1. **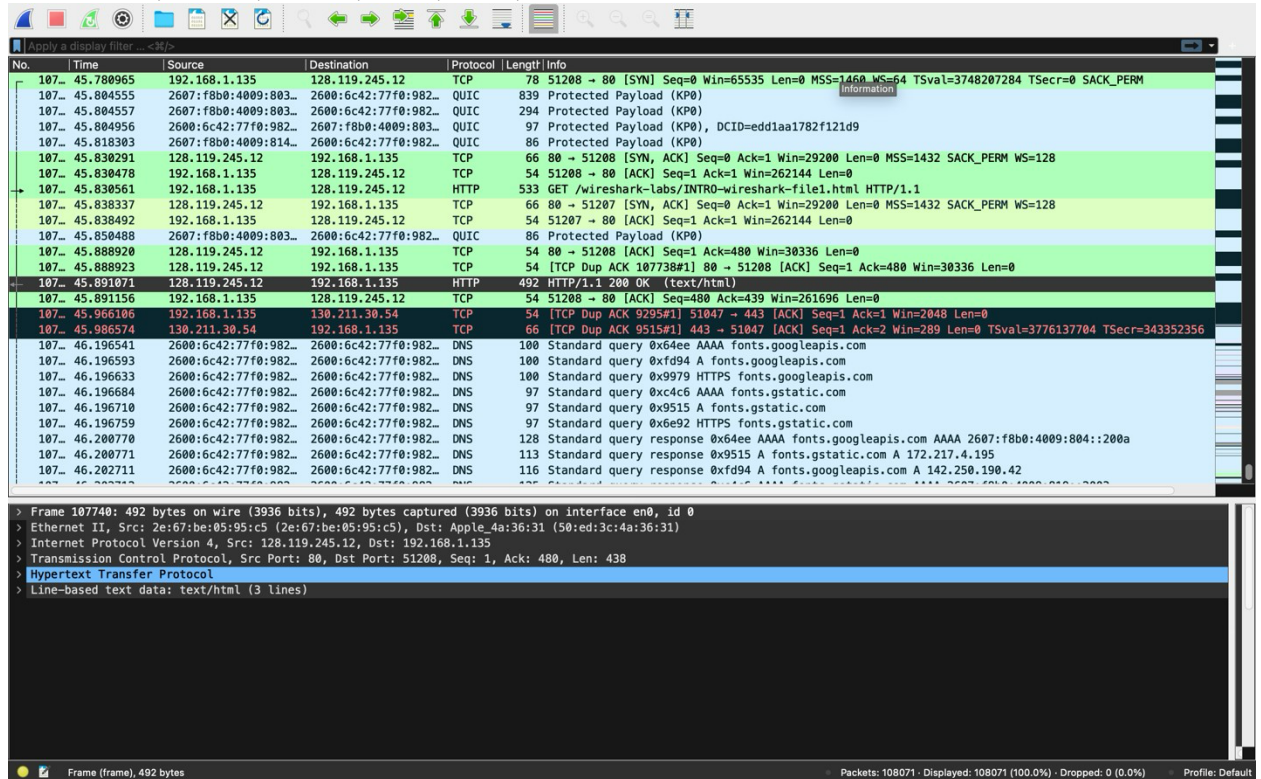Which of the following protocols are shown as appearing (i.e., are listed in the Wireshark "protocol" column) in the unfiltered packet-listing window in step 7 above: TCP, QUIC, HTTP, DNS, UDP, TLSv1.2?**

In the provided image many of the protocols are shown. Upon the ending of wireshark session TCP, QUIC, HTTP, DNS, UDP, TLSv1.2 protocols appeared at some point in the session.

2. **How long did it take from when the HTTP GET message was sent until the HTTP OK reply was received? (By default, the value of the Time column in the packetlisting window is the amount of time, in seconds, since Wireshark tracing began. To display the Time field in time-of-day format, select the Wireshark View pull down**

   menu, then select Time Display Format, then select Time-of-day.)
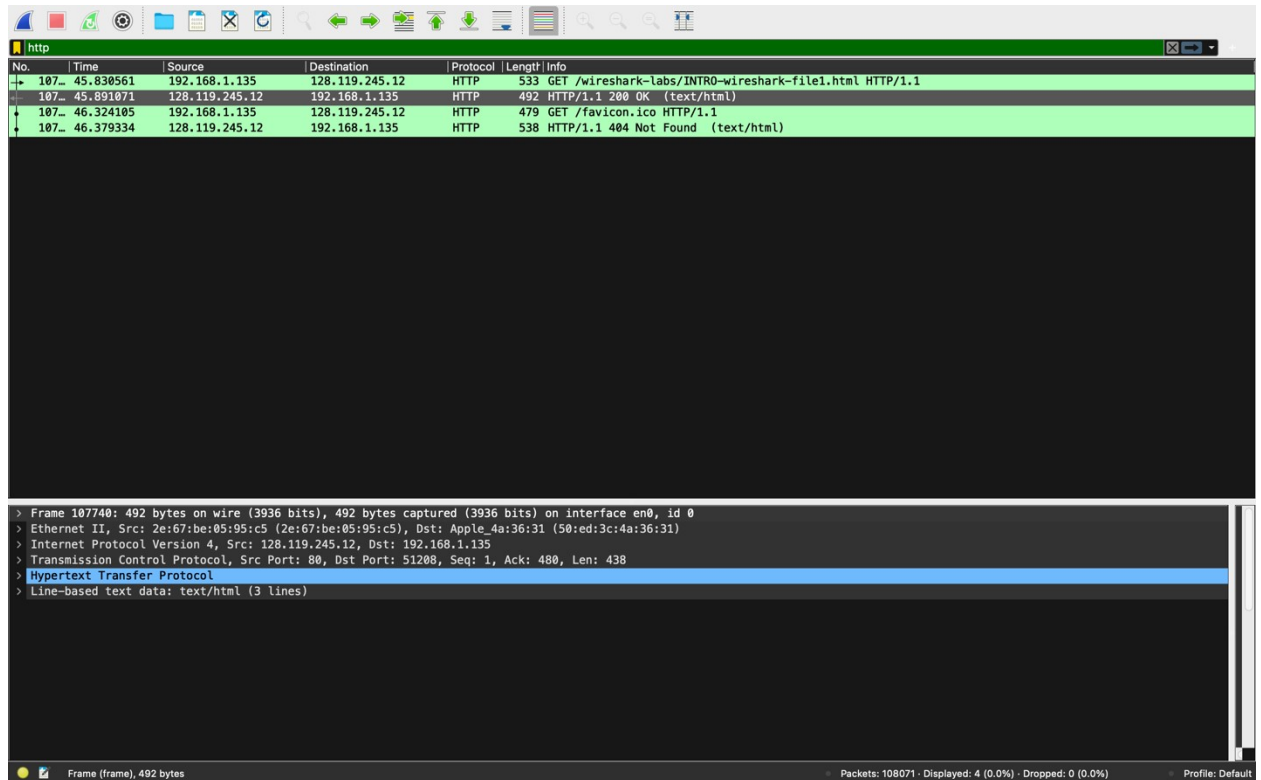
From the image, the HTTP GET request was sent at 45.830561 seconds, and the HTTP OK response was received at 45.891071 seconds. The difference is 0.06051 seconds, meaning it took approximately **0.06051 seconds** for the server to respond with the HTTP OK after the GET request was sent.

3. **What is the Internet address of the gaia.cs.umass.edu (also known as wwwnet.cs.umass.edu)? What is the Internet address of your computer?**
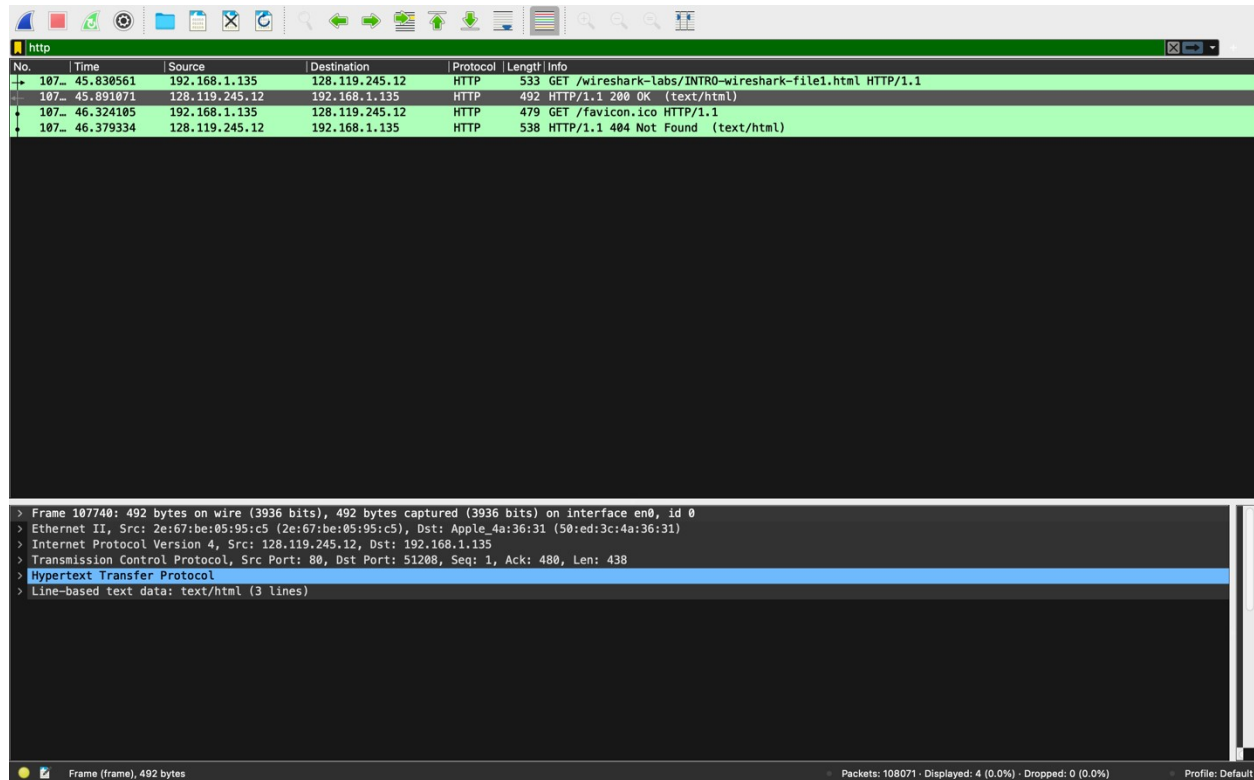
Based on the provided image, the Internet address of gaia.cs.umass.edu) is **128.119.245.12**. The Internet address of my computer, listed in the Source column for the HTTP GET request, is **192.168.1.135**.

4. **Print the two HTTP messages (GET and OK) referred to in question 2 above. To do so, select Print from the Wireshark File command menu, and select the "Selected Packet Only" and "Print as displayed" radial buttons, and then click OK.**

```
GET /wireshark-labs/INTRO-wireshark-file1.html HTTP/1.1
Host: gaia.cs.umass.edu
Connection: keep-alive
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) A
ppleWebKit/537.36 (KHTML, like Gecko) Chrome/127.0.0.0 Safari
/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9
,image/avif,image/webp,image/apng,*/*;q=0.8,application/signe
d-exchange;v=b3;q=0.7
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9

HTTP/1.1 200 OK
Date: Sat, 24 Aug 2024 18:45:26 GMT
Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/7.4.33
mod_perl/2.0.11 Perl/v5.16.3
Last-Modified: Sat, 24 Aug 2024 05:59:01 GMT
ETag: "51-6206796a587fc"
Accept-Ranges: bytes
Content-Length: 81
Keep-Alive: timeout=5, max=100
Connection: Keep-Alive
Content-Type: text/html; charset=UTF-8

<html>
Congratulations!  You've downloaded the first Wireshark lab f
ile!
</html>
```

5. Programming with the Zone Server

i.   Spawned mul.ple independent Linux containers. YES
ii.   Uploaded a source code/file to the shared file space and accessed it from one or
        more containers. YES
iii.   Edited the source code/file within a container using vim, emacs, or nano. YES iv.
        Compiled and ran a C/C++ code within the containers. YES

v.   Established communica.on between a client code on one container and a server code
        on another. vi. Downloaded a modified source code/file from a container to your local
        machine. YES

stuartlech — root@slech-0:~ — ssh -o SetEnv INSTANCE=0 slech@zone.cs...

```
[root@slech-0 ~]# ./a.out
Hello World
[root@slech-0 ~]# ls
a.out   hello.cpp   hello.cpp~
[root@slech-0 ~]# rm hello.cpp~
[root@slech-0 ~]#
[root@slech-0 ~]# gcc server.c -o server
[root@slech-0 ~]# ls
a.out   client   client.c   hello.cpp   hellomod.cpp   hellomod.cpp~   server   server.
c
[root@slech-0 ~]# emacs server.c

[2]+  Stopped                 emacs server.c
[root@slech-0 ~]# emacs server.c

[3]+  Stopped                 emacs server.c
[root@slech-0 ~]# ./server
Server: waiting for connections...
Server: got connection
[root@slech-0 ~]# ./server
Server: waiting for connections...
Server: got connection
[root@slech-0 ~]# []
```

stuartlech — root@slech-1:~ — ssh -o SetEnv INSTANCE=1 slech@zone.cs.s...

```
./client: line 102: typedef: command not found
./client: line 110: typedef: command not found
./client: line 111: typedef: command not found
./client: line 119: typedef: command not found
./client: line 120: typedef: command not found
./client: line 121: typedef: command not found
./client: line 122: typedef: command not found
./client: line 123: typedef: command not found
./client: line 124: typedef: command not found
./client: line 125: typedef: command not found
./client: line 126: typedef: command not found
./client: line 127: typedef: command not found
./client: line 128: typedef: command not found
./client: line 129: syntax error near unexpected token `}'
./client: line 129: `typedef struct { int __val[2]; } __fsid_t;'
[root@slech-1 ~]# gcc client.c -o client
[root@slech-1 ~]# ls
'#client.c#'   a.out   client   client.c   client.c~   hello.cpp   hellomod.cpp
    hellomod.cpp~   server   server.c
[root@slech-1 ~]# ./client
Client: connected to server
[root@slech-1 ~]# ./client
Client: connected to server
[root@slech-1 ~]# []
```

Documents — ssh • sftp slech@zone.cs.siue.edu:/root — 80×24

```
sftp> ls
a.out            hello.cpp      hellomod.cpp   hellomod.cpp~
sftp> exit
stuartlech@Stuarts-Air Documents % ls
Terminal Saved Output.txt       client.c                hellomod.cpp
                server.c
stuartlech@Stuarts-Air Documents % sftp slech@zone.cs.siue.edu:/root
slech@zone.cs.siue.edu's password:
Connected to zone.cs.siue.edu.
Changing to: /root
sftp> lls
Terminal Saved Output.txt       client.c                hellomod.cpp
                server.c
sftp> put client.c
Uploading client.c to /root/client.c
client.c

        100%  785      21.6KB/s   00:00
sftp> put server.c
Uploading server.c to /root/server.c
server.c

        100% 1124      25.2KB/s   00:00
sftp> []
```