

Project#1 Introduction to Computer Networks

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分工

- Part A: 李浩东
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1. 60% for answering each question, and 40% for pointing out the correct part of the supporting material
 2. the original questions and your answers right under the questions
 3. include supporting material for your answers
 4. explain how you get each answer by showing diagrams/screenshots when appropriate and highlighting the related fields
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Part A

声明：由于访问<http://gaia.cs.umass.edu/wireshark-labs/INTRO-wireshark-file1.html>得到的 http 报文传输为 GET 与 Not Modified，而不是 GET 与 OK，并且为了更好的体验 http 使用 TCP 的持续性串行连接，笔者将使用<http://httpbin.org/>替代原网站访问。

List up to 10 different protocols that appear in the protocol column in the unfiltered packet-listing window in step 7 above.

1. QUIC
2. TLSv1.3
3. TCP
4. NBNS
5. UDP
6. DTLS
7. BROWSER
8. DB-LSP-DISC/JSON
9. RARP
10. IPv4
11. DNS
12. ARP
13. HTTP

*Microsoft: WLAN

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/>

No.	Time	Source	Destination	Protocol	Length
635	2021-03-26 10:32:45.787112	10.185.90.199	120.253.253.98	TCP	
636	2021-03-26 10:32:45.788588	10.185.90.199	120.253.253.98	QUIC	
637	2021-03-26 10:32:45.789105	10.185.90.199	120.253.253.98	TLSv1.3	
638	2021-03-26 10:32:45.789196	10.185.90.199	120.253.253.98	TLSv1.3	
639	2021-03-26 10:32:45.790729	10.185.90.199	120.253.253.98	QUIC	
640	2021-03-26 10:32:45.800212	120.253.253.98	10.185.90.199	TCP	
641	2021-03-26 10:32:45.800212	120.253.253.98	10.185.90.199	TCP	
642	2021-03-26 10:32:45.815630	10.185.90.199	120.253.253.98	QUIC	
643	2021-03-26 10:32:45.887859	10.185.76.166	255.255.255.255	UDP	
644	2021-03-26 10:32:45.887859	10.185.92.83	10.185.127.255	NBNS	
645	2021-03-26 10:32:45.889537	34.199.75.4	10.185.90.199	TCP	
646	2021-03-26 10:32:45.889537	34.199.75.4	10.185.90.199	TCP	
647	2021-03-26 10:32:45.898751	10.185.84.80	10.185.127.255	NBNS	
648	2021-03-26 10:32:45.898751	10.185.84.80	10.185.127.255	NBNS	
649	2021-03-26 10:32:45.914477	10.185.84.80	10.185.127.255	NBNS	
650	2021-03-26 10:32:46.091732	10.185.126.249	255.255.255.255	UDP	
651	2021-03-26 10:32:46.092183	10.185.75.108	10.185.127.255	NBNS	
652	2021-03-26 10:32:46.092183	34.199.75.4	10.185.90.199	TCP	
653	2021-03-26 10:32:46.094329	10.185.118.253	255.255.255.255	UDP	
654	2021-03-26 10:32:46.297402	10.185.14.46	10.185.127.255	DTLS	
655	2021-03-26 10:32:46.297402	10.185.80.200	10.185.127.255	NBNS	
656	2021-03-26 10:32:46.399402	10.185.84.80	10.185.127.255	NBNS	
657	2021-03-26 10:32:46.399402	10.185.84.80	10.185.127.255	NBNS	
658	2021-03-26 10:32:46.706478	10.185.92.83	10.185.127.255	NBNS	
659	2021-03-26 10:32:46.706478	10.185.95.64	10.185.127.255	BROWSER	
660	2021-03-26 10:32:46.707410	10.185.84.80	10.185.127.255	NBNS	
661	2021-03-26 10:32:46.707410	10.185.84.80	10.185.127.255	NBNS	
662	2021-03-26 10:32:46.707410	10.185.95.64	10.185.127.255	NBNS	
663	2021-03-26 10:32:46.708378	10.185.95.64	10.185.127.255	NBNS	
664	2021-03-26 10:32:46.708378	10.185.95.64	10.185.127.255	NRNC	
Frame 1: 110 bytes on wire (880 bits), 110 bytes captured (880 bits) on interface \Device\NPF_{...}					
> Ethernet II, Src: Apple_59:79:e2 (3c:22:fb:59:79:e2), Dst: Broadcast (ff:ff:ff:ff:ff:ff)					
> Internet Protocol Version 4, Src: 10.185.48.152, Dst: 10.185.127.255					
> User Datagram Protocol, Src Port: 137, Dst Port: 137					
> NetBIOS Name Service					
< >					
NetBIOS Name Service (nbns), 68 bytes					
Packets: 1265 · Displayed: 1265 (100.0%) · Profile: Default					
668	2021-03-26 10:32:47.116840	10.185.118.253	255.255.255.255	UDP	
669	2021-03-26 10:32:47.320818	10.185.54.115	10.185.127.255	NBNS	
670	2021-03-26 10:32:47.321323	10.185.14.46	10.185.127.255	DTLS	
671	2021-03-26 10:32:47.422894	10.185.92.83	10.185.127.255	NBNS	
672	2021-03-26 10:32:47.628311	10.185.75.108	10.185.127.255	NBNS	
673	2021-03-26 10:32:47.730496	10.185.33.11	255.255.255.255	DB-LSP-DISC/JSON	
674	2021-03-26 10:32:47.731139	10.185.33.11	10.185.127.255	DB-LSP-DISC/JSON	
675	2021-03-26 10:32:47.833037	10.185.14.46	10.185.127.255	DTLS	
676	2021-03-26 10:32:48.037666	10.185.28.76	10.185.127.255	NBNS	
677	2021-03-26 10:32:48.037666	10.185.54.115	10.185.127.255	NBNS	
678	2021-03-26 10:32:48.140164	10.185.92.83	10.185.127.255	NBNS	
679	2021-03-26 10:32:48.448074	10.185.121.139	255.255.255.255	UDP	
/15	2021-03-26 10:32:53.669923	10.185.19.96	10.185.127.255	NBNS	
716	2021-03-26 10:32:54.181732	10.185.92.83	10.185.127.255	NBNS	
717	2021-03-26 10:32:54.283942	10.185.10.128	10.185.127.255	BROWSER	
718	2021-03-26 10:32:54.898214	de:71:25:ec:3d:d4	Broadcast	RARP	
719	2021-03-26 10:32:54.899442	10.185.76.166	255.255.255.255	UDP	
720	2021-03-26 10:32:55.001117	10.185.92.83	10.185.127.255	NBNS	
721	2021-03-26 10:32:55.308014	de:71:25:ec:3d:d4	Broadcast	RARP	
722	2021-03-26 10:32:55.308435	10.185.125.113	10.185.127.255	BROWSER	
723	2021-03-26 10:32:55.717822	10.185.92.83	10.185.127.255	NBNS	
724	2021-03-26 10:32:55.717822	10.185.28.195	10.185.127.255	NBNS	

164	2021-03-26	10:43:55.494647	10.185.93.148	255.255.255.255	UDP
165	2021-03-26	10:43:55.596970	10.185.92.83	10.185.127.255	NBNS
166	2021-03-26	10:43:55.802313	10.185.118.253	255.255.255.255	UDP
167	2021-03-26	10:43:56.007270	10.185.22.54	10.185.127.255	DTLS
168	2021-03-26	10:43:56.009417	10.185.76.209	255.255.255.255	IPv4
169	2021-03-26	10:43:56.010580	10.185.76.209	255.255.255.255	UDP
170	2021-03-26	10:43:56.211663	10.185.22.54	10.185.127.255	DTLS
209	2021-03-26	10:43:58.788014	10.185.90.199	34.199.75.4	TCP
210	2021-03-26	10:43:58.788392	10.185.90.199	34.199.75.4	TCP
211	2021-03-26	10:43:58.877050	10.10.0.21	10.185.90.199	DNS
212	2021-03-26	10:43:58.877792	203.208.41.34	10.185.90.199	QUIC
213	2021-03-26	10:43:58.877792	203.208.41.34	10.185.90.199	QUIC
214	2021-03-26	10:43:58.877792	203.208.41.34	10.185.90.199	QUIC
215	2021-03-26	10:43:58.878898	10.185.90.199	203.208.41.34	QUIC
216	2021-03-26	10:43:58.905057	10.185.90.199	203.208.41.34	QUIC
217	2021-03-26	10:43:58.981239	203.208.41.34	10.185.90.199	QUIC
218	2021-03-26	10:43:58.981239	203.208.41.34	10.185.90.199	QUIC
219	2021-03-26	10:43:58.981239	203.208.41.34	10.185.90.199	QUIC
220	2021-03-26	10:43:58.982031	10.185.90.199	34.199.75.4	TCP
221	2021-03-26	10:43:58.982426	10.185.90.199	203.208.41.34	QUIC
222	2021-03-26	10:43:59.080231	HuaweiTe_26:2f:2e	LiteonTe_4d:3b:81	ARP
223	2021-03-26	10:43:59.080255	LiteonTe_4d:3b:81	HuaweiTe_26:2f:2e	ARP
224	2021-03-26	10:43:59.098993	34.199.75.4	10.185.90.199	TCP
225	2021-03-26	10:43:59.099161	10.185.90.199	34.199.75.4	TCP
226	2021-03-26	10:43:59.099823	10.185.90.199	34.199.75.4	HTTP
227	2021-03-26	10:43:59.183181	34.199.75.4	10.185.90.199	TCP
228	2021-03-26	10:44:02.495773	10.185.90.199	34.199.75.4	TCP

How long did it take from when the HTTP GET message was sent until the HTTP OK reply was received?

- when getting the TEXT/HTML
 - $Time = 59.099823 - 59.495773 = 0.395950 \text{ (s)}$
- when getting JavaScript Object Notation
 - $Time = 03.998318 - 02.854319 = 1.143999 \text{ (s)}$
- when getting img/vnd.microsoft.icon
 - $Time = 03.610635 - 02.858129 = 0.752506 \text{ (s)}$

Microsoft: WLAN						
No.	Date	Source	Destination	Protocol	Length	Info
226	2021-03-26 10:43:59.099823	10.185.90.199	34.199.75.4	HTTP	554	GET / HTTP/1.1
244	2021-03-26 10:43:59.495773	34.199.75.4	10.185.90.199	HTTP	887	HTTP/1.1 200 OK (text/html)
312	2021-03-26 10:44:02.854319	10.185.90.199	34.199.75.4	HTTP	405	GET /spec.json HTTP/1.1
313	2021-03-26 10:44:02.858129	10.185.90.199	34.199.75.4	HTTP	518	GET /static/favicon.ico HTTP/1.1
391	2021-03-26 10:44:03.610635	34.199.75.4	10.185.90.199	HTTP	536	HTTP/1.1 200 OK (image/vnd.microsoft.icon)
422	2021-03-26 10:44:03.998318	34.199.75.4	10.185.90.199	HTTP/JSON	193	HTTP/1.1 200 OK , JavaScript Object Notation (application/json)

Print the two HTTP messages displayed above.

We choose these two messages to display(the figure below).

Protocol	Length	Info
HTTP	554	GET / HTTP/1.1
HTTP	887	HTTP/1.1 200 OK (text/html)

- GET / HTTP/1.1

No.	Time	Source	Destination	Protocol	Length	Info
226	2021-03-26 10:43:59.099823	10.185.90.199	34.199.75.4	HTTP	554	GET / HTTP/1.1
Frame 226: 554 bytes on wire (4432 bits), 554 bytes captured (4432 bits) on interface \Device\NPF_{2185D483-DFDA-4A15-9370-A13B7B9E1AA7}, id 0						
Ethernet II, Src: LiteonTe_4d:3b:81 (3c:91:80:4d:3b:81), Dst: HuaweiTe_26:2f:2e (84:46:fe:26:2f:2e)						
Internet Protocol Version 4, Src: 10.185.90.199, Dst: 34.199.75.4						
Transmission Control Protocol, Src Port: 49808, Dst Port: 80, Seq: 1, Ack: 1, Len: 500						
Hypertext Transfer Protocol						
GET / HTTP/1.1\r\n						
Host: httpbin.org\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 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/89.0.4389.90 Safari/537.36\r\n						
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=0.9\r\n						
Accept-Encoding: gzip, deflate\r\n						
Accept-Language: en-CN,en;q=0.9,zh-CN;q=0.8,zh;q=0.7,en-GB;q=0.6,en-US;q=0.5\r\n						
\r\n						
[Full request URI: http://httpbin.org/]						
[HTTP request 1/2]						
[Response in frame: 244]						
[Next request in frame: 312]						

- HTTP/1.1 200 OK (text/html)

No.	Time	Source	Destination	Protocol	Length	Info
244	2021-03-26 10:43:59.495773	34.199.75.4	10.185.90.199	HTTP	887	HTTP/1.1 200 OK (text/html)
Frame 244: 887 bytes on wire (7096 bits), 887 bytes captured (7096 bits) on interface \Device\NPF_{2185D483-DFDA-4A15-9370-A13B7B9E1AA7}, id 0						
Ethernet II, Src: HuaweiTe_26:2f:2e (84:46:fe:26:2f:2e), Dst: LiteonTe_4d:3b:81 (3c:91:80:4d:3b:81)						
Internet Protocol Version 4, Src: 34.199.75.4, Dst: 10.185.90.199						
Transmission Control Protocol, Src Port: 80, Dst Port: 49808, Seq: 9000, Ack: 501, Len: 833						
[8 Reassembled TCP Segments (9832 bytes): #236(239), #237(1460), #238(1460), #239(1460), #241(1460), #243(1460), #242(1460), #244(833)]						
Hypertext Transfer Protocol						
HTTP/1.1 200 OK\r\n						
Date: Fri, 26 Mar 2021 02:43:59 GMT\r\n						
Content-Type: text/html; charset=utf-8\r\n						
Content-Length: 9593\r\n						
Connection: keep-alive\r\n						
Server: gunicorn/19.9.0\r\n						
Access-Control-Allow-Origin: *\r\n						
Access-Control-Allow-Credentials: true\r\n						
\r\n						
[HTTP response 1/2]						
[Time since request: 0.395950000 seconds]						
[Request in frame: 226]						
[Next request in frame: 312]						
[Next response in frame: 422]						
[Request URI: http://httpbin.org/spec.json]						
File Data: 9593 bytes						
Line-based text data: text/html (208 lines)						

Part B
