | 37 | | 5f | | 31 | | 35 | 30 | 38 |
| 38 | 31 | | 31 | | 37 | | 30 | | 38 | | 2e | | 34 | | 30 | | 32 | | 38 | | 33 | | 35 | | 3b | 20 | 55 |
| 4c | 56 | | 3d | | 31 | | 35 | | 30 | | 38 | | 38 | | 31 | | 31 | | 37 | | 30 | | 39 | | 35 | 37 | 33 |
| 3a | 31 | | 3a | | 31 | | 3a | | 31 | | 3a | | 31 | | 32 | | 32 | | 2e | | 32 | | 32 | | 34 | 2e | 35 |
| 32 | 2e | | 31 | | 37 | | 5f | | 31 | | 35 | | 30 | | 38 | | 38 | | 31 | | 31 | | 37 | | 30 | 38 | 2e |
| 34 | 30 | | 32 | | 38 | | 33 | | 35 | | 3a | | 0d | | 0a | | 43 | | 6f | | 6e | | 6e | | 65 | 63 | 74 |
| 69 | 6f | | 6e | | 3a | | 20 | | 6b | | 65 | | 65 | | 70 | | 2d | | 61 | | 6c | | 69 | | 76 | 65 | 0d |
| 0a | 55 | | 70 | | 67 | | 72 | | 61 | | 64 | | 65 | | 2d | | 49 | | 6e | | 73 | | 65 | | 63 | 75 | 72 |
| 65 | 2d | | 52 | | 65 | | 71 | | 75 | | 65 | | 73 | | 74 | | 73 | | 3a | | 20 | | 31 | | 0d | 0a | 0d |
| 0a |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  |  |
| 6 | 00 | 0e | | c6 | | c2 | | 79 | | 48 | | ec | | 6c | | 9f | | 05 | | 3e | | 5c | | 08 | | 00 | 45 | 00 |
| 00 | 28 | | a4 | | 26 | | 40 | | 00 | | 3a | | 06 | | 0e | | c8 | | db | | ee | | 04 | | 09 | ac | 10 |
| 01 | da | | 00 | | 50 | | c5 | | 3a | | 3c | | 44 | | 0c | | c3 | | 90 | | c6 | | f0 | | ef | 50 | 10 |
| 00 | 1f | | 91 | | 8b | | 00 | | 00 | | 00 | | 00 | | 00 | | 00 | | 00 | | 00 | |  | |  |  |  |

1. TCP端口号与套接字有什么区别？连接套接字（connected socket）与侦听套接字（listening socket）有什么区别？
2. 为什么TCP连接建立过程中需要使用三次握手机制？
3. 传输层的TCP连接与网络层的虚电路子网（virtual-circuit network）中建立的连接有什么不同？
4. TCP流量控制机制与拥塞控制机制各解决什么问题？
5. 数据链路层协议的差错控制与传输层协议的差错控制有什么不同之处？
6. 防火墙（Firewall）的功能是什么？
7. 请描述从校园网中的一台主机访问校外某网站（例如，www.sohu.com）的过程中，会需要使用到哪些计算机网络协议？这些协议各有什么用途？