CS305 Lab3
HTTP

Dept. Computer Science and Engineering

Southern University of Science and Technology

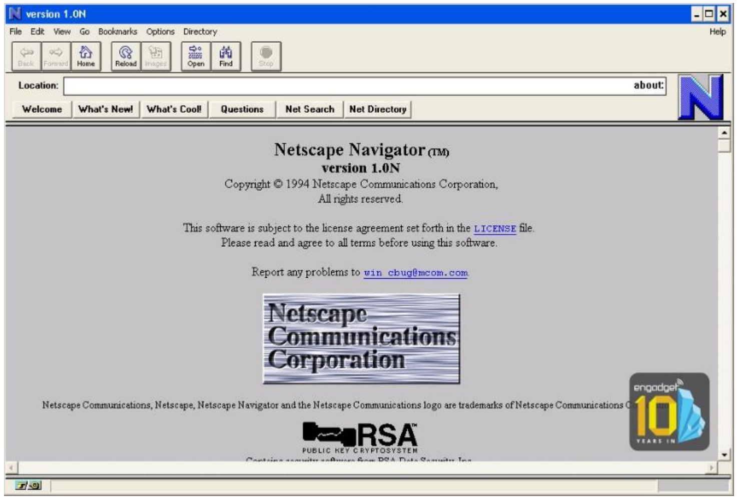
Thanks to HHQ.ZHANG

TOPICS

- Client and Server
- URL and MIME
- Request and Reply
- Tools: browser, curl, Wireshark

Web browsers

- A web browser is a program to retrieve and display resources on the Web
  Example: Netscape 1.0N


version 1.0N
File Edit View Go Bookmarks Options Directory
Help
Back Forward Home Reload Images Open Find Stop
Location:
about:
Welcome
What's New!
What's Cool!
Questions
Net Search
Net Directory

Netscape Navigator (TM)
version 1.0N
Copyright © 1994 Netscape Communications Corporation,
All rights reserved.

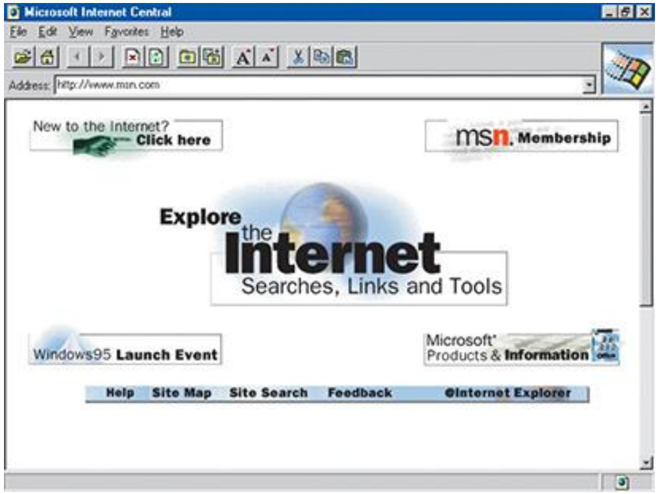
This software is subject to the license agreement set forth in the LICENSE file.
Please read and agree to all terms before using this software.

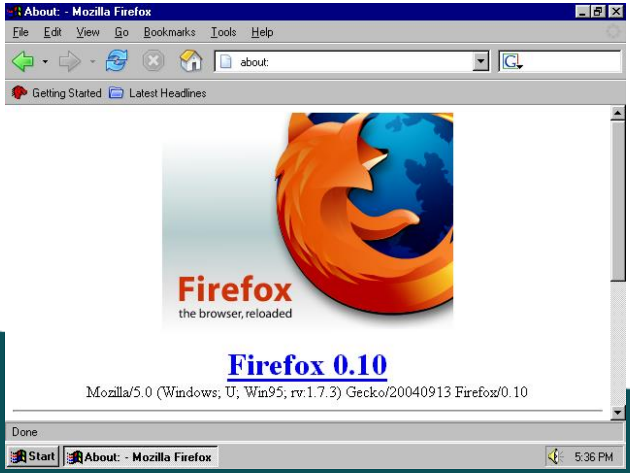
Report any problems to win cbug@mcom.com

Netscape Communications Corporation

Netscape Communications, Netscape, Netscape Navigator and the Netscape Communications logo are trademarks of Netscape Communications C

RSA
PUBLIC KEY CRYPTOSYSTEM
engadget
10
YEARS IN


Microsoft Internet Central
File Edit View Favorites Help
Address: http://www.msn.com
New to the Internet? Click here
msn. Membership
Explore the Internet
Searches, Links and Tools
Windows95 Launch Event
Microsoft Products & Information
Help
Site Map
Site Search
Feedback
Internet Explorer



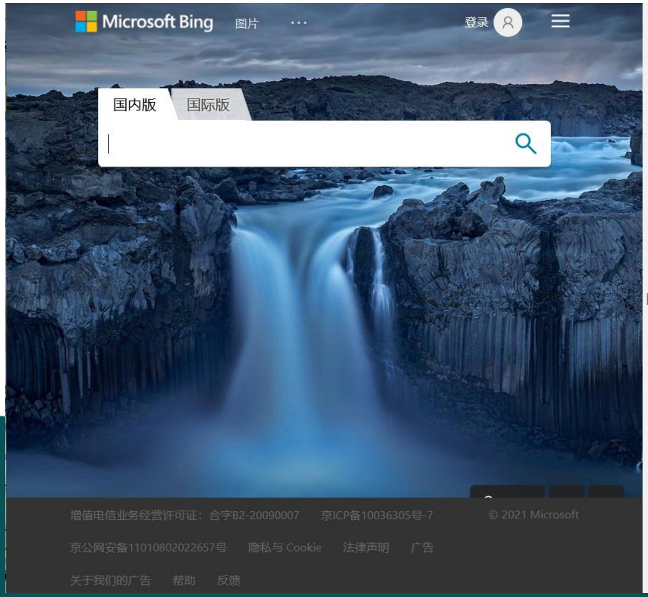
Firefox 0.10
Mozilla/5.0 (Windows; U; Win95; rv:1.7.3) Gecko/20040913 Firefox/0.10

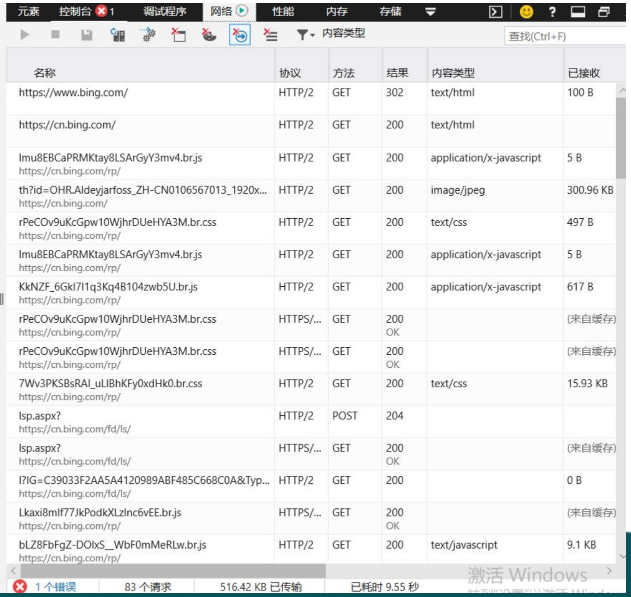
Web browsers and servers

- Popular web browsers: Google Chrome, Apple Safari, Microsoft Internet Explorer, Mozilla Firefox
  - https://www.w3counter.com/globalstats.php
- A web server receives requests from a web browser and returns the requested resource.
  - Retrieve the resource from file system on server
  - Run a program to generate the resource
- Popular web servers: Microsoft IIS, Apache HTTP server, Nginx
  - https://news.netcraft.com/archives/2021/08/25/august-2021-web-server-survey.html

Web resources in a web page

- A web page actually consists of several kinds of web resources
  - One or more HTML document
  - Some CSS style sheets
  - Some JavaScript programs
  - Images
  - Objects *(e.g. flash going died)*
  - Font
  - …





名称	协议	方法	结果	内容类型	已接收
https://www.bing.com/	HTTP/2	GET	302	text/html	100 B
https://cn.bing.com/	HTTP/2	GET	200	text/html	
Imu8EBCaPRMKtay8LSArGyY3mv4.br.js https://cn.bing.com/rp/	HTTP/2	GET	200	application/x-javascript	5 B
th?id=OHR.Aldeyjarfoss_ZH-CN0106567013_1920x... https://cn.bing.com/	HTTP/2	GET	200	image/jpeg	300.96 KB
rPeCOv9uKcGpw10WjhrDUeHYA3M.br.css https://cn.bing.com/rp/	HTTP/2	GET	200	text/css	497 B
Imu8EBCaPRMKtay8LSArGyY3mv4.br.js https://cn.bing.com/rp/	HTTP/2	GET	200	application/x-javascript	5 B
KkNZF_6GkI7I1q3Kq4B104zwb5U.br.js https://cn.bing.com/rp/	HTTP/2	GET	200	application/x-javascript	617 B
rPeCOv9uKcGpw10WjhrDUeHYA3M.br.css https://cn.bing.com/rp/	HTTPS/...	GET	200 OK		(来自缓存)
rPeCOv9uKcGpw10WjhrDUeHYA3M.br.css https://cn.bing.com/rp/	HTTPS/...	GET	200 OK		(来自缓存)
7Wv3PKSBsRAI_uLIBhKFy0xdHk0.br.css https://cn.bing.com/rp/	HTTP/2	GET	200	text/css	15.93 KB
lsp.aspx? https://cn.bing.com/fd/ls/	HTTP/2	POST	204		
lsp.aspx? https://cn.bing.com/fd/ls/	HTTPS/...	GET	200 OK		(来自缓存)
l?IG=C39033F2AA5A4120989ABF485C668C0A&Typ... https://cn.bing.com/fd/ls/	HTTP/2	GET	200		0 B
Lkaxi8mIf77JkPodkXLzInc6vEE.br.js https://cn.bing.com/rp/	HTTPS/...	GET	200 OK		(来自缓存)
bLZ8FbFgZ-DOIxS__WbF0mMeRLw.br.js https://cn.bing.com/rp/	HTTP/2	GET	200	text/javascript	9.1 KB

1 个错误　83 个请求　516.42 KB 已传输　已耗时 9.55 秒

Web resources

- A resource is anything that is important enough to be referenced as a thing in itself.
- A resource has at least one URL as its address. A browser uses the URL to download the resource from a server.
- The web server uses MIME type to specify the data type of a representation of a resource.
  - Examples of resources:
    - The front page of SUSTech web site
    - The logo of SUSTech
    - A directory of resources pertaining to “web design” found by Google.
    - A json record returned by Facebook graph API: https://graph.facebook.com/cocacola

Address of web resource

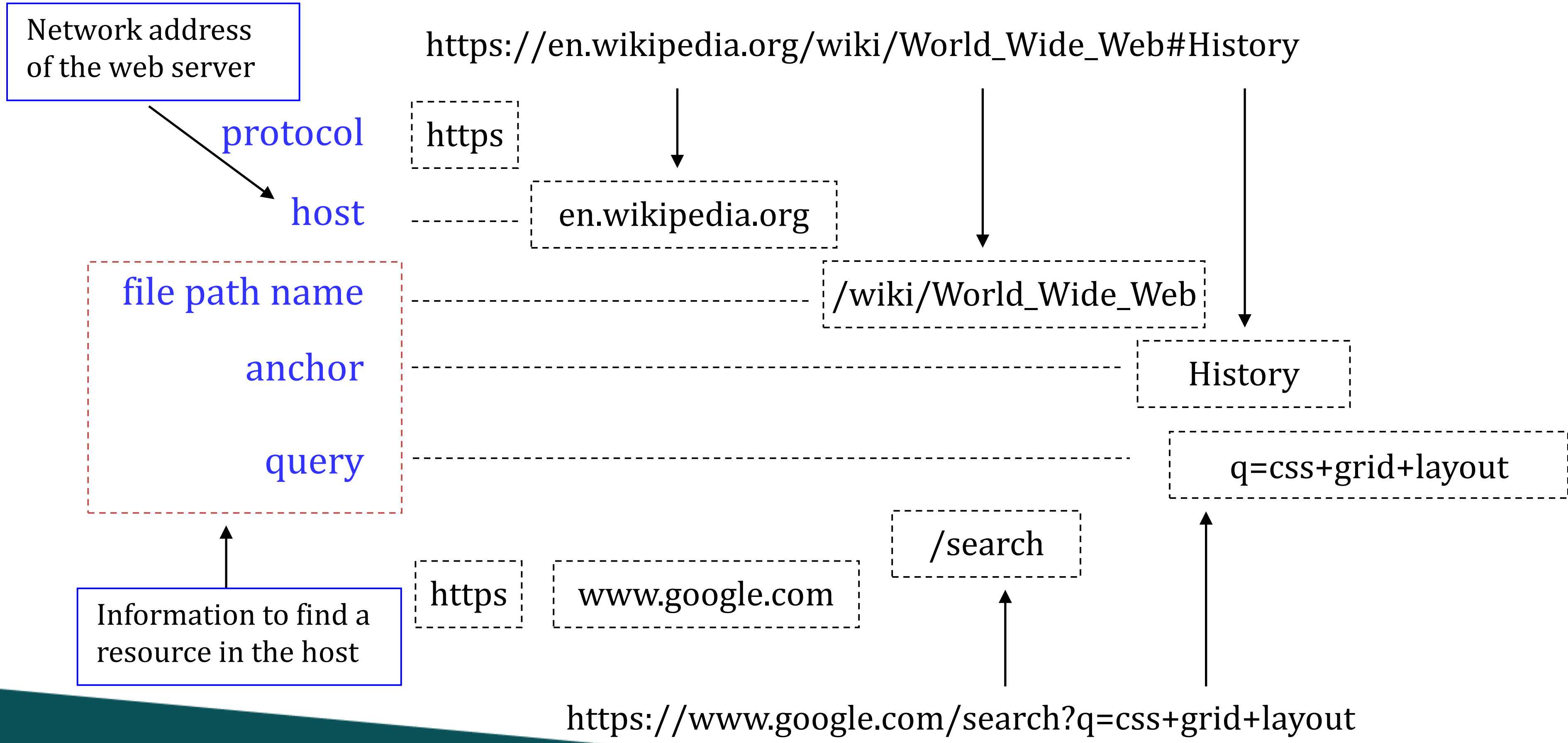
- Each web resource has a **URL** (Universal Resource Locator) as an address. It includes
  - protocol – how to communicate with the server
  - address of a web server – where to find the resource
  - additional info for the server to find the resource – which resource in the server
- Given a URL, a browser has enough info to construct a request to retrieve the resource

Syntax of URL

protocol://host/filepathname?query#anchor

- Protocol is either ‘http’ or ‘https’
- Host is usually a domain name of a web server
- File path name identifies a resource in the server
- Query is form data submitted to a server-side script. The format is name1=value1&name2=value2
- Anchor refers to an element with the id in an html or xml file.
- Notice that separator characters in blue must be encoded if they are used as ordinary text in URL.

Inside a URL ...



Network address of the web server

Information to find a resource in the host

https://en.wikipedia.org/wiki/World_Wide_Web#History

protocol

https

host

en.wikipedia.org

file path name

/wiki/World_Wide_Web

anchor

History

query

q=css+grid+layout

https

www.google.com

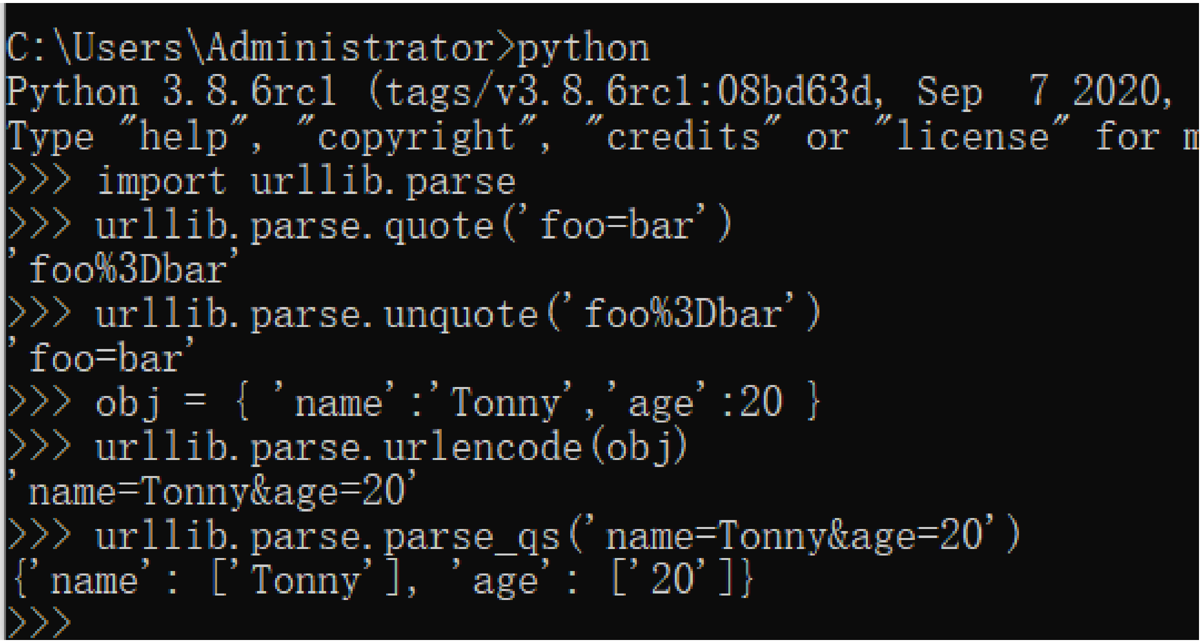
/search

https://www.google.com/search?q=css+grid+layout

Encode characters in URL

- In general, characters other than letters and numbers should be encoded in URL.
  - Space may be written as ‘+’ or ‘%20’
  - Other printable character in ASCII should be written in hexadecimal. e.g, 1/2 is encoded as ‘1%2F2’
  - Non-ascii characters, e.g, Chinese, should be written as UTF-8 in hexadecimal. e.g.中文 is encoded as ‘%E4%B8%AD%E6%96%87’

Python urllib



```
C:\Users\Administrator>python
Python 3.8.6rc1 (tags/v3.8.6rc1:08bd63d, Sep  7 2020,
Type "help", "copyright", "credits" or "license" for m
>>> import urllib.parse
>>> urllib.parse.quote(’foo=bar’)
’foo%3Dbar’
>>> urllib.parse.unquote(’foo%3Dbar’)
’foo=bar’
>>> obj = { ’name’:’Tonny’,’age’:20 }
>>> urllib.parse.urlencode(obj)
’name=Tonny&age=20’
>>> urllib.parse.parse_qs(’name=Tonny&age=20’)
{’name’: [’Tonny’], ’age’: [’20’]}
>>>
```

Reference: https://docs.python.org/3/library/urllib.parse.html

Data type of web resource

- There are various types of web resources
  - E.g. text, image, audio, video, data
- There are different formats to encode a certain type
  - E.g. an image can be in GIF, JPEG or PNG
  - Some formats are defined by W3C, e.g. HTML, CSS, XML (general data), PNG (bitmap image), SVG (vector graphics)
  - Others are de-facto standards defined by the industry, e.g. GIF, JPEG, SWF (flash movie), JavaScript
- These formats are identified by a standard called **MIME type**
- Most browsers support these formats, and can display them correctly.

Common MIME types

category	MIME type	format
Text	text/html	HTML (.html)
	text/css	CSS (.css)
Images	image/gif	GIF (.gif)
	image/jpeg	JPEG (.jpg)
	image/png	PNG (.png) Portable Network Graphics
	image/svg+xml	SVG (.svg) Scalable Vector Graphics
Audio	audio/mp3, audio/m4a	Mp3 audio, MPEG4 audio
Video	video/mp4, video/m4v	MPEG4 video
Multipurpose	application/xml	General XML
	application/json	JSON data
	application/javascript	JavaScript source (.js)
	application/octet-stream	Arbitrary binary data
	application/x-www-form-urlencoded	HTML form submission

Practise 1

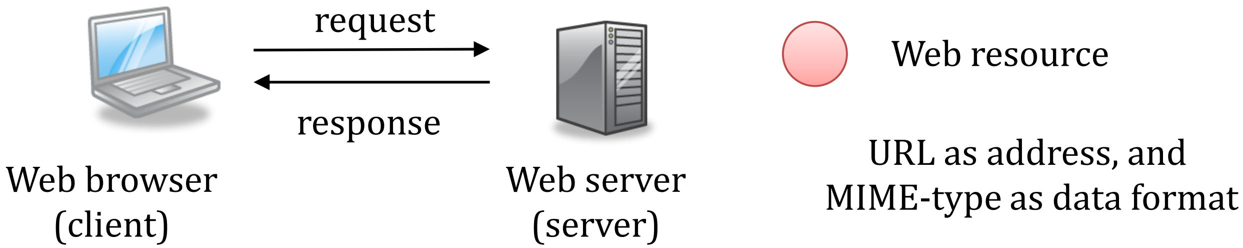
- Find the MIME types of all files in the specified directory by python.
- Tips: analyze the suffix of each file.

HTTP operation

- Each HTTP transaction consists of one request and one response
  - A client sends a request for a resource to the server. Then the server returns a response containing a representation of the resource to the client.
- HTTP/1.0 requires a new TCP connection for each HTTP transaction
  - the server closes the connection after sending the response
- HTTP/1.1 can transfer several web resources in a TCP connection

Basic retrieval

- To retrieve a static file in server
  - A browser sends a request to GET a resource at a URL
  - The server receives the request, maps the URL to a file in its file system, e.g.
    http://example.com/home.html -> c:\inetpub\home.html
  - The server infers the MIME-type from the file extension, e.g.
    *.html -> text/html, *.gif -> image/gif
  - The server constructs and returns the response



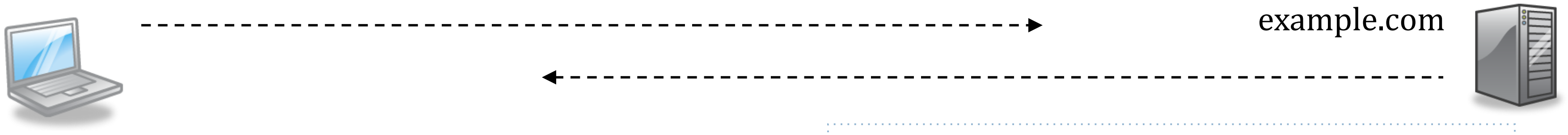
● Web resource

URL as address, and
MIME-type as data format

Example: Basic retrieval

HTTP request

```
GET /home.html HTTP/1.1
Host: example.com
User-Agent: Mozilla/5.0 ... Chrome/57.0
```



```
HTTP/1.1 200 OK
Date: Fri, 18 Sep 2020 08:00:29 GMT
Server: nginx/1.10.3
Content-Type: text/html; charset=utf-8

<html>... </html>
```

HTTP response

Simple HTTP retrieval of the page http://example.com/home.html.

Notice how the URL of the resource is specified in the request, and how the data type is stated in the response.

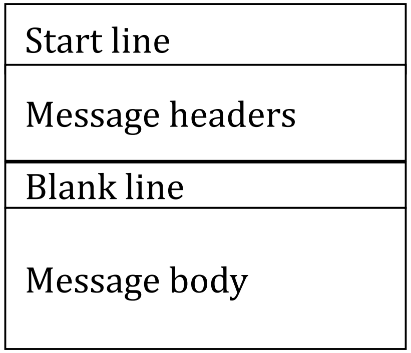
Basic HTTP request and response

- A basic **request** contains
  - Method GET to retrieve a resource
  - URL (or part of URL) – address of the resource
  - Other headers, e.g. name of user-agent

- A basic **response** contains
  - Status code
  - A representation of the resource
  - its MIME-type and encoding (for text resource) in Content-type header
  - Other headers, e.g. name of server

HTTP message structure(1)

- **HTTP requests and responses have similar structure**
  - **Start line** – URL requested, any error
  - Headers – additional info
  - **Blank line**
  - Body – representation of the resource
- **Start line** and **blank line** are **required**.
- Headers and body are **optional**.



Start line

Message headers

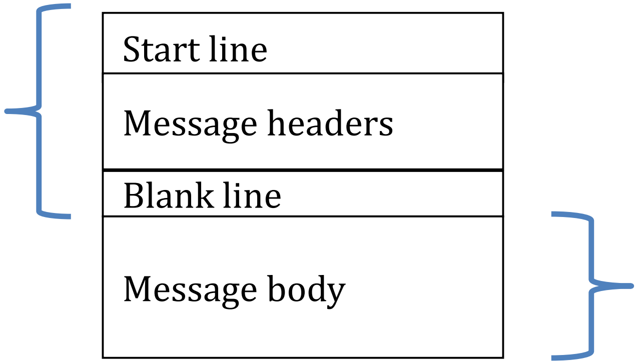
Blank line

Message body

HTTP message structure(2)

- Start line and headers must be in US-ASCII
  - i.e. Chinese characters must be encoded
- Message body can be text in any encoding or binary data
  - The header Content-Type defines the data type
  - The header Content-Length defines the size (in bytes)

Each line ends with CR LF (ASCII 13 and 10), and can only contain US-ASCII characters.



Start line

Message headers

Blank line

Message body

The body can be in any encoding or binary data

Request Line

- The request line has three parts:
  - Method name: GET, POST, HEAD, etc
  - (partial) URL of the resource
  - Version of HTTP: HTTP/1.0 or HTTP/1.1

```
GET /test.html HTTP/1.0
```

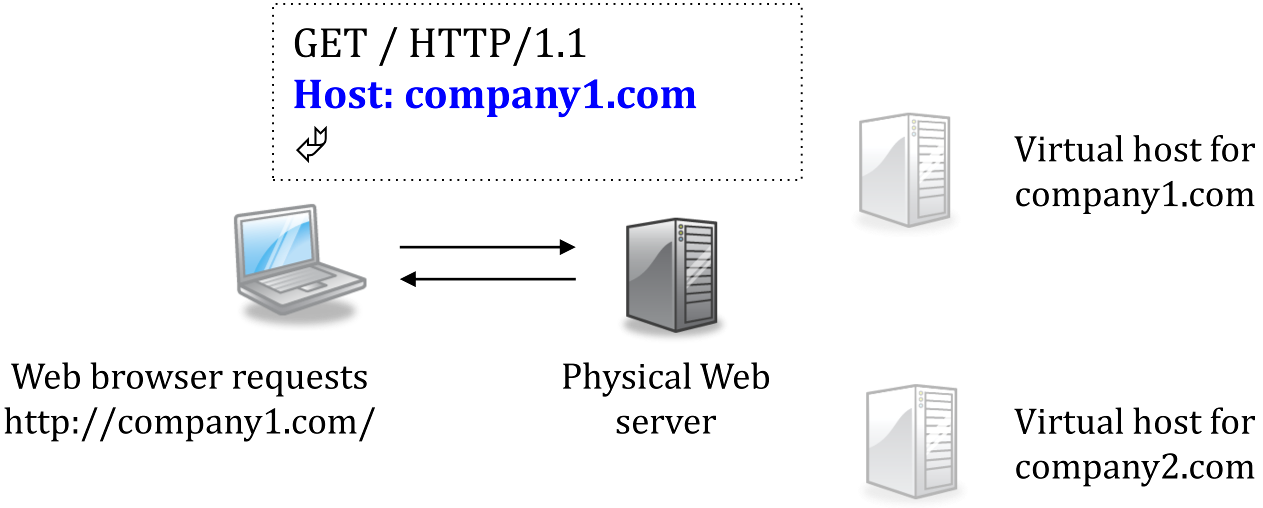
```
GET http://www.example.com/test.html HTTP/1.0
```

```
GET /search?hl=en&q=HTTP+headers&btnG=Google+Search HTTP/1.1
```

```
POST /accounts/ServiceLoginAuth?service=mail HTTP/1.1
```

Host

- Compulsory header in HTTP/1.1
- Specifies the host of the requested URL
  - Useful for multi-homed web servers. Several web sites (with different host names) may be using the same IP address.



```
GET / HTTP/1.1
Host: company1.com
↵
```

Web browser requests
http://company1.com/

Physical Web
server

Virtual host for
company1.com

Virtual host for
company2.com

Example: HTTP requests

To retrieve the web page
http://www.example.com/test.html
The web browser constructs a HTTP request and sends it to the web server at www.example.com.

```
GET /test.html HTTP/1.1↵
Host: www.example.com↵
↵
```

```
GET /test.html HTTP/1.0↵
↵
```

```
GET http://www.example.com/test.html HTTP/1.1↵
Host: www.example.com↵
↵
```

Status line

- The status line has three parts:
  - HTTP version
  - Response status code
    - 200 – success
    - 404 – file not found
    - 500 – server error
  - English reason phrase, which describes the status code

```
HTTP/1.1 200 OK
```

```
HTTP/1.1 404 Not found
```

- HTTP defines five classes of status code

– 1xx – informational message	
– 2xx - success of some kind	Here you go.
– 3xx – redirects the client to another URL	Go away.
– 4xx – an error on the client's part	you screwed up.
– 5xx – an error on the server's part	I screwed up.

Common codes for success and error

Status code	Meaning
200 OK	The server successfully carried out the action that the client requested. For GET request, the response body contains a representation of the requested resource.
204 No content	The server successfully carried out the action, but declined to return any representation. In Ajax, this usually means the browser should not refresh the user interface.
400 Bad request	Generic client-side error. Probably a request format error.
404 Not found	The server cannot find the resource at the requested URL.
500 Internal server error	Generic server-side error. Probably a server-side program run-time error.
503 Service unavailable	The web server is not available, probably because of overloading or maintenance.

https://developer.mozilla.org/en-US/docs/Web/HTTP/Status

Example: HTTP responses

After receiving the request for
http://www.example.com/test.html
The web server will return a response containing the page, or an error message if it cannot find the page.

```
HTTP/1.1 200 OK↵
Content-Type: text/html↵
Content-Length: 2300↵
↵
<html>... content of test.html ...</html>
```

```
HTTP/1.1 404 Not found↵
Content-Type: text/html↵
Content-Length: 1024↵
↵
<html>... error message ...</html>
```

Content-Type:

- Indicates the data type (MIME) and character encoding of the message body in requests and responses
  - Omitted if empty body
  - Content-Type: application/octet-stream if server cannot decide

HTTP request to login mail.com

```
POST /accounts/auth?service=mail HTTP/1.1
Host: www.mail.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 194

...&email=username&passwd=password&...
```

Notice how character encoding is specified.

HTTP response

```
HTTP/1.1 200 OK
Content-Type: text/html; charset=UTF-8
Content-Length: 12800

<html>...</html>
```

Content-Length:

- Indicates the size (in bytes) of the message body in requests and responses
  - Content-length header is sent before the message body
  - Difficult to determine message size if the response is generated dynamically by a program
  - A solution: chunked-transfer encoding (to be discussed)

HTTP request to login mail.com

```
POST /accounts/auth?service=mail HTTP/1.1
Host: www.mail.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 194

...&email=username&passwd=password&...
```

HTTP response

```
HTTP/1.1 200 OK
Content-Type: text/html; charset=UTF-8
Content-Length: 12800

<html>...</html>
```

Common headers

Header	Request	Response
Host:	Domain name of requested URL	
User-agent:	Which web browser?	
Server:		Which web server?
Referer:	From which web page does the browser obtain this URL?	
Content-type:	Type of content in the body	
Content-length:	Length of the body in bytes	

User-Agent: & Server:

- Indicate which web browser generates the request and which web server generates the response
  - May be used for collecting statistics about web browser market share
  - A server may generate browser specific response

Browser and server names in actual use are much longer.

```
GET /test.html HTTP/1.1
Host: httpbin.org
User-Agent: Mozilla 5.0 (Windows)
…
```

request

```
HTTP/1.1 200 Ok
Server: nginx/1.10
…
```

response

Methods in HTTP/1.0

- HTTP methods are operations on resources
- HTTP/1.0 supports three methods
  - GET – to retrieve a representation of a resource
  - HEAD – to retrieve only the metadata of a resource
  - POST – to submit some data to a resource (program) in web server for processing

GET method

- **GET** retrieves a representation of a resource
  - Usually empty body in request message
  - Browsers mainly use this method to retrieve web resources
  - Usually a read-only operation

```
GET /a.txt HTTP/1.1
Host: example.com
```

request

```
HTTP/1.1 200 OK
Content-Type: text/plain
Content-Length: 5

Hello
```

response

HEAD method

- **HEAD** is similar to **GET**, but the response only contains headers and an empty body
- Useful to check the characteristics of a resource without retrieving it, e.g.
  - What is its size?
  - Is the resource still available?

```
HEAD/a.txt HTTP/1.1
Host: example.com
```

request

```
HTTP/1.1 200 OK
Content-Type: text/plain
Content-Length: 5
```

response

POST method

- **POST** submits some data to a resource for processing
  - The resource is usually a server-side program
  - The data are usually encoded in the body of the POST request
  - Usually invokes some server-side action

```
POST /accounts/auth?service=mail HTTP/1.1
Host: www.mail.com
Content-Type: application/x-www-form-urlencoded
Content-Length: 194

...&email=username&passwd=password&...
```

HTTP request to login mail.com

Observation

- The **GET** request in form submission can be …
  - saved in bookmark
  - saved in browser history (possible security problem!)
  - used in a hyperlink <a href="..">. When users click the link, the browser sends the same GET request as in submitting the HTML form.

```
GET /login.php?user=philip&passwd=12345 HTTP/1.1
Host: example.com
```

Request for
http://example.com/login.php?user=philip&passwd=12345

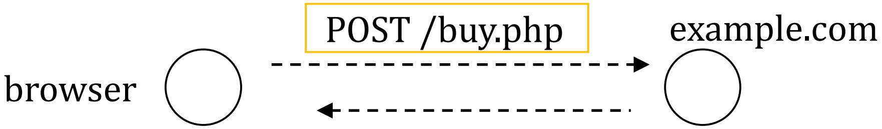
Side-effect

- **GET** and **HEAD** have no side-effect
  - read-only operations in web servers
  - A browser may repeat sending these requests without user confirmation
  - May repeat a **GET** request in case of network error
- **POST** may have side-effect
  - May cause some actions in the server (e.g. adding a record, sending an email, placing an order)
  - A browser must confirm with users before resending such requests

Also try : https://www.w3school.com.cn/tiy/t.asp?f=html_form_submit

Example: resubmit a POST request

- In this example, a purchase request is sent as a POST (because it has side-effect).
- The server returns the transaction result in the response
- If the user refreshes the result page, the browser would need to send the POST request twice.
  - What would happen?



```
HTTP/1.1 200 Ok
Content-Type: text/html
Content-Length: 5000

<html>...
Thanks for your
purchase! ...</html>
```

```
POST /buy.php HTTP/1.1
Host: example.com
Content-Type: application/x-www-form-
urlencoded
Content-Length: 194

...&productID=554433&quantity=1&...
```

Confirmation when resubmitting request

- Because GET causes no action in the server, it should make no difference to repeat or skip a GET request
  - The browser may resubmit a GET request
- POST may have side-effect. If the browser resubmits a POST request, the server may perform some action twice.
  - The browser must confirm with users before resubmitting a POST request
  - *Users may be confused by the resend warning … Solution: Post/Redirect/Get pattern*

Comparison: GET and POST

	GET	POST
Typical usage	Readonly query like Google search, Google Charts	Request that triggers action on server side. E.g. place an order, login, save a file
Side-effect?	Read-only operations in servers. Browsers can resubmit requests without confirmation	May cause write operations in servers. Browsers must confirm with users.
Form data in URL?	Yes. The query URL can be saved in bookmark and hyperlinks.	No
Support file upload	No	Yes

cURL: Utility for URL

- cURL is a computer software project providing a library and command-line tool for transferring data using various protocols.
  Download: **https://curl.haxx.se/download.html**
- Example:

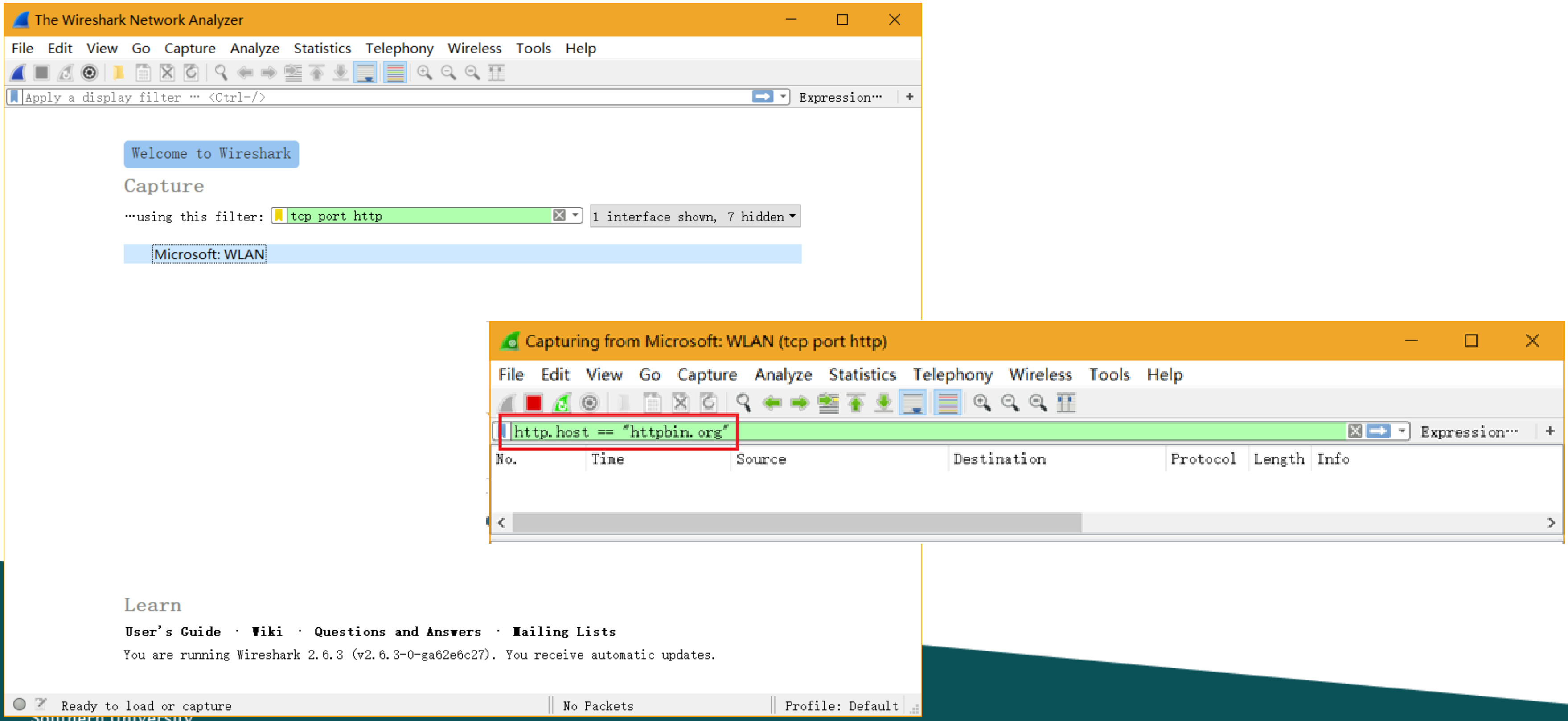
```
$ curl http://httpbin.org/headers
{
  "headers": {
   "Accept": "*/*",
   "Host": "httpbin.org",
   "User-Agent": "curl/7.55.1"
   "X-Amzn-Trace-Id": "Root=1-5f646cba-4f1892177757747d3883a5ed"
 }
}
```

cURL: Inspect HTTP transaction

```
$ curl http://httpbin.org/headers --HEAD -v
> HEAD /headers HTTP/1.1
> Host: httpbin.org
> User-Agent: curl/7.55.1
> Accept: */*
                                  ...
                                  < HTTP/1.1 200 OK
                                  < Server: gunicorn/19.9.0
                                  < Date:  Fri, 17 Sep 2021 14:55:18 GMT
                                  < Content-Type: application/json
                                  < Content-Length: 173
                                  < Access-Control-Allow-Origin: *
                                  < Access-Control-Allow-Credentials: true
```

Wireshark: Capture HTTP Request

- Wireshark is a free and open source packet analyzer. It is used for network troubleshooting, analysis, software and communications protocol development, and education.



The Wireshark Network Analyzer
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Expression…
Welcome to Wireshark
Capture
Learn
User's Guide · Wiki · Questions and Answers · Mailing Lists

Apply a display filter … <Ctrl-/>

…using this filter: tcp port http

1 interface shown, 7 hidden

Microsoft: WLAN

You are running Wireshark 2.6.3 (v2.6.3-0-ga62e6c27). You receive automatic updates.

Ready to load or capture | No Packets | Profile: Default

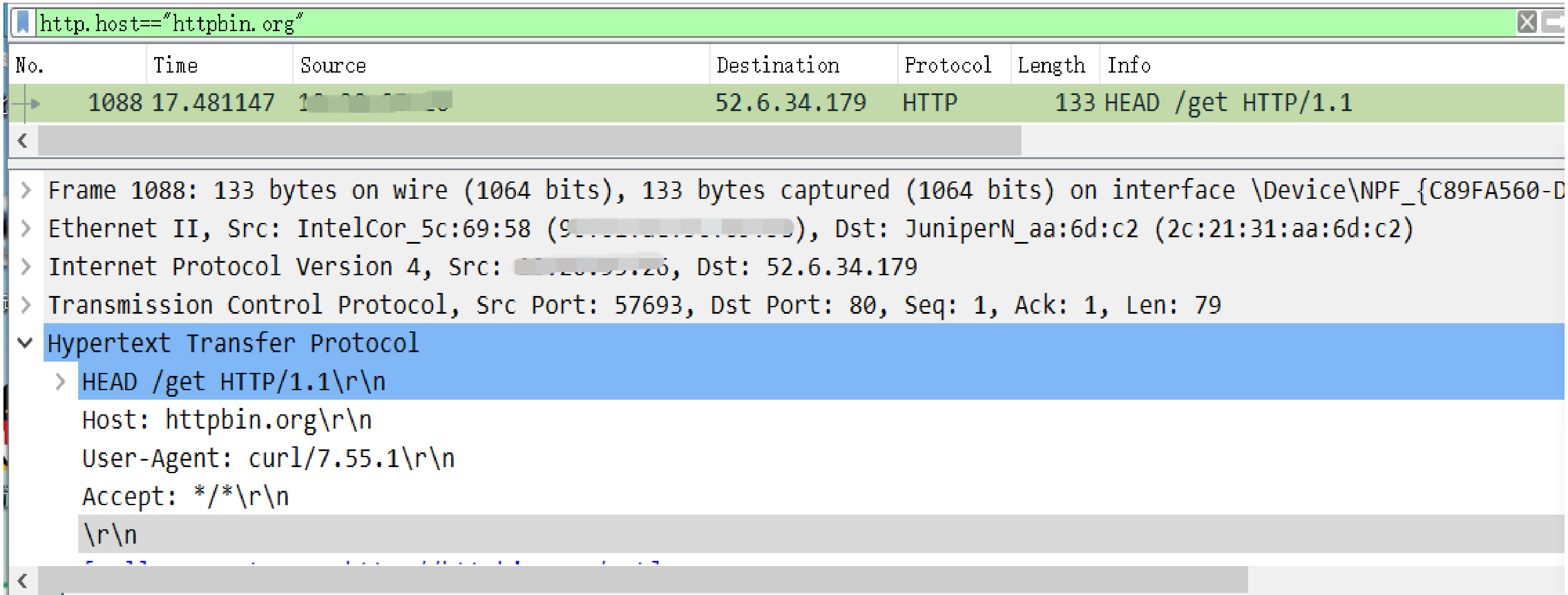
Capturing from Microsoft: WLAN (tcp port http)
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Expression…
No. Time Source Destination Protocol Length Info

```
http.host == "httpbin.org"
```

cURL: Inspect GET request

```
$ curl http://httpbin.org/get
{
 "args": {},
 "headers": {
  "Accept": "*/*",
  "Host": "httpbin.org",
  "User-Agent": "curl/7.55.1",
  "X-Amzn-Trace-Id": "Root=1-6140670b-03d479b60088bb886a908dcd"
 },
 "origin": "116.6.234.150",
 "url": "http://httpbin.org/get"
}
```

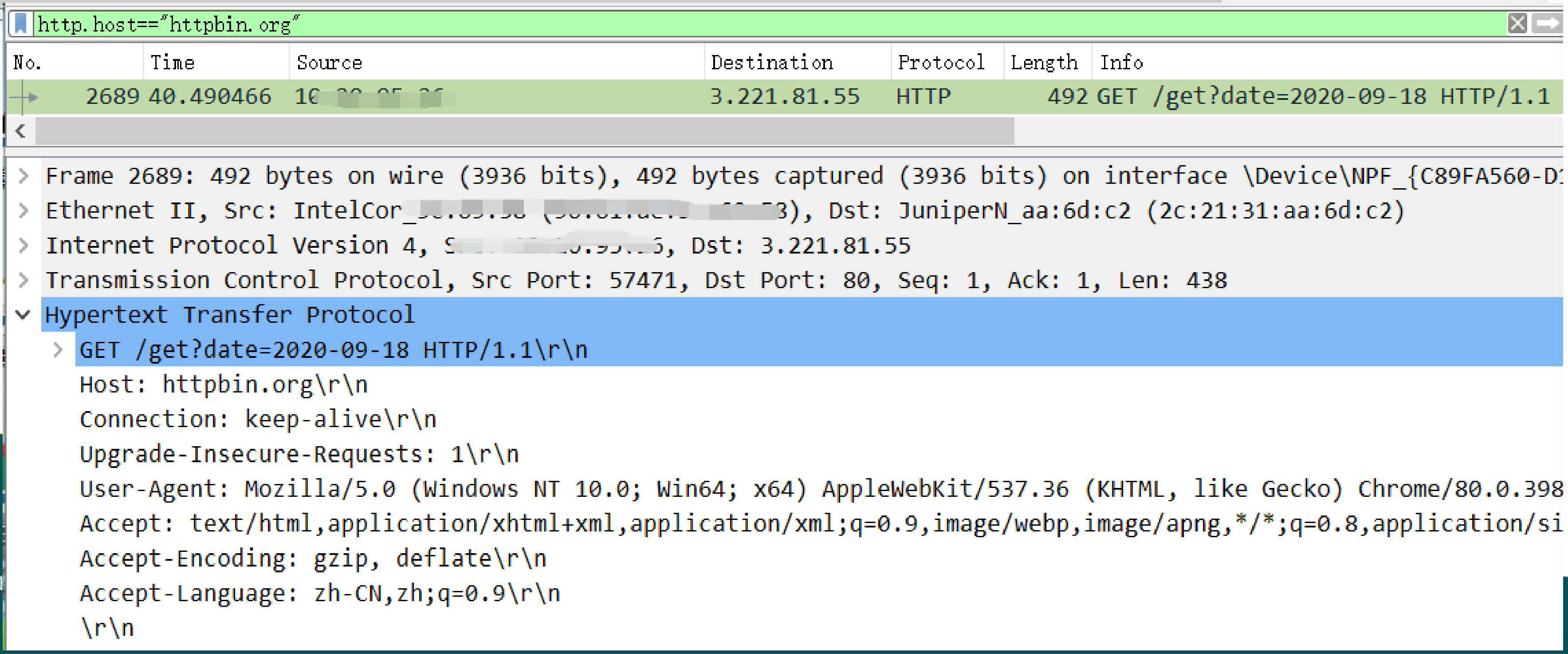
```
$ curl http://httpbin.org/get?date=2021-09-18
{
 "args": {
  "date": "2021-09-18"
 },
 "headers": {
  "Accept": "*/*",
  "Host": "httpbin.org",
  "User-Agent": "curl/7.55.1",
  "X-Amzn-Trace-Id": "Root=1-614066d5-7e918fbc5ca540b9583f976b"
 },
 "origin": "116.6.234.150",
 "url": "http://httpbin.org/get?date=2021-09-18"
}
```



```
http.host=="httpbin.org"

No.   Time       Source      Destination   Protocol  Length  Info
1088  17.481147  [redacted]  52.6.34.179   HTTP      133     HEAD /get HTTP/1.1

> Frame 1088: 133 bytes on wire (1064 bits), 133 bytes captured (1064 bits) on interface \Device\NPF_{C89FA560-D
> Ethernet II, Src: IntelCor_5c:69:58 ([redacted]), Dst: JuniperN_aa:6d:c2 (2c:21:31:aa:6d:c2)
> Internet Protocol Version 4, Src: [redacted], Dst: 52.6.34.179
> Transmission Control Protocol, Src Port: 57693, Dst Port: 80, Seq: 1, Ack: 1, Len: 79
v Hypertext Transfer Protocol
  > HEAD /get HTTP/1.1\r\n
    Host: httpbin.org\r\n
    User-Agent: curl/7.55.1\r\n
    Accept: */*\r\n
    \r\n
```



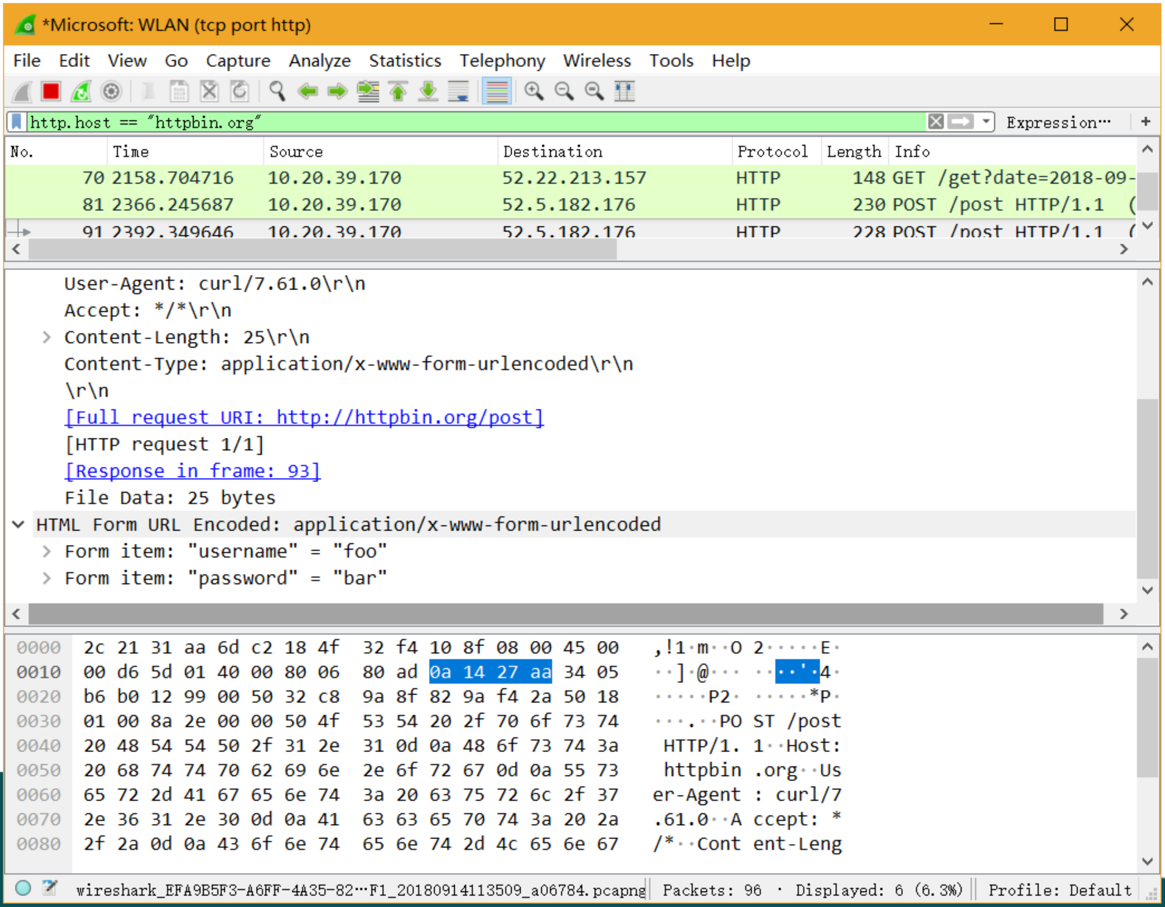
```
http.host=="httpbin.org"

No.   Time       Source      Destination   Protocol  Length  Info
2689  40.490466  [redacted]  3.221.81.55   HTTP      492     GET /get?date=2020-09-18 HTTP/1.1

> Frame 2689: 492 bytes on wire (3936 bits), 492 bytes captured (3936 bits) on interface \Device\NPF_{C89FA560-D
> Ethernet II, Src: IntelCor_[redacted]), Dst: JuniperN_aa:6d:c2 (2c:21:31:aa:6d:c2)
> Internet Protocol Version 4, [redacted], Dst: 3.221.81.55
> Transmission Control Protocol, Src Port: 57471, Dst Port: 80, Seq: 1, Ack: 1, Len: 438
v Hypertext Transfer Protocol
  > GET /get?date=2020-09-18 HTTP/1.1\r\n
    Host: httpbin.org\r\n
    Connection: keep-alive\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/80.0.398
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,application/si
    Accept-Encoding: gzip, deflate\r\n
    Accept-Language: zh-CN,zh;q=0.9\r\n
    \r\n
```

cURL: Inspect POST request

```
$ curl -d "username=foo&password=bar" -X POST http://httpbin.org/post
{
 "args": {},
 "data": "",
 "files": {},
 "form": {
  "password": "bar",
  "username": "foo"
 },
 "headers": {
  ...
}
```



*Microsoft: WLAN (tcp port http)
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Expression…

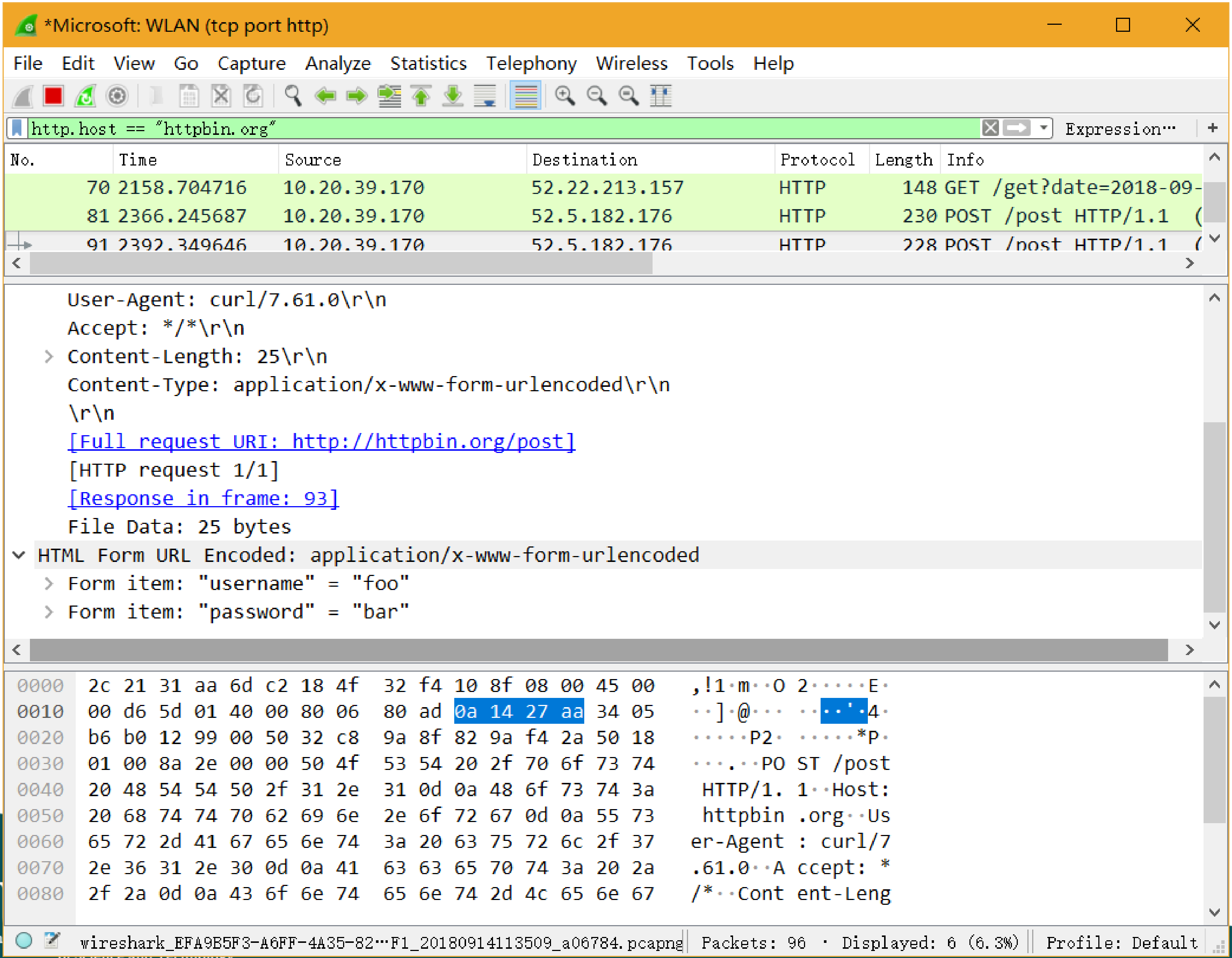
```
http.host == "httpbin.org"
```

```
No.   Time          Source         Destination     Protocol  Length Info
   70 2158.704716   10.20.39.170   52.22.213.157   HTTP      148 GET /get?date=2018-09-
   81 2366.245687   10.20.39.170   52.5.182.176    HTTP      230 POST /post HTTP/1.1  (
   91 2392.349646   10.20.39.170   52.5.182.176    HTTP      228 POST /post HTTP/1.1  (
```

```
    User-Agent: curl/7.61.0\r\n
    Accept: */*\r\n
  > Content-Length: 25\r\n
    Content-Type: application/x-www-form-urlencoded\r\n
    \r\n
    [Full request URI: http://httpbin.org/post]
    [HTTP request 1/1]
    [Response in frame: 93]
    File Data: 25 bytes
v HTML Form URL Encoded: application/x-www-form-urlencoded
  > Form item: "username" = "foo"
  > Form item: "password" = "bar"
```

```
0000  2c 21 31 aa 6d c2 18 4f  32 f4 10 8f 08 00 45 00   ,!1·m··O 2·····E·
0010  00 d6 5d 01 40 00 80 06  80 ad 0a 14 27 aa 34 05   ··]·@··· ····'·4·
0020  b6 b0 12 99 00 50 32 c8  9a 8f 82 9a f4 2a 50 18   ·····P2· ·····*P·
0030  01 00 8a 2e 00 00 50 4f  53 54 20 2f 70 6f 73 74   ···.··PO ST /post
0040  20 48 54 54 50 2f 31 2e  31 0d 0a 48 6f 73 74 3a    HTTP/1. 1··Host:
0050  20 68 74 74 70 62 69 6e  2e 6f 72 67 0d 0a 55 73    httpbin .org··Us
0060  65 72 2d 41 67 65 6e 74  3a 20 63 75 72 6c 2f 37   er-Agent : curl/7
0070  2e 36 31 2e 30 0d 0a 41  63 63 65 70 74 3a 20 2a   .61.0··A ccept: *
0080  2f 2a 0d 0a 43 6f 6e 74  65 6e 74 2d 4c 65 6e 67   /*··Cont ent-Leng
```

```
wireshark_EFA9B5F3-A6FF-4A35-82…F1_20180914113509_a06784.pcapng | Packets: 96 · Displayed: 6 (6.3%) | Profile: Default
```



```
http.host == "httpbin.org"
```

```
No.    Time            Source          Destination     Protocol  Length Info
    70 2158.704716     10.20.39.170    52.22.213.157   HTTP        148 GET /get?date=2018-09-
    81 2366.245687     10.20.39.170    52.5.182.176    HTTP        230 POST /post HTTP/1.1  (
    91 2392.349646     10.20.39.170    52.5.182.176    HTTP        228 POST /post HTTP/1.1  (
```

```
    User-Agent: curl/7.61.0\r\n
    Accept: */*\r\n
  > Content-Length: 25\r\n
    Content-Type: application/x-www-form-urlencoded\r\n
    \r\n
    [Full request URI: http://httpbin.org/post]
    [HTTP request 1/1]
    [Response in frame: 93]
    File Data: 25 bytes
v HTML Form URL Encoded: application/x-www-form-urlencoded
  > Form item: "username" = "foo"
  > Form item: "password" = "bar"
```

```
0000  2c 21 31 aa 6d c2 18 4f  32 f4 10 8f 08 00 45 00   ,!1·m··O 2·····E·
0010  00 d6 5d 01 40 00 80 06  80 ad 0a 14 27 aa 34 05   ··]·@··· ····'·4·
0020  b6 b0 12 99 00 50 32 c8  9a 8f 82 9a f4 2a 50 18   ·····P2· ·····*P·
0030  01 00 8a 2e 00 00 50 4f  53 54 20 2f 70 6f 73 74   ···.··PO ST /post
0040  20 48 54 54 50 2f 31 2e  31 0d 0a 48 6f 73 74 3a    HTTP/1. 1··Host:
0050  20 68 74 74 70 62 69 6e  2e 6f 72 67 0d 0a 55 73    httpbin .org··Us
0060  65 72 2d 41 67 65 6e 74  3a 20 63 75 72 6c 2f 37   er-Agent : curl/7
0070  2e 36 31 2e 30 0d 0a 41  63 63 65 70 74 3a 20 2a   .61.0··A ccept: *
0080  2f 2a 0d 0a 43 6f 6e 74  65 6e 74 2d 4c 65 6e 67   /*··Cont ent-Leng
```

```
wireshark_EFA9B5F3-A6FF-4A35-82…F1_20180914113509_a06784.pcapng | Packets: 96 · Displayed: 6 (6.3%) | Profile: Default
```

Practise 2

- Try to using following URL to invoke a http session:
  - http://www.sustech.edu.cn
  - https://www.sustech.edu.cn
  - http://sustech.edu.cn
  - https://sustech.edu.cn

  Use curl or Wireshark to find:

  1) the status code of the http responses, and explain the meanings.

  2) the port number of the server.