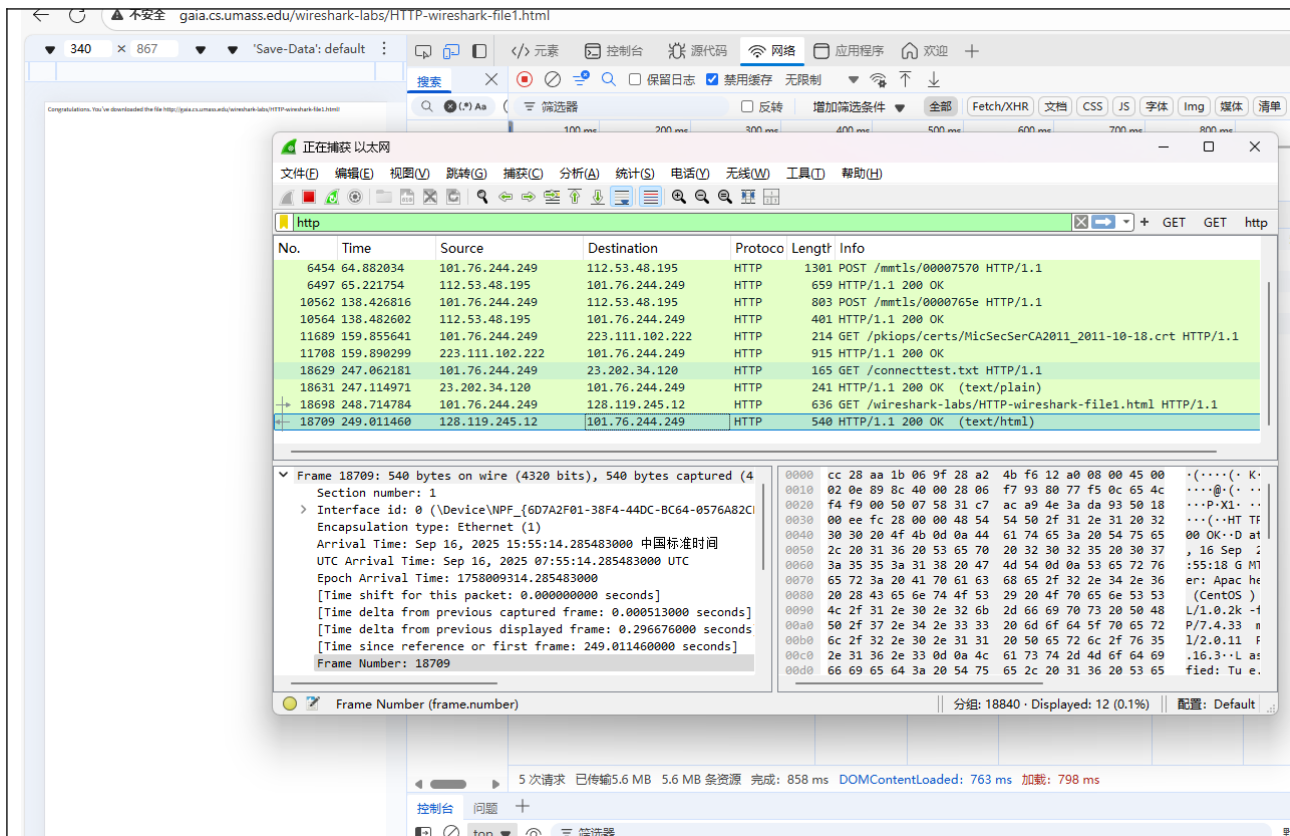


山东大学 计算机 学院
计算机网络 课程实验报告

学号：202400130039	姓名：张汇智	班级：智能																																																																																				
实验题目： Wireshark_HTTP																																																																																						
实验学时：2h	实验日期： 2025.																																																																																					
实验目的： explore several aspects of the HTTP protocol																																																																																						
硬件环境： AMD ryzen R9 7900HX ; NVIDIA RTX4070LAPTOP ; RAM SAMSUNG 16GB*2 ; ROM WD770 1T+2T;																																																																																						
软件环境： Windows11 23H2 (KB5056580)																																																																																						
实验步骤与内容： 1. The Basic HTTP GET/response interaction																																																																																						
<div>文件(F) 编辑(E) 视图(V) 跳转(G) 捕获(C) 分析(A) 统计(S) 电话(V) 无线(W) 工具(T) 帮助(H)</div> <div><p>The screenshot shows the Wireshark network protocol analyzer. The top pane displays a list of captured packets, with the selected packet (No. 684) being an HTTP GET request for /wireshark-labs/HTTP-wireshark-file1.html. The middle pane shows the details of the selected packet, including the Hypertext Transfer Protocol section. The bottom pane shows the raw packet data in hexadecimal and ASCII.</p><table border="1"><thead><tr><th>No.</th><th>Time</th><th>Source</th><th>Destination</th><th>Protocol</th><th>Length</th><th>Info</th></tr></thead><tbody><tr><td>78</td><td>3.660967</td><td>101.76.244.249</td><td>128.119.245.12</td><td>HTTP</td><td>684</td><td>GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1</td></tr><tr><td>84</td><td>3.961778</td><td>128.119.245.12</td><td>101.76.244.249</td><td>HTTP</td><td>293</td><td>HTTP/1.1 304 Not Modified</td></tr><tr><td>517</td><td>25.288838</td><td>101.76.244.249</td><td>2.17.107.89</td><td>HTTP</td><td>165</td><td>GET /connecttest.txt HTTP/1.1</td></tr><tr><td>519</td><td>25.560983</td><td>2.17.107.89</td><td>101.76.244.249</td><td>HTTP</td><td>241</td><td>HTTP/1.1 200 OK (text/plain)</td></tr><tr><td>1835</td><td>60.604647</td><td>101.76.244.249</td><td>23.200.230.80</td><td>HTTP</td><td>165</td><td>GET /connecttest.txt HTTP/1.1</td></tr><tr><td>1837</td><td>60.655980</td><td>23.200.230.80</td><td>101.76.244.249</td><td>HTTP</td><td>241</td><td>HTTP/1.1 200 OK (text/plain)</td></tr><tr><td>2569</td><td>130.556834</td><td>101.76.244.249</td><td>112.53.55.202</td><td>HTTP</td><td>1151</td><td>POST /mmtls/000014e6 HTTP/1.1</td></tr><tr><td>2572</td><td>130.564944</td><td>101.76.244.249</td><td>109.244.210.118</td><td>HTTP</td><td>1006</td><td>POST /mmtls/000014e6 HTTP/1.1</td></tr><tr><td>2574</td><td>130.592161</td><td>109.244.210.118</td><td>101.76.244.249</td><td>HTTP</td><td>950</td><td>HTTP/1.1 200 OK</td></tr><tr><td>2579</td><td>130.617339</td><td>112.53.55.202</td><td>101.76.244.249</td><td>HTTP</td><td>397</td><td>HTTP/1.1 200 OK</td></tr><tr><td>2627</td><td>136.538943</td><td>101.76.244.249</td><td>112.53.55.202</td><td>HTTP</td><td>796</td><td>POST /mmtls/000014fa HTTP/1.1</td></tr></tbody></table><p>Hypertext Transfer Protocol</p><p>GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\nHost: gaia.cs.umass.edu\r\nConnection: keep-alive\r\nCache-Control: max-age=0\r\nUpgrade-Insecure-Requests: 1\r\nUser-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/120.0.0.0 Safari/537.36\r\nAccept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8\r\nAccept-Encoding: gzip, deflate\r\nAccept-Language: zh-CN,zh;q=0.9,en;q=0.8,en-GB;q=0.7,en-US;q=0.6\r\nIf-None-Match: "80-63ee497e305a0"\r\nIf-Modified-Since: Tue, 16 Sep 2025 05:43:01 GMT\r\n\r\n</p><p>304 Not Modified</p><p>Cache-Control: max-age=0, s-maxage=86400\r\n\r\n</p></div>			No.	Time	Source	Destination	Protocol	Length	Info	78	3.660967	101.76.244.249	128.119.245.12	HTTP	684	GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1	84	3.961778	128.119.245.12	101.76.244.249	HTTP	293	HTTP/1.1 304 Not Modified	517	25.288838	101.76.244.249	2.17.107.89	HTTP	165	GET /connecttest.txt HTTP/1.1	519	25.560983	2.17.107.89	101.76.244.249	HTTP	241	HTTP/1.1 200 OK (text/plain)	1835	60.604647	101.76.244.249	23.200.230.80	HTTP	165	GET /connecttest.txt HTTP/1.1	1837	60.655980	23.200.230.80	101.76.244.249	HTTP	241	HTTP/1.1 200 OK (text/plain)	2569	130.556834	101.76.244.249	112.53.55.202	HTTP	1151	POST /mmtls/000014e6 HTTP/1.1	2572	130.564944	101.76.244.249	109.244.210.118	HTTP	1006	POST /mmtls/000014e6 HTTP/1.1	2574	130.592161	109.244.210.118	101.76.244.249	HTTP	950	HTTP/1.1 200 OK	2579	130.617339	112.53.55.202	101.76.244.249	HTTP	397	HTTP/1.1 200 OK	2627	136.538943	101.76.244.249	112.53.55.202	HTTP	796	POST /mmtls/000014fa HTTP/1.1
No.	Time	Source	Destination	Protocol	Length	Info																																																																																
78	3.660967	101.76.244.249	128.119.245.12	HTTP	684	GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1																																																																																
84	3.961778	128.119.245.12	101.76.244.249	HTTP	293	HTTP/1.1 304 Not Modified																																																																																
517	25.288838	101.76.244.249	2.17.107.89	HTTP	165	GET /connecttest.txt HTTP/1.1																																																																																
519	25.560983	2.17.107.89	101.76.244.249	HTTP	241	HTTP/1.1 200 OK (text/plain)																																																																																
1835	60.604647	101.76.244.249	23.200.230.80	HTTP	165	GET /connecttest.txt HTTP/1.1																																																																																
1837	60.655980	23.200.230.80	101.76.244.249	HTTP	241	HTTP/1.1 200 OK (text/plain)																																																																																
2569	130.556834	101.76.244.249	112.53.55.202	HTTP	1151	POST /mmtls/000014e6 HTTP/1.1																																																																																
2572	130.564944	101.76.244.249	109.244.210.118	HTTP	1006	POST /mmtls/000014e6 HTTP/1.1																																																																																
2574	130.592161	109.244.210.118	101.76.244.249	HTTP	950	HTTP/1.1 200 OK																																																																																
2579	130.617339	112.53.55.202	101.76.244.249	HTTP	397	HTTP/1.1 200 OK																																																																																
2627	136.538943	101.76.244.249	112.53.55.202	HTTP	796	POST /mmtls/000014fa HTTP/1.1																																																																																



不知道为啥删不掉 禁用缓存200 OK DISPLAYED

Is your browser running HTTP version 1.0 or 1.1? 1.1.

What version of HTTP is the server running? HTTP/1.1

2. What languages (if any) does your browser indicate that it can accept to the server? zh-CN, zh;q=0.9, en;q=0.8, en-GB;q=0.7, en-US;q=0.6 简中 中英 不列颠英美英。

3. What is the IP address of your computer? 101.76.244.249

Of the gaia.cs.umass.edu server? 128.119.245.12

4. What is the status code returned from the server to your browser? 200

5. When was the HTML file that you are retrieving last modified at the server? Tue, 16 Sep 2025 07:55:00 GMT

6. How many bytes of content are being returned to your browser? 128

7. By inspecting the raw data in the packet content window, do you see any headers within the data that are not displayed in the packet-listing window?

True

If so, name one.

Keep alive

//呵呵没到解释一分钟我就遇到了304,,

//自此笔者上课来到实验室, 由以太网变为WLAN

2. The HTTP CONDITIONAL GET/response interaction

h

http

No.	Time	Source	Destination	Protocol	Length	Info
4258	120.963983	172.25.138.72	128.119.245.12	HTTP	636	GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1
4266	121.246093	128.119.245.12	172.25.138.72	HTTP	784	HTTP/1.1 200 OK (text/html)
4550	147.329969	2001:250:5800:1002::...	2600:1417:4400:3::1..	HTTP	186	GET /connecttest.txt HTTP/1.1
4553	147.340421	172.25.138.72	23.202.35.33	HTTP	165	GET /connecttest.txt HTTP/1.1

Frame 4258: 636 bytes on wire (5088 bits), 636 bytes captured (5088 bits) on interface \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E} Section number: 1

Interface id: 0 (\Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E})

Interface name: \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E}

Interface description: WLAN 2

Encapsulation type: Ethernet (1)

Arrival Time: Sep 16, 2025 16:18:38.404643000 中国标准时间

UTC Arrival Time: Sep 16, 2025 08:18:38.404643000 UTC

Epoch Arrival Time: 1758010718.404643000

[Time shift for this packet: 0.000000000 seconds]

[Time delta from previous captured frame: 0.001672000 seconds]

[Time delta from previous displayed frame: 5.862926000 seconds]

[Time since reference or first frame: 120.963983000 seconds]

Frame Number: 4258

Frame Length: 636 bytes (5088 bits)

Capture Length: 636 bytes (5088 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp:http]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

Ethernet II, Src: Intel_9a:fi:aa (e8:bf:b8:9a:fi:aa), Dst: JuniperNetwo_f6:12:a0 (28:a2:4b:f6:12:a0)

Destination: JuniperNetwo_f6:12:a0 (28:a2:4b:f6:12:a0)

.....0..... = LG bit: Globally unique address (factory default)

.....0..... = IG bit: Individual address (unicast)

Source: Intel_9a:fi:aa (e8:bf:b8:9a:fi:aa)

.....0..... = LG bit: Globally unique address (factory default)

.....0..... = IG bit: Individual address (unicast)

Type: IPv4 (0x0000)

[Stream index: 0]

Internet Protocol Version 4, Src: 172.25.138.72, Dst: 128.119.245.12

0100 = Version: 4

....0101 = Header Length: 20 bytes (5)

Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)

0000 00.. = Differentiated Services Codepoint: Default (0)

0000 28 a2 4b f6 12 a0 e8 bf b8 9a f1 aa 08 00 45 00

0010 02 6e ac d8 40 00 80 06 00 00 ac 19 8a 48 80 77

0020 f5 0c 27 31 00 50 48 6a 48 30 48 f5 b1 97 50 18

0030 02 01 ae 40 00 00 47 45 54 20 2f 7f 69 72 65 73

0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 50 2d 7f

0050 69 72 65 73 68 61 72 6b 2d 66 69 6c 65 32 2e 68

0060 74 6d 6c 20 48 54 50 2f 31 2e 31 0d 0a 48 6f

0070 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 73

0080 73 2e 65 64 75 0d 0a 43 6f 6e 65 63 74 69 6f

0090 6e 3a 20 6b 65 65 70 2d 61 6c 69 76 65 0d 0a 50

00a0 72 61 67 6d 61 3a 20 6e 6f 2d 63 61 63 68 65 0d

00b0 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f 6c 3a 20

00c0 6e 6f 2d 63 61 63 68 65 0d 0a 55 70 67 72 61 64

00d0 65 2d 49 6e 73 65 63 75 72 65 2d 52 65 71 75 65

00e0 73 74 73 3a 20 31 0d 0a 55 73 65 72 2d 41 67 65

00f0 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20

0100 28 4c 69 6e 75 78 3b 20 41 6e 64 72 6f 69 64 2d

0110 36 2e 30 3b 20 4e 65 78 75 73 20 35 20 42 75 69

0120 6c 64 2f 4d 52 41 35 38 4e 29 20 41 70 70 6c 65

0130 57 65 62 4b 69 74 2f 35 33 37 2e 33 36 28 2b 4b

0140 48 54 4d 4c 2c 20 6c 69 6b 65 20 47 65 63 6b 6f

0150 29 20 43 68 72 6f 6d 65 2f 31 34 30 2e 30 2e 30

0160 2e 30 20 4d 6f 62 69 6c 65 20 53 61 66 61 72 69

0170 2f 35 33 37 2e 33 36 20 45 64 6f 2f 31 34 30 2e

0180 30 2e 30 2e 30 0d 0a 41 63 63 65 70 74 3a 20 7a

0190 65 78 74 2f 68 74 6d 6c 2c 61 70 70 6c 69 63 61

01a0 74 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c 61

01b0 70 70 6c 69 63 61 74 69 6f 6e 2f 78 6d 6c 3b 71

01c0 3d 30 2e 35 2c 69 6d 61 67 65 2f 61 76 69 66 2c

01d0 69 6d 61 67 65 2f 77 65 62 70 2c 69 6d 61 67 65

01e0 2f 61 70 6e 67 2c 2a 2f 2a 3b 71 3d 30 2e 38 2c

01f0 61 70 70 6c 69 63 61 74 69 6f 6e 2f 73 69 67 6e

0200 65 64 2d 65 78 63 68 61 6e 67 65 3b 76 3d 62 33

0210 3b 71 3d 30 2e 37 0d 0a 41 63 63 65 78 74 2d 43

0220 6e 63 6f 64 69 6e 67 3a 20 67 7a 69 70 2c 64

0230 65 66 6c 61 74 65 0d 0a 41 63 63 65 70 74 2d 4c

0240 61 6e 67 75 61 67 65 3a 20 7a 68 2d 43 4e 2c 7a

0250 68 3b 71 3d 30 2e 39 2c 65 6e 3b 71 3d 30 2e 38

0260 2c 65 6e 2d 47 42 61 71 3d 30 2e 37 2c 65 6e 2d

0270 55 53 3b 71 3d 30 2e 36 0d 0a 0d 0a

0000 28 a2 4b f6 12 a0 e8 bf b8 9a f1 aa 08 00 45 00

0010 02 6e ac d8 40 00 80 06 00 00 ac 19 8a 48 80 77

0020 f5 0c 27 31 00 50 48 6a 48 30 48 f5 b1 97 50 18

0030 02 01 ae 40 00 00 47 45 54 20 2f 7f 69 72 65 73

0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 50 2d 7f

0050 69 72 65 73 68 61 72 6b 2d 66 69 6c 65 32 2e 68

0060 74 6d 6c 20 48 54 50 2f 31 2e 31 0d 0a 48 6f

0070 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 73

0080 73 2e 65 64 75 0d 0a 43 6f 6e 65 63 74 69 6f

0090 6e 3a 20 6b 65 65 70 2d 61 6c 69 76 65 0d 0a 50

00a0 72 61 67 6d 61 3a 20 6e 6f 2d 63 61 63 68 65 0d

00b0 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f 6c 3a 20

00c0 6e 6f 2d 63 61 63 68 65 0d 0a 55 70 67 72 61 64

00d0 65 2d 49 6e 73 65 63 75 72 65 2d 52 65 71 75 65

00e0 73 74 73 3a 20 31 0d 0a 55 73 65 72 2d 41 67 65

00f0 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20

0100 28 4c 69 6e 75 78 3b 20 41 6e 64 72 6f 69 64 2d

0110 36 2e 30 3b 20 4e 65 78 75 73 20 35 20 42 75 69

0120 6c 64 2f 4d 52 41 35 38 4e 29 20 41 70 70 6c 65

0130 57 65 62 4b 69 74 2f 35 33 37 2e 33 36 28 2b 4b

0140 48 54 4d 4c 2c 20 6c 69 6b 65 20 47 65 63 6b 6f

0150 29 20 43 68 72 6f 6d 65 2f 31 34 30 2e 30 2e 30

0160 2e 30 20 4d 6f 62 69 6c 65 20 53 61 66 61 72 69

0170 2f 35 33 37 2e 33 36 20 45 64 6f 2f 31 34 30 2e

0180 30 2e 30 2e 30 0d 0a 41 63 63 65 70 74 3a 20 7a

0190 65 78 74 2f 68 74 6d 6c 2c 61 70 70 6c 69 63 61

01a0 74 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c 61

01b0 70 70 6c 69 63 61 74 69 6f 6e 2f 78 6d 6c 3b 71

01c0 3d 30 2e 35 2c 69 6d 61 67 65 2f 61 76 69 66 2c

01d0 69 6d 61 67 65 2f 77 65 62 70 2c 69 6d 61 67 65

01e0 2f 61 70 6e 67 2c 2a 2f 2a 3b 71 3d 30 2e 38 2c

01f0 61 70 70 6c 69 63 61 74 69 6f 6e 2f 73 69 67 6e

0200 65 64 2d 65 78 63 68 61 6e 67 65 3b 76 3d 62 33

0210 3b 71 3d 30 2e 37 0d 0a 41 63 63 65 78 74 2d 43

0220 6e 63 6f 64 69 6e 67 3a 20 67 7a 69 70 2c 64

0230 65 66 6c 61 74 65 0d 0a 41 63 63 65 70 74 2d 4c

0240 61 6e 67 75 61 67 65 3a 20 7a 68 2d 43 4e 2c 7a

0250 68 3b 71 3d 30 2e 39 2c 65 6e 3b 71 3d 30 2e 38

0260 2c 65 6e 2d 47 42 61 71 3d 30 2e 37 2c 65 6e 2d

0270 55 53 3b 71 3d 30 2e 36 0d 0a 0d 0a

0000 28 a2 4b f6 12 a0 e8 bf b8 9a f1 aa 08 00 45 00

0010 02 6e ac d8 40 00 80 06 00 00 ac 19 8a 48 80 77

0020 f5 0c 27 31 00 50 48 6a 48 30 48 f5 b1 97 50 18

0030 02 01 ae 40 00 00 47 45 54 20 2f 7f 69 72 65 73

0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 50 2d 7f

0050 69 72 65 73 68 61 72 6b 2d 66 69 6c 65 32 2e 68

0060 74 6d 6c 20 48 54 50 2f 31 2e 31 0d 0a 48 6f

0070 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 73

0080 73 2e 65 64 75 0d 0a 43 6f 6e 65 63 74 69 6f

0090 6e 3a 20 6b 65 65 70 2d 61 6c 69 76 65 0d 0a 50

00a0 72 61 67 6d 61 3a 20 6e 6f 2d 63 61 63 68 65 0d

00b0 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f 6c 3a 20

00c0 6e 6f 2d 63 61 63 68 65 0d 0a 55 70 67 72 61 64

00d0 65 2d 49 6e 73 65 63 75 72 65 2d 52 65 71 75 65

00e0 73 74 73 3a 20 31 0d 0a 55 73 65 72 2d 41 67 65

00f0 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20

0100 28 4c 69 6e 75 78 3b 20 41 6e 64 72 6f 69 64 2d

0110 36 2e 30 3b 20 4e 65 78 75 73 20 35 20 42 75 69

0120 6c 64 2f 4d 52 41 35 38 4e 29 20 41 70 70 6c 65

0130 57 65 62 4b 69 74 2f 35 33 37 2e 33 36 28 2b 4b

0140 48 54 4d 4c 2c 20 6c 69 6b 65 20 47 65 63 6b 6f

0150 29 20 43 68 72 6f 6d 65 2f 31 34 30 2e 30 2e 30

0160 2e 30 20 4d 6f 62 69 6c 65 20 53 61 66 61 72 69

0170 2f 35 33 37 2e 33 36 20 45 64 6f 2f 31 34 30 2e

0180 30 2e 30 2e 30 0d 0a 41 63 63 65 70 74 3a 20 7a

0190 65 78 74 2f 68 74 6d 6c 2c 61 70 70 6c 69 63 61

01a0 74 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c 61

01b0 70 70 6c 69 63 61 74 69 6f 6e 2f 78 6d 6c 3b 71

01c0 3d 30 2e 35 2c 69 6d 61 67 65 2f 61 76 69 66 2c

01d0 69 6d 61 67 65 2f 77 65 62 70 2c 69 6d 61 67 65

01e0 2f 61 70 6e 67 2c 2a 2f 2a 3b 71 3d 30 2e 38 2c

01f0 61 70 70 6c 69 63 61 74 69 6f 6e 2f 73 69 67 6e

0200 65 64 2d 65 78 63 68 61 6e 67 65 3b 76 3d 62 33

0210 3b 71 3d 30 2e 37 0d 0a 41 63 63 65 78 74 2d 43

0220 6e 63 6f 64 69 6e 67 3a 20 67 7a 69 70 2c 64

0230 65 66 6c 61 74 65 0d 0a 41 63 63 65 70 74 2d 4c

0240 61 6e 67 75 61 67 65 3a 20 7a 68 2d 43 4e 2c 7a

0250 68 3b 71 3d 30 2e 39 2c 65 6e 3b 71 3d 30 2e 38

0260 2c 65 6e 2d 47 42 61 71 3d 30 2e 37 2c 65 6e 2d

0270 55 53 3b 71 3d 30 2e 36 0d 0a 0d 0a

0000 28 a2 4b f6 12 a0 e8 bf b8 9a f1 aa 08 00 45 00

0010 02 6e ac d8 40 00 80 06 00 00 ac 19 8a 48 80 77

0020 f5 0c 27 31 00 50 48 6a 48 30 48 f5 b1 97 50 18

0030 02 01 ae 40 00 00 47 45 54 20 2f 7f 69 72 65 73

0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 50 2d 7f

0050 69 72 65 73 68 61 72 6b 2d 66 69 6c 65 32 2e 68

0060 74 6d 6c 20 48 54 50 2f 31 2e 31 0d 0a 48 6f

0070 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 73

0080 73 2e 65 64 75 0d 0a 43 6f 6e 65 63 74 69 6f

0090 6e 3a 20 6b 65 65 70 2d 61 6c 69 76 65 0d 0a 50

00a0 72 61 67 6d 61 3a 20 6e 6f 2d 63 61 63 68 65 0d

00b0 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f 6c 3a 20

00c0 6e 6f 2d 63 61 63 68 65 0d 0a 55 70 67 72 61 64

00d0 65 2d 49 6e 73 65 63 75 72 65 2d 52 65 71 75 65

00e0 73 74 73 3a 20 31 0d 0a 55 73 65 72 2d 41 67 65

00f0 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20

0100 28 4c 69 6e 75 78 3b 20 41 6e 64 72 6f 69 64 2d

0110 36 2e 30 3b 20 4e 65 78 75 73 20 35 20 42 75 69

0120 6c 64 2f 4d 52 41 35 38 4e 29 20 41 70 70 6c 65

0130 57 65 62 4b 69 74 2f 35 33 37 2e 33 36 28 2b 4b

0140 48 54 4d 4c 2c 20 6c 69 6b 65 20 47 65 63 6b 6f

0150 29 20 43 68 72 6f 6d 65 2f 31 34 30 2e 30 2e 30

0160 2e 30 20 4d 6f 62 69 6c 65 20 53 61 66 61 72 69

0170 2f 35 33 37 2e 33 36 20 45 64 6f 2f 31 34 30 2e

0180 30 2e 30 2e 30 0d 0a 41 63 63 65 70 74 3a 20 7a

0190 65 78 74 2f 68 74 6d 6c 2c 61 70 70 6c 69 63 61

01a0 74 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c 61

01b0 70 70 6c 69 63 61 74 69 6f 6e 2f 78 6d 6c 3b 71

01c0 3d 30 2e 35 2c 69 6d 61 67 65 2f 61 76 69 66 2c

01d0 69 6d 61 67 65 2f 77 65 62 70 2c 69 6d 61 67 65

01e0 2f 61 70 6e 67 2c 2a 2f 2a 3b 71 3d 30 2e 38 2c

01f0 61 70 70 6c 69 63 61 74 69 6f 6e 2f 73 69 67 6e

0200 65 64 2d 65 78 63 68 61 6e 67 65 3b 76 3d 62 33

0210 3b 71 3d 30 2e 37 0d 0a 41 63 63 65 78 74 2d 43

0220 6e 63 6f 64 69 6e 67 3a 20 67 7a 69 70 2c 64

0230 65 66 6c 61 74 65 0d 0a 41 63 63 65 70 74 2d 4c

0240 61 6e 67 75 61 67 65 3a 20 7a 68 2d 43 4e 2c 7a

0250 68 3b 71 3d 30 2e 39 2c 65 6e 3b 71 3d 30 2e 38

0260 2c 65 6e 2d 47 42 61 71 3d 30 2e 37 2c 65 6e 2d

0270 55 53 3b 71 3d 30 2e 36 0d 0a 0d 0a

0000 28 a2 4b f6 12 a0 e8 bf b8 9a f1 aa 08 00 45 00

0010 02 6e ac d8 40 00 80 06 00 00 ac 19 8a 48 80 77

0020 f5 0c 27 31 00 50 48 6a 48 30 48 f5 b1 97 50 18

0030 02 01 ae 40 00 00 47 45 54 20 2f 7f 69 72 65 73

0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 50 2d 7f

0050 69 72 65 73 68 61 72 6b 2d 66 69 6c 65 32 2e 68

0060 74 6d 6c 20 48 54 50 2f 31 2e 31 0d 0a 48 6f

0070 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 73

0080 73 2e 65 64 75 0d 0a 43 6f 6e 65 63 74 69 6f

0090 6e 3a 20 6b 65 65 70 2d 61 6c 69 76 65 0d 0a 50

00a0 72 61 67 6d 61 3a 20 6e 6f 2d 63 61 63 68 65 0d

00b0 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f 6c 3a 20

00c0 6e 6f 2d 63 61 63 68 65 0d 0a 55 70 67 72 61 64

00d0 65 2d 49 6e 73 65 63 75 72 65 2d 52 65 71 75 65

00e0 73 74 73 3a 20 31 0d 0a 55 73 65 72 2d 41 67 65

00f0 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20

0100 28 4c 69 6e 75 78 3b 20 41 6e 64 72 6f 69 64 2d

0110 36 2e 30 3b 20 4e 65 78 75 73 20 35 20 42 75 69

0120 6c 64 2f 4d 52 41 35 38 4e 29 20 41 70 70 6c 65

0130 57 65 62 4b 69 74 2f 35 33 37 2e 33 36 28 2b 4b

0140 48 54 4d 4c 2c 20 6c 69 6b 65 20 47 65 63 6b 6f

0150 29 20 43 68 72 6f 6d 65 2f 31 34 30 2e 30 2e 30

0160 2e 30 20 4d 6f 62 69 6c 65 20 53 61 66 61 72 69

0170 2f 35 33 37 2e 33 36 20 45 64 6f 2f 31 34 30 2e

0180 30 2e 30 2e 30 0d 0a 41 63 63 65 70 74 3a 20 7a

0190 65 78 74 2f 68 74 6d 6c 2c 61 70 70 6c 69 63 61

01a0 74 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c 61

01b0 70 70 6c 69 63 61 74 69 6f 6e 2f 78 6d 6c 3b 71

01c0 3d 30 2e 35 2c 69 6d 61 67 65 2f 61 76 69 66 2c

01d0 69 6d 61 67 65 2f 77 65 62 70 2c 69 6d 61 67 65

01e0 2f 61 70 6e 67 2c 2a 2f 2a 3b 71 3d 30 2e 38 2c

01f0 61 70 70 6c 69 63 61 74 69 6f 6e 2f 73 69 67 6e

0200 65 64 2d 65 78 63 68 61 6e 67 65 3b 76 3d 62 33

0210 3b 71 3d 30 2e 37 0d 0a 41 63 63 65 78 74 2d 43

0220 6e 63 6f 64 69 6e 67 3a 20 67 7a 69 70 2c 64

0230 65 66 6c 61 74 65 0d 0a 41 63 63 65 70 74 2d 4

No.	Time	Source	Destination	Protocol	Length	Info
28453	524.849762	172.25.138.72	128.119.245.12	HTTP	705	GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1
28459	525.141818	128.119.245.12	172.25.138.72	HTTP	294	HTTP/1.1 304 Not Modified
28553	533.373772	172.25.138.72	120.222.223.244	HTTP	287	GET /NFwTzBMNEw5TA3BgUgDgCgUAABRRc9o5yRBuBybH1ZFwU293oO51mluQUBr2mm285UDGx281akCSqQdVOLLzCqEAY7cYb8XPcF3wUpEUCGyX3D HTTP/1.1
28555	533.385668	120.222.223.244	172.25.138.72	OCSP	1008	Response
28581	537.308703	2001:250:5800:1002::	2600:140b:a00:8::b8	HTTP	186	GET /connecttest.txt HTTP/1.1
28585	537.616969	2600:140b:a00:8::b8	2001:250:5800:1002::	HTTP	261	HTTP/1.1 200 OK (text/plain)
28600	538.390492	172.25.138.72	2.17.107.89	HTTP	165	GET /connecttest.txt HTTP/1.1
23115	570.610548	2001:250:5800:1002::	2402:4e00:1620:1611::	HTTP	1237	POST /mmtls/00000f6f HTTP/1.1
23189	570.778943	2402:4e00:1620:1611::	2001:250:5800:1002::	HTTP	485	HTTP/1.1 200 OK
23223	572.203985	2001:250:5800:1002::	2402:4e00:1620:1611::	HTTP	833	POST /mmtls/00000f73 HTTP/1.1
23228	572.280267	2402:4e00:1620:1611::	2001:250:5800:1002::	HTTP	433	HTTP/1.1 200 OK
23244	572.629988	172.25.138.72	23.200.230.80	HTTP	165	GET /connecttest.txt HTTP/1.1
23246	572.686542	23.200.230.80	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
23253	572.779306	2001:250:5800:1002::	2600:140b:a00:8::b8	HTTP	186	GET /connecttest.txt HTTP/1.1
23258	572.987408	2600:140b:a00:8::b8	2001:250:5800:1002::	HTTP	261	HTTP/1.1 200 OK (text/plain)
23447	595.327215	2001:250:5800:1002::	2402:4e00:1620:1611::	HTTP	869	POST /mmtls/00000f6e HTTP/1.1
23449	595.400873	2402:4e00:1620:1611::	2001:250:5800:1002::	HTTP	421	HTTP/1.1 200 OK
23567	608.217429	172.25.138.72	23.200.230.70	HTTP	165	GET /connecttest.txt HTTP/1.1
23569	608.287554	23.200.230.70	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
23575	608.339402	2001:250:5800:1002::	2600:140b:a00:8::b8	HTTP	186	GET /connecttest.txt HTTP/1.1
23582	608.548544	2600:140b:a00:8::b8	2001:250:5800:1002::	HTTP	261	HTTP/1.1 200 OK (text/plain)

```
[Time since first frame in this TCP stream: 8.126258000 seconds]
[Time since previous frame in this TCP stream: 7.831765000 seconds]
[SEQ/ACK analysis]
[RTT: 0.294493000 seconds]
[Bytes in flight: 651]
[Bytes sent since last PSH flag: 651]
TCP payload (651 bytes)
Hypertext Transfer Protocol
GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n
Request Method: GET
Request URI: /wireshark-labs/HTTP-wireshark-file2.html
Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
Cache-Control: max-age=0\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Linux; Android 6.0; Nexus 5 Build/WRASBN) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/78.0.3922.161 Mobile Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
Accept-Encoding: gzip, deflate\r\n
Accept-Language: zh-CN,zh;q=0.9,en;q=0.8,en-GB;q=0.7,en-US;q=0.6\r\n
If-None-Match: "173-63ee4d11ce190"\r\n
If-Modified-Since: Tue, 16 Sep 2025 05:59:02 GMT\r\n
\r\n
[Response in frame: 20459]
[Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file2.html]
```

```
0000 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20 28 t: Mozilla/5.0 (
0001 4c 69 6e 75 78 30 20 41 6e 64 72 6f 69 64 20 36 Linux; Android
0002 2e 30 3b 20 4e 65 78 75 73 20 35 20 42 75 69 6c .0; Nexus 5 Buil
0003 64 2f 4d 52 41 35 38 4e 29 20 41 70 70 6c 65 57 d/MRASBN ) Appli
0004 65 62 40 69 74 2f 35 37 2e 33 36 20 28 4b 48 eKit/53.7.36 (M
0005 54 4d 4c 2c 20 6c 69 6b 65 20 47 65 63 6b 6f 29 TML, lik e Gecko
0006 20 43 68 72 6f 6d 65 2f 31 34 30 2e 30 2e 30 2e Chrome/ 140.0.0.
0007 30 20 4d 6f 62 69 6c 65 20 53 61 66 61 72 69 2f 0 Mobile Safari/
0008 35 33 37 2e 33 36 20 45 64 6f 2f 31 34 30 2e 30 537.36 E dg/140.0.
0009 2e 30 2e 30 0d 0a 41 63 63 65 70 74 3a 20 74 65 .0.0; Accpt: te
0010 78 74 2f 68 74 6d 6c 2c 61 70 78 6c 69 63 61 74 xt/html, applicat
0011 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c 61 70 ion/xhtml+xml, ap
0012 70 6c 69 63 61 74 69 6f 6e 2f 78 6d 6c 3b 71 3d plication/xml;q=
0013 30 2e 39 2c 69 6d 61 67 65 2f 61 76 69 66 2c 69 0.9,image/avif,i
0014 61 67 65 2f 77 65 62 70 2c 69 6d 61 67 65 2f mage/webp,i, image/
0015 61 70 6e 67 2c 2a 2f 2a 3b 71 3d 30 2e 38 2c 61 apng,*/*;q=0.8,a
0016 70 70 6c 69 63 61 74 69 6f 6e 2f 73 69 67 6e 65 pplicati on/signe
0017 64 2d 65 78 65 68 61 6e 67 65 30 76 3d 62 33 30 d-exchange;v=b3;
0018 71 3d 30 2a 37 6d 0a 41 63 63 65 70 74 2d 45 6e q=0.7; A ccept-En
0019 63 6f 64 69 6e 67 3a 20 67 7a 69 70 2c 20 64 65 coding: gzip, de
0020 66 6c 61 74 65 0d 0a 41 63 63 65 70 74 2d 4c 61 flate; A cceptLa
0021 6a 67 75 61 67 65 3a 20 7a 68 2d 43 4e 2c 7a 68 nguage: zh-CN,zh
0022 3b 71 3d 30 2e 39 2c 65 6e 3b 71 3d 30 2e 38 2c 0;q=0.9, en;q=0.8,
0023 65 6e 2d 47 42 3b 71 3d 30 2e 37 2c 65 6e 2d 55 en-GB;q= 0.7,en-U
0024 53 3b 71 3d 30 2e 36 0d 0a 49 66 2d 4e 6f 6e 65 S;q=0.6- if-None
0025 2d 4d 61 74 63 68 3a 20 22 31 37 33 2d 36 33 65 -Match: "173-63e
0026 65 34 64 31 31 63 65 31 39 62 22 0d 0a 49 66 2e e4d11ce1 9b"
0027 4d 6f 64 69 66 69 65 64 20 53 69 6e 63 65 3a 20 Modified-Since:
0028 54 75 65 2c 20 31 36 20 53 65 70 20 32 39 32 35 Tue, 16 Sep 2025
0029 20 30 35 3a 35 39 3a 30 32 20 47 4d 54 0d 0a 0d 05:59:02 GMT.
0030 0a
```

取消禁用缓存，刷新，有IF MODIFIED SINCE 字段，value Tue, 16 Sep 2025 05:59:02 GMT

No.	Time	Source	Destination	Protocol	Length	Info
18743	411.739908	142.250.199.227	172.25.138.72	PKIX-C..	1296	Certificate Revocation List
18744	411.749831	172.25.138.72	142.250.199.227	HTTP	254	GET /r/r1.cr1 HTTP/1.1
18749	411.833160	142.250.199.227	172.25.138.72	PKIX-C..	415	Certificate Revocation List
18759	411.982924	172.25.138.72	23.200.236.42	HTTP	338	GET /DgICertTrustedG4CodeSigningRSA4096SHA3842021CA1.cr1 HTTP/1.1
18765	412.100835	23.200.236.42	172.25.138.72	HTTP	371	HTTP/1.1 304 Not Modified
20172	514.145030	172.25.138.72	23.200.230.70	HTTP	165	GET /connecttest.txt HTTP/1.1
20175	514.165456	2001:250:5800:1002::	2600:1417:4400:3::1	HTTP	186	GET /connecttest.txt HTTP/1.1
20178	514.237408	2600:1417:4400:3::1	2001:250:5800:1002::	HTTP	261	HTTP/1.1 200 OK (text/plain)
20180	514.237408	23.200.230.70	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
20348	517.016412	172.25.138.72	128.119.245.12	HTTP	636	GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1
20355	517.339255	128.119.245.12	172.25.138.72	HTTP	784	HTTP/1.1 200 OK (text/html)
20453	524.849762	172.25.138.72	128.119.245.12	HTTP	705	GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1
20459	525.141818	128.119.245.12	172.25.138.72	HTTP	294	HTTP/1.1 304 Not Modified
20553	533.373772	172.25.138.72	120.222.223.244	HTTP	287	GET /NFwTzBMNEw5TA3BgUgDgCgUAABRRc9o5yRBuBybH1ZFwU293oO51mluQUBr2mm285UDGx281akCSqQdVOLLzCqEAY7cYb8XPcF3wUpEUCGyX3D HTTP/1.1
20555	533.385668	120.222.223.244	172.25.138.72	OCSP	1008	Response
20581	537.308703	2001:250:5800:1002::	2600:140b:a00:8::b8	HTTP	186	GET /connecttest.txt HTTP/1.1
20585	537.616969	2600:140b:a00:8::b8	2001:250:5800:1002::	HTTP	261	HTTP/1.1 200 OK (text/plain)
20600	538.390492	172.25.138.72	2.17.107.89	HTTP	165	GET /connecttest.txt HTTP/1.1
23115	570.610548	2001:250:5800:1002::	2402:4e00:1620:1611::	HTTP	1237	POST /mmtls/00000f6f HTTP/1.1
23189	570.778943	2402:4e00:1620:1611::	2001:250:5800:1002::	HTTP	485	HTTP/1.1 200 OK
23223	572.203985	2001:250:5800:1002::	2402:4e00:1620:1611::	HTTP	833	POST /mmtls/00000f73 HTTP/1.1
23228	572.280267	2402:4e00:1620:1611::	2001:250:5800:1002::	HTTP	433	HTTP/1.1 200 OK
Frame 20459: 294 bytes on wire (2352 bits), 294 bytes captured (2352 bits) on interface 'Device\NPF_{32641896-CA77-4472-87E1-853C5851338E}'						
Section number: 1						
Interface id: 0 (Device\NPF_{32641896-CA77-4472-87E1-853C5851338E})						
Interface name: Device\NPF_{32641896-CA77-4472-87E1-853C5851338E}						
Interface description: WLAN 2						
Encapsulation type: Ethernet (1)						
Arrival Time: Sep 16, 2025 16:25:22.581678000 中国标准时间						
UTC Arrival Time: Sep 16, 2025 08:25:22.581678000 UTC						
Epoch Arrival Time: 175801122.581678000						
[Time shift for this packet: 0.000000000 seconds]						
[Time delta from previous captured frame: 0.000000000 seconds]						
[Time delta from previous displayed frame: 0.291256000 seconds]						
[Time since reference or first frame: 525.141818000 seconds]						
Frame Number: 20459						
Frame Length: 294 bytes (2352 bits)						
Capture Length: 294 bytes (2352 bits)						
[Frame is marked: False]						
[Frame is ignored: False]						
[Protocols in frame: eth:ethertype:ip:tcp:http]						
[Coloring Rule Name: HTTP]						
[Coloring Rule String: http tcp.port == 80 http2]						
Ethernet II, Src: JuniperNetwo_f6:12:a0 (28:a2:4b:f6:12:a0), Dst: Intel_9a:f1:aa (e8:bf:b8:9a:f1:aa)						
Destination: Intel_9a:f1:aa (e8:bf:b8:9a:f1:aa)						
.....0..... = LG bit: Globally unique address (factory default)						
.....0..... = IG bit: Individual address (unicast)						
Source: JuniperNetwo_f6:12:a0 (28:a2:4b:f6:12:a0)						

304 not modified

没有文本信息

很明显，GET请求有一个若改动则的字段请求，server发现无改动（modified）就不给新文本了。😓

3. Retrieving Long Documents

正在捕获 Wireshark 2

文件(F) 编辑(E) 视图(V) 捕获(C) 分析(A) 统计(S) 电话(T) 无线(W) 工具(I) 帮助(H)

http

GET GET

No.	Time	Source	Destination	Protocol	Length	Info
23246	572.686542	23.200.230.80	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
23251	572.779306	2001:250:5800:1002::...	2000:140b:a00:8::b8...	HTTP	186	GET /connecttest.txt HTTP/1.1
23258	572.987408	2600:140b:a00:8::b8...	2001:250:5800:1002::...	HTTP	261	HTTP/1.1 200 OK (text/plain)
23447	595.327215	2001:250:5800:1002::...	2402:4e00:1620:1611...	HTTP	869	POST /mntls/0000fba HTTP/1.1
23449	595.400873	2402:4e00:1620:1611...	2001:250:5800:1002::...	HTTP	421	HTTP/1.1 200 OK
23567	608.212429	172.25.138.72	23.200.230.70	HTTP	165	GET /connecttest.txt HTTP/1.1
23569	608.287554	23.200.230.70	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
23579	608.399402	2001:250:5800:1002::...	2600:140b:a00:8::b8...	HTTP	186	GET /connecttest.txt HTTP/1.1
23582	608.548544	2600:140b:a00:8::b8...	2001:250:5800:1002::...	HTTP	261	HTTP/1.1 200 OK (text/plain)
24080	643.694997	2001:250:5800:1002::...	2001:cb0:1205::2a63...	HTTP	209	GET /connecttest.txt HTTP/1.1
24094	643.697290	172.25.138.72	42.99.128.161	HTTP	188	GET /connecttest.txt HTTP/1.1
24197	643.763973	2001:cb0:1205::2a63...	2001:250:5800:1002::...	HTTP	261	HTTP/1.1 200 OK (text/plain)
24200	643.765393	42.99.128.161	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
32381	895.511205	2001:250:5800:1002::...	2402:4e00:1620:1611...	HTTP	845	POST /mntls/00001391 HTTP/1.1
32383	895.589119	2402:4e00:1620:1611...	2001:250:5800:1002::...	HTTP	421	HTTP/1.1 200 OK
32401	896.130428	2001:250:5800:1002::...	2600:1417:4400:3::1...	HTTP	186	GET /connecttest.txt HTTP/1.1
32404	896.130855	172.25.138.72	23.200.230.80	HTTP	165	GET /connecttest.txt HTTP/1.1
32406	896.182565	2600:1417:4400:3::1...	2001:250:5800:1002::...	HTTP	261	HTTP/1.1 200 OK (text/plain)
32411	896.185264	23.200.230.80	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
32580	901.076392	172.25.138.72	128.119.245.12	HTTP	636	GET /wireshark-labs/HTTP-wireshark-file3.html HTTP/1.1
32605	901.355293	128.119.245.12	172.25.138.72	HTTP	535	HTTP/1.1 200 OK (text/html)

1... = Data: Present
... 1.. = ACK: Present
... 1.. = SYN-ACK: Present
... 1.. = SYN: Present
[Completeness Flags: -FDASS]
[TCP Segment Len: 582]
Sequence Number: 1 (relative sequence number)
Sequence Number (raw): 2145694841
[Next Sequence Number: 583 (relative sequence number)]
Acknowledgment Number: 1 (relative ack number)
Acknowledgment number (raw): 2102398685
0101 ... = Header Length: 20 bytes (5)
Flags: 0x018 (PSH, ACK)
000 ... = Reserved: Not set
... 0 ... = Accurate ECN: Not set
... 0 ... = Congestion Window Reduced: Not set
... 0 ... = ECN-Echo: Not set
... 0 ... = Urgent: Not set
... 1 ... = Acknowledgment: Set
... 1 ... = Push: Set
... 0 ... = Reset: Not set
... 0 ... = SYN: Not set
... 0 ... = FIN: Not set
[TCP Flags:AP...]
Window: 513
[Estimated window size: 429500]

0030 02 01 ae 46 00 00 47 45 54 20 2f 77 69 72 65 73
0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 50 2d 77
0050 69 72 65 73 68 61 72 6b 2d 66 69 6c 65 33 2e 68
0060 74 6d 6c 20 48 54 54 50 2f 31 2e 31 8d 0a 48 6f
0070 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 73
0080 73 2e 65 64 75 0d 0a 43 6f 6e 65 63 74 69 6f
0090 6a 3a 20 6b 65 65 70 2d 61 6c 69 76 65 0d 0a 50
00a0 72 61 67 6d 61 3a 20 6e 6f 2d 63 61 63 68 65 8d
00b0 0a 43 61 63 68 65 2d 43 6f 6e 74 72 6f 6c 3a 20
00c0 6e 6f 2d 63 61 63 68 65 0d 0a 55 70 67 72 61 64
00d0 65 2d 49 6e 73 65 63 75 72 65 2d 52 65 71 75 65
00e0 73 74 73 3a 20 31 0d 0a 55 73 65 72 2d 41 67 65
00f0 6e 74 3a 20 4d 6f 74 69 6c 6c 61 2f 35 2e 30 20
0100 28 4c 69 6e 75 70 3b 20 41 6e 64 72 6f 69 64 20
0110 36 2a 38 3b 20 4e 65 78 75 73 0b 35 0b 42 75 69
0120 6c 64 2f 4d 52 41 35 38 4e 29 20 41 70 70 6c 65
0130 57 65 62 4b 69 74 2f 35 33 7e 33 36 20 28 4b
0140 48 54 4d 4c 2c 20 6c 69 60 65 20 47 65 63 6f 6f
0150 29 20 43 68 72 6f 6d 65 2f 31 34 30 2e 30 2e 30
0160 2e 30 20 4d 6f 62 69 6c 65 20 53 61 66 61 72 69
0170 2f 35 33 37 2e 33 36 20 45 64 67 2f 31 34 30 2e
0180 36 2a 38 2e 38 0d 0a 41 63 65 70 74 3a 0b 74
0190 65 78 74 2f 68 74 6d 6c 2c 61 70 70 6c 69 63 61
01a0 74 69 6f 6e 2f 78 68 74 6d 6c 2b 78 6d 6c 2c 61
01b0 70 70 6c 69 63 61 74 69 6f 6e 2f 78 6d 6c 30 71
01c0 3d 30 2e 39 2c 69 6d 61 67 65 2f 61 76 69 66 2c
01d0 69 6d 61 67 65 2f 77 65 62 70 2c 69 6d 61 67 65
01e0 2f 61 70 6e 67 2c 2a 2f 2a 3b 71 3d 30 2e 30 2c
01f0 61 70 70 6c 69 63 61 74 69 6f 6e 2f 73 69 67 6e
0200 65 64 2d 65 78 63 68 61 6e 67 65 3b 76 3d 62 33
0210 3b 71 3d 30 2e 37 0d 0a 41 63 65 70 74 2d 45

The window size value from the TCP header (tcp.window.size.value), 2 byte(s)

分組: 32772 - Displayed: 108 (0.3%)

配置: Def

1个。在frame32580中。

Frame 32605中响应了200 OK

[Time since first frame in this TCP stream: 0.58922600...]
[Time since previous frame in this TCP stream: 0.002...]
[SEQ/ACK analysis]
[RTT: 0.309967000 seconds]
[Bytes in flight: 481]
[Bytes sent since last PSH flag: 4861]
TCP payload (481 bytes)
TCP segment data (481 bytes)
[4 Reassembled TCP Segments (4861 bytes): #32601(1460), #32602(1460), #32603(1460), #32605(481)]
[Frame: 32601, payload: 0-1459 (1460 bytes)]
[Frame: 32602, payload: 1460-2919 (1460 bytes)]
[Frame: 32603, payload: 2920-4379 (1460 bytes)]
[Frame: 32605, payload: 4380-4860 (481 bytes)]
[Segment count: 4]
[Reassembled TCP length: 4861]
[Reassembled TCP Data [...]]
485454502f312e3120323030204f0d0a446174653a205475652c203136205365702032303230383a33313a343220474d540d0a53657272665723a204170616368652f322e342e36202843656744f5:2d6669707320504]
Hypertext Transfer Protocol
HTTP/1.1 200 OK\r\n
Response Version: HTTP/1.1
Status Code: 200
[Status Code Description: OK]
Response Phrase: OK
Date: Tue, 16 Sep 2025 08:31:42 GMT\r\n
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/7.4.33 mod_perl/2.0.11 Perl/v5.16.3\r\n

4个segment TCP。

4. HTML Documents with Embedded Objects

No.	Time	Source	Destination	Protocol	Length	Info
50	1.306551	2600:140b:a00:8::b8...	2001:250:5800:1002::...	HTTP	261	HTTP/1.1 200 OK (text/plain)
97	5.271260	172.25.138.72	128.119.245.12	HTTP	636	GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1
142	5.545309	128.119.245.12	172.25.138.72	HTTP	1355	HTTP/1.1 200 OK (text/html)
148	5.693635	172.25.138.72	128.119.245.12	HTTP	582	GET /pearson.png HTTP/1.1
170	5.967421	128.119.245.12	172.25.138.72	HTTP	745	HTTP/1.1 200 OK (PNG)
364	8.335043	172.25.138.72	178.79.137.164	HTTP	549	GET /8E_cover_small.jpg HTTP/1.1
394	8.806692	178.79.137.164	172.25.138.72	HTTP	225	HTTP/1.1 301 Moved Permanently
1218	35.287203	2001:250:5800:1002::...	2402:4e00:1620:1611...	HTTP	129	POST /mntls/00001ba4 HTTP/1.1
1220	35.775600	2402:4e00:1620:1611...	2001:250:5800:1002::...	HTTP	670	HTTP/1.1 200 OK

Q16: 可以看到发了3GET请求。通往128.119.245.12; 128.119.245.12; 178.79.137.164。

1355 bytes on wire (10840 bits), 1355 bytes captured (10840 bits) on interface \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E}					
Section number: 1					
Interface id: 0 (\Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E})					
Interface name: \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E}					
Interface description: WLAN 2					
Encapsulation type: Ethernet (1)					
Arrival Time: Sep 16, 2025 16:41:36.021970000 中国标准时间					
UTC Arrival Time: Sep 16, 2025 08:41:36.021970000 UTC					
Epoch Arrival Time: 1758012096.021970000					
[Time shift for this packet: 0.000000000 seconds]					
[Time delta from previous captured frame: 0.000532000 seconds]					
[Time delta from previous displayed frame: 0.274049000 seconds]					
[Time since reference or first frame: 5.545309000 seconds]					
Frame Number: 142					
Frame Length: 1355 bytes (10840 bits)					
97	5.271260	172.25.138.72	128.119.245.12	HTTP	636 GET /wireshark-labs/HTTP-wireshark
142	5.545309	128.119.245.12	172.25.138.72	HTTP	1355 HTTP/1.1 200 OK (text/html)
148	5.693635	172.25.138.72	128.119.245.12	HTTP	582 GET /pearson.png HTTP/1.1
170	5.967421	128.119.245.12	172.25.138.72	HTTP	745 HTTP/1.1 200 OK (PNG)
364	8.335043	172.25.138.72	178.79.137.164	HTTP	549 GET /8E_cover_small.jpg HTTP/1.1
394	8.806692	178.79.137.164	172.25.138.72	HTTP	225 HTTP/1.1 301 Moved Permanently
1218	35.287203	2001:250:5800:1002::...	2402:4e00:1620:1611::...	HTTP	129 POST /mmtls/00001ba4 HTTP/1.1
1229	35.775609	2402:4e00:1620:1611::...	2001:250:5800:1002::...	HTTP	679 HTTP/1.1 200 OK
1300	36.659511	2001:250:5800:1002::...	2600:140b:a00:8::b8::...	HTTP	186 GET /connecttest.txt HTTP/1.1
1305	36.683196	172.25.138.72	2.17.107.74	HTTP	165 GET /connecttest.txt HTTP/1.1
1309	36.885904	2600:140b:a00:8::b8::...	2001:250:5800:1002::...	HTTP	261 HTTP/1.1 200 OK (text/plain)
1316	36.964735	2.17.107.74	172.25.138.72	HTTP	241 HTTP/1.1 200 OK (text/plain)

549 bytes on wire (4392 bits), 549 bytes captured (4392 bits) on interface \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E}					
Section number: 1					
Interface id: 0 (\Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E})					
Interface name: \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E}					
Interface description: WLAN 2					
Encapsulation type: Ethernet (1)					
Arrival Time: Sep 16, 2025 16:41:38.811704000 中国标准时间					
UTC Arrival Time: Sep 16, 2025 08:41:38.811704000 UTC					
Epoch Arrival Time: 1758012098.811704000					
[Time shift for this packet: 0.000000000 seconds]					
[Time delta from previous captured frame: 0.000399000 seconds]					
[Time delta from previous displayed frame: 2.367622000 seconds]					
[Time since reference or first frame: 8.335043000 seconds]					
Frame Number: 364					

Q17:时间差2.36s，串行下载的特征，怀疑网络问题，重新抓一下

180	8.771008	172.25.138.72	2.17.107.89	HTTP	165 GET /connecttest.txt HTTP/1.1
279	11.108140	172.25.138.72	128.119.245.12	HTTP	685 GET /wireshark-labs/HTTP-wireshark-f
288	11.387306	128.119.245.12	172.25.138.72	HTTP	294 HTTP/1.1 304 Not Modified
433	26.362759	172.25.138.72	128.119.245.12	HTTP	636 GET /wireshark-labs/HTTP-wireshark-f
436	26.714293	128.119.245.12	172.25.138.72	HTTP	1355 HTTP/1.1 200 OK (text/html)
438	26.806958	172.25.138.72	128.119.245.12	HTTP	582 GET /pearson.png HTTP/1.1
454	27.082213	128.119.245.12	172.25.138.72	HTTP	745 HTTP/1.1 200 OK (PNG)
465	27.382065	172.25.138.72	178.79.137.164	HTTP	549 GET /8E_cover_small.jpg HTTP/1.1
472	27.637639	178.79.137.164	172.25.138.72	HTTP	225 HTTP/1.1 301 Moved Permanently
1051	44.056205	172.25.138.72	23.33.126.195	HTTP	165 GET /connecttest.txt HTTP/1.1
1053	44.109756	23.33.126.195	172.25.138.72	HTTP	241 HTTP/1.1 200 OK (text/plain)
1060	44.206126	2001:250:5800:1002::...	2600:140b:a00:8::b8...	HTTP	186 GET /connecttest.txt HTTP/1.1
1062	44.429477	2600:140b:a00:8::b8...	2001:250:5800:1002::...	HTTP	261 HTTP/1.1 200 OK (text/plain)
1127	50.066765	2001:250:5800:1002::...	2402:4e00:1620:1611::...	HTTP	217 POST /mmtls/000025a8 HTTP/1.1
1135	50.471509	2402:4e00:1620:1611::...	2001:250:5800:1002::...	HTTP	679 HTTP/1.1 200 OK

✓ Frame 465: 549 bytes on wire (4392 bits), 549 bytes captured (4392 bits) on interface \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E}

Section number: 1

 ✓ Interface id: 0 (\Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E})

Interface name: \Device\NPF_{32641B96-CA77-4472-87E1-853C5B51338E}

Interface description: WLAN 2

Encapsulation type: Ethernet (1)

Arrival Time: Sep 16, 2025 16:54:48.145350000 中国标准时间

UTC Arrival Time: Sep 16, 2025 08:54:48.145350000 UTC

Epoch Arrival Time: 1758012888.145350000

[Time shift for this packet: 0.000000000 seconds]

[Time delta from previous captured frame: 0.000410000 seconds]

[Time delta from previous displayed frame: 0.299852000 seconds]

[Time since reference or first frame: 27.382065000 seconds]

Frame Number: 465

Frame Length: 549 bytes (4392 bits)

Capture Length: 549 bytes (4392 bits)

[Frame is marked: False]

[Frame is ignored: False]

[Protocols in frame: eth:ethertype:ip:tcp:http]

[Coloring Rule Name: HTTP]

[Coloring Rule String: http || tcp.port == 80 || http2]

 ✓ Ethernet II, Src: Intel Qa-f1:aa (a8:bfb8:9a:f1:aa), Dest: JuniperNetwo f6:12:a0 (28:a2:4b:f6:12:a0)

0. 29s认为是并行下载。

5 HTTP Authentication

http						
No.	Time	Source	Destination	Protocol	Length	Info
69	3.972517	172.25.138.72	128.119.245.12	HTTP	652	GET /wireshark-labs/protected_pages/HTTP-wireshark-file5.html HTTP/1.1
74	4.251718	128.119.245.12	172.25.138.72	HTTP	771	HTTP/1.1 401 Unauthorized (text/html)
382	23.965369	172.25.138.72	23.33.126.195	HTTP	165	GET /connecttest.txt HTTP/1.1
383	23.965525	2001:250:5800:1002::...	2600:140b:a00:8::b8...	HTTP	186	GET /connecttest.txt HTTP/1.1
389	24.281015	23.33.126.195	172.25.138.72	HTTP	241	HTTP/1.1 200 OK (text/plain)
385	24.145520	2600:140b:a00:8::b8...	2001:250:5800:1002::...	HTTP	261	HTTP/1.1 200 OK (text/plain)
801	40.369970	172.25.138.72	128.119.245.12	HTTP	711	GET /wireshark-labs/protected_pages/HTTP-wireshark-file5.html HTTP/1.1
806	40.963960	128.119.245.12	172.25.138.72	HTTP	544	HTTP/1.1 200 OK (text/html)
1085	59.294089	172.25.138.72	23.200.230.80	HTTP	165	GET /connecttest.txt HTTP/1.1
1089	59.370800	2001:250:5800:1002::...	2600:140b:a00:8::b8...	HTTP	186	GET /connecttest.txt HTTP/1.1
1095	59.776621	2600:140b:a00:8::b8...	2001:250:5800:1002::...	HTTP	261	HTTP/1.1 200 OK (text/plain)
2056	67.291735	172.25.138.72	23.33.126.195	HTTP	165	GET /connecttest.txt HTTP/1.1
2058	67.292053	2001:250:5800:1002::...	2600:140b:a00:8::b8...	HTTP	186	GET /connecttest.txt HTTP/1.1

输入账密

Q18: 401 UNAUTHORIZED

Q19: Authorization: Basic d2lyZXNoYXJrLXN0dWRlbmRzOm5ldHdvcm0=\r\n

结论分析与体会：

实验总结与分析

基础请求与响应机制 通过分析简单 HTML 文件的请求与响应，我掌握了 HTTP 报文的结构，包括请求行、请求头、响应状态码、响应头和实体内容。浏览器与服务器之间的通信是建立在 TCP 连接之上的，Wireshark 清晰地展示了这一层层封装。

条件 GET 与缓存机制 实验中观察到浏览器在第二次请求时会自动添加 If-Modified-Since 和 If-None-Match 字段，用于判断资源是否更新。这种机制显著提升了网页加载效率，也体现了 HTTP 的轻量级优化能力。

长文档的分段传输 当请求较大的 HTML 文件时，服务器会将响应内容分成多个 TCP 段进行传输。Wireshark 的“TCP segment of a reassembled PDU”提示让我理解了 TCP 的重组机制，以及 HTTP 本身并不具备分段能力。

嵌入对象的并行加载 浏览器在加载包含图片的 HTML 文件时，会并行发起多个 GET 请求，分别向不同服务器请求嵌入资源。这种并行处理方式体现了现代浏览器的高效资源调度能力。

HTTP 认证机制的安全隐患 在访问受密码保护的页面时，浏览器通过 Base64 编码将用户名和密码附加在 Authorization 字段中。虽然看似“加密”，但其实只是编码，任何人都可以轻易解码，这让我深刻认识到：HTTP 基本认证并不安全，必须依赖 HTTPS 或更高级的认证机制来保护用户隐私。

个人体会

通过本次实验，我不仅掌握了 HTTP 协议的核心机制，还提升了使用 Wireshark 进行网络抓包与分析的能力。每一个数据包背后都隐藏着协议的设计哲学与工程智慧。尤其是在认证部分，我意识到网络安全不仅仅是技术问题，更是用户隐私与信任的基础。

这次实验让我真正做到了“看得见、摸得着”的网络协议学习，也让我对 Web 通信的底层逻辑有了更清晰的认知。