

```
9 7.437136803    10.11.157.115    128.119.245.12    HTTP    522    GET /wireshark-labs/HTTP-wireshark-
file4.html HTTP/1.1
Frame 9: 522 bytes on wire (4176 bits), 522 bytes captured (4176 bits) on interface 0
Ethernet II, Src: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0), Dst: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81)
Internet Protocol Version 4, Src: 10.11.157.115, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 47866, Dst Port: 80, Seq: 1, Ack: 1, Len: 456
  Source Port: 47866
  Destination Port: 80
  [Stream index: 1]
  [TCP Segment Len: 456]
  Sequence number: 1    (relative sequence number)
  [Next sequence number: 457    (relative sequence number)]
  Acknowledgment number: 1    (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 229
  [Calculated window size: 29312]
  [Window size scaling factor: 128]
  Checksum: 0x8df6 [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (456 bytes)
Hypertext Transfer Protocol
  GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1\r\n
    [Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1\r\n]
    Request Method: GET
    Request URI: /wireshark-labs/HTTP-wireshark-file4.html
    Request Version: HTTP/1.1
  Host: gaia.cs.umass.edu\r\n
  Connection: keep-alive\r\n
  Upgrade-Insecure-Requests: 1\r\n
  User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) QtWebEngine/5.10.0 Chrome/61.0.3163.140
Safari/537.36\r\n
  Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8\r\n
  Accept-Language: en-US,en\r\n
  X-Do-Not-Track: 1\r\n
  DNT: 1\r\n
  Accept-Encoding: gzip, deflate\r\n
\r\n
  [Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file4.html]
  [HTTP request 1/3]
  [Response in frame: 12]
  [Next request in frame: 14]
12 7.523845256    128.119.245.12    10.11.157.115    HTTP    1139    HTTP/1.1 200 OK (text/html)
Frame 12: 1139 bytes on wire (9112 bits), 1139 bytes captured (9112 bits) on interface 0
Ethernet II, Src: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81), Dst: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 10.11.157.115
Transmission Control Protocol, Src Port: 80, Dst Port: 47866, Seq: 1, Ack: 457, Len: 1073
  Source Port: 80
  Destination Port: 47866
  [Stream index: 1]
  [TCP Segment Len: 1073]
  Sequence number: 1    (relative sequence number)
  [Next sequence number: 1074    (relative sequence number)]
  Acknowledgment number: 457    (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 235
  [Calculated window size: 30080]
  [Window size scaling factor: 128]
  Checksum: 0x1e9f [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (1073 bytes)
Hypertext Transfer Protocol
  HTTP/1.1 200 OK\r\n
    [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
    Request Version: HTTP/1.1
    Status Code: 200
    [Status Code Description: OK]
    Response Phrase: OK
  Date: Thu, 25 Jan 2018 06:35:05 GMT\r\n
  Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/5.4.16 mod_perl/2.0.10 Perl/v5.16.3\r\n
  Last-Modified: Thu, 25 Jan 2018 06:35:01 GMT\r\n
  ETag: "2ca-56393fabd34e7"\r\n
  Accept-Ranges: bytes\r\n
  Content-Length: 714\r\n
  Keep-Alive: timeout=5, max=100\r\n
  Connection: Keep-Alive\r\n
  Content-Type: text/html; charset=UTF-8\r\n
\r\n
  [HTTP response 1/3]
  [Time since request: 0.086708453 seconds]
  [Request in frame: 9]
  [Next request in frame: 14]
```

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[Next response in frame: 21]
File Data: 714 bytes
Line-based text data: text/html
  14 7.532868202    10.11.157.115    128.119.245.12    HTTP    493    GET /pearson.png HTTP/1.1
Frame 14: 493 bytes on wire (3944 bits), 493 bytes captured (3944 bits) on interface 0
Ethernet II, Src: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0), Dst: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81)
Internet Protocol Version 4, Src: 10.11.157.115, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 47866, Dst Port: 80, Seq: 457, Ack: 1074, Len: 427
  Source Port: 47866
  Destination Port: 80
  [Stream index: 1]
  [TCP Segment Len: 427]
  Sequence number: 457    (relative sequence number)
  [Next sequence number: 884    (relative sequence number)]
  Acknowledgment number: 1074    (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 245
  [Calculated window size: 31360]
  [Window size scaling factor: 128]
  Checksum: 0x1010 [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (427 bytes)
Hypertext Transfer Protocol
  GET /pearson.png HTTP/1.1\r\n
  [Expert Info (Chat/Sequence): GET /pearson.png HTTP/1.1\r\n]
  Request Method: GET
  Request URI: /pearson.png
  Request Version: HTTP/1.1
  Host: gaia.cs.umass.edu\r\n
  Connection: keep-alive\r\n
  User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) QtWebEngine/5.10.0 Chrome/61.0.3163.140
  Safari/537.36\r\n
  Accept: image/webp,image/apng,image/*,*/*;q=0.8\r\n
  Accept-Language: en-US,en\r\n
  X-Do-Not-Track: 1\r\n
  DNT: 1\r\n
  Referer: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file4.html\r\n
  Accept-Encoding: gzip, deflate\r\n
  \r\n
  [Full request URI: http://gaia.cs.umass.edu/pearson.png]
  [HTTP request 2/3]
  [Prev request in frame: 9]
  [Response in frame: 21]
  [Next request in frame: 218]
  21 7.620141140    128.119.245.12    10.11.157.115    HTTP    155    HTTP/1.1 200 OK (PNG)
Frame 21: 155 bytes on wire (1240 bits), 155 bytes captured (1240 bits) on interface 0
Ethernet II, Src: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81), Dst: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 10.11.157.115
Transmission Control Protocol, Src Port: 80, Dst Port: 47866, Seq: 4596, Ack: 884, Len: 89
  Source Port: 80
  Destination Port: 47866
  [Stream index: 1]
  [TCP Segment Len: 89]
  Sequence number: 4596    (relative sequence number)
  [Next sequence number: 4685    (relative sequence number)]
  Acknowledgment number: 884    (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 243
  [Calculated window size: 31104]
  [Window size scaling factor: 128]
  Checksum: 0xb7ab [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (89 bytes)
  TCP segment data (89 bytes)
[4 Reassembled TCP Segments (3611 bytes): #17(1174), #18(1174), #20(1174), #21(89)]
Hypertext Transfer Protocol
  HTTP/1.1 200 OK\r\n
  [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
  Request Version: HTTP/1.1
  Status Code: 200
  [Status Code Description: OK]
  Response Phrase: OK
  Date: Thu, 25 Jan 2018 06:35:05 GMT\r\n
  Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/5.4.16 mod_perl/2.0.10 Perl/v5.16.3\r\n
  Last-Modified: Sat, 06 Aug 2016 10:08:14 GMT\r\n
  ETag: "cc3-539645c7f1ee7"\r\n
  Accept-Ranges: bytes\r\n
  Content-Length: 3267\r\n
  Keep-Alive: timeout=5, max=99\r\n
  Connection: Keep-Alive\r\n
  Content-Type: image/png\r\n
```

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\r\n
[HTTP response 2/3]
[Time since request: 0.087272938 seconds]
[Prev request in frame: 9]
[Prev response in frame: 12]
[Request in frame: 14]
[Next request in frame: 218]
[Next response in frame: 220]
File Data: 3267 bytes
Portable Network Graphics
 28 7.931916663 10.11.157.115 128.119.240.90 HTTP 507 GET /~kurose/cover_5th_ed.jpg HTTP/1.1
Frame 28: 507 bytes on wire (4056 bits), 507 bytes captured (4056 bits) on interface 0
Ethernet II, Src: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0), Dst: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81)
Internet Protocol Version 4, Src: 10.11.157.115, Dst: 128.119.240.90
Transmission Control Protocol, Src Port: 59048, Dst Port: 80, Seq: 1, Ack: 1, Len: 441
  Source Port: 59048
  Destination Port: 80
  [Stream index: 2]
  [TCP Segment Len: 441]
  Sequence number: 1 (relative sequence number)
  [Next sequence number: 442 (relative sequence number)]
  Acknowledgment number: 1 (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 229
  [Calculated window size: 29312]
  [Window size scaling factor: 128]
  Checksum: 0x13d7 [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (441 bytes)
Hypertext Transfer Protocol
  GET /~kurose/cover_5th_ed.jpg HTTP/1.1\r\n
    [Expert Info (Chat/Sequence): GET /~kurose/cover_5th_ed.jpg HTTP/1.1\r\n]
    Request Method: GET
    Request URI: /~kurose/cover_5th_ed.jpg
    Request Version: HTTP/1.1
  Host: manic.cs.umass.edu\r\n
  Connection: keep-alive\r\n
  User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) QtWebEngine/5.10.0 Chrome/61.0.3163.140
Safari/537.36\r\n
  Accept: image/webp,image/apng,image/*,*/*;q=0.8\r\n
  Accept-Language: en-US,en\r\n
  X-Do-Not-Track: 1\r\n
  DNT: 1\r\n
  Referer: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file4.html\r\n
  Accept-Encoding: gzip, deflate\r\n
\r\n
  [Full request URI: http://manic.cs.umass.edu/~kurose/cover_5th_ed.jpg]
  [HTTP request 1/1]
  [Response in frame: 30]
  30 8.051733934 128.119.240.90 10.11.157.115 HTTP 522 HTTP/1.1 302 Found (text/html)
Frame 30: 522 bytes on wire (4176 bits), 522 bytes captured (4176 bits) on interface 0
Ethernet II, Src: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81), Dst: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0)
Internet Protocol Version 4, Src: 128.119.240.90, Dst: 10.11.157.115
Transmission Control Protocol, Src Port: 80, Dst Port: 59048, Seq: 1, Ack: 442, Len: 456
  Source Port: 80
  Destination Port: 59048
  [Stream index: 2]
  [TCP Segment Len: 456]
  Sequence number: 1 (relative sequence number)
  [Next sequence number: 457 (relative sequence number)]
  Acknowledgment number: 442 (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 243
  [Calculated window size: 15552]
  [Window size scaling factor: 64]
  Checksum: 0x5265 [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (456 bytes)
Hypertext Transfer Protocol
  HTTP/1.1 302 Found\r\n
    [Expert Info (Chat/Sequence): HTTP/1.1 302 Found\r\n]
    Request Version: HTTP/1.1
    Status Code: 302
    [Status Code Description: Found]
    Response Phrase: Found
  Date: Thu, 25 Jan 2018 06:35:05 GMT\r\n
  Server: Apache\r\n
  Location: http://caite.cs.umass.edu/~kurose/cover_5th_ed.jpg\r\n
  Content-Length: 234\r\n
  Connection: close\r\n
  Content-Type: text/html; charset=iso-8859-1\r\n
```

```
\r\n
[HTTP response 1/1]
[Time since request: 0.119817271 seconds]
[Request in frame: 28]
File Data: 234 bytes
Line-based text data: text/html
  42 8.206099291    10.11.157.115          128.119.240.90      HTTP      507    GET /~kurose/cover_5th_ed.jpg HTTP/1.1
Frame 42: 507 bytes on wire (4056 bits), 507 bytes captured (4056 bits) on interface 0
Ethernet II, Src: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0), Dst: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81)
Internet Protocol Version 4, Src: 10.11.157.115, Dst: 128.119.240.90
Transmission Control Protocol, Src Port: 59050, Dst Port: 80, Seq: 1, Ack: 1, Len: 441
  Source Port: 59050
  Destination Port: 80
  [Stream index: 3]
  [TCP Segment Len: 441]
  Sequence number: 1      (relative sequence number)
  [Next sequence number: 442      (relative sequence number)]
  Acknowledgment number: 1      (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x018 (PSH, ACK)
  Window size value: 229
  [Calculated window size: 29312]
  [Window size scaling factor: 128]
  Checksum: 0xb40c [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (441 bytes)
Hypertext Transfer Protocol
  GET /~kurose/cover_5th_ed.jpg HTTP/1.1\r\n
    [Expert Info (Chat/Sequence): GET /~kurose/cover_5th_ed.jpg HTTP/1.1\r\n]
    Request Method: GET
    Request URI: /~kurose/cover_5th_ed.jpg
    Request Version: HTTP/1.1
  Host: caite.cs.umass.edu\r\n
  Connection: keep-alive\r\n
  User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) QtWebEngine/5.10.0 Chrome/61.0.3163.140
  Safari/537.36\r\n
  Accept: image/webp,image/apng,image/*,*/*;q=0.8\r\n
  Accept-Language: en-US,en\r\n
  X-Do-Not-Track: 1\r\n
  DNT: 1\r\n
  Referer: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file4.html\r\n
  Accept-Encoding: gzip, deflate\r\n
\r\n
  [Full request URI: http://caite.cs.umass.edu/~kurose/cover_5th_ed.jpg]
  [HTTP request 1/1]
  [Response in frame: 204]
  204 8.607660201    128.119.240.90          10.11.157.115      HTTP      314    HTTP/1.1 200 OK (JPEG JFIF image)
Frame 204: 314 bytes on wire (2512 bits), 314 bytes captured (2512 bits) on interface 0
Ethernet II, Src: Alcatel-_67:a4:81 (2c:fa:a2:67:a4:81), Dst: IntelCor_3f:83:e0 (e0:9d:31:3f:83:e0)
Internet Protocol Version 4, Src: 128.119.240.90, Dst: 10.11.157.115
Transmission Control Protocol, Src Port: 80, Dst Port: 59050, Seq: 100965, Ack: 442, Len: 248
  Source Port: 80
  Destination Port: 59050
  [Stream index: 3]
  [TCP Segment Len: 248]
  Sequence number: 100965      (relative sequence number)
  [Next sequence number: 101214      (relative sequence number)]
  Acknowledgment number: 442      (relative ack number)
  1000 .... = Header Length: 32 bytes (8)
  Flags: 0x019 (FIN, PSH, ACK)
  Window size value: 243
  [Calculated window size: 15552]
  [Window size scaling factor: 64]
  Checksum: 0xf84a [unverified]
  [Checksum Status: Unverified]
  Urgent pointer: 0
  Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  [SEQ/ACK analysis]
  TCP payload (248 bytes)
  TCP segment data (248 bytes)
[87 Reassembled TCP Segments (101212 bytes): #44(1174), #46(1174), #48(1174), #50(1174), #52(1174), #54(1174), #56(1174),
#58(1174), #60(1174), #62(1174), #64(1174), #66(1174), #68(1174), #70(1174), #72(1174), #74(1174), #75(1174), #76(1174)]
Hypertext Transfer Protocol
  HTTP/1.1 200 OK\r\n
    [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
    Request Version: HTTP/1.1
    Status Code: 200
    [Status Code Description: OK]
    Response Phrase: OK
  Date: Thu, 25 Jan 2018 06:35:05 GMT\r\n
  Server: Apache\r\n
  Last-Modified: Tue, 15 Sep 2009 18:23:27 GMT\r\n
  ETag: "78004-18a68-473a1e0e6e5c0"\r\n
  Accept-Ranges: bytes\r\n
  Content-Length: 100968\r\n
  Connection: close\r\n
```

```
Content-Type: image/jpeg\r\n\r\n
[HTTP response 1/1]
[Time since request: 0.401560910 seconds]
[Request in frame: 42]
File Data: 100968 bytes
JPEG File Interchange Format
```

16. The browser sent 4 get requests, sent to 129.119.245.12 and 128.119.240.90

17. It was serial, the requests and responses do not overlap