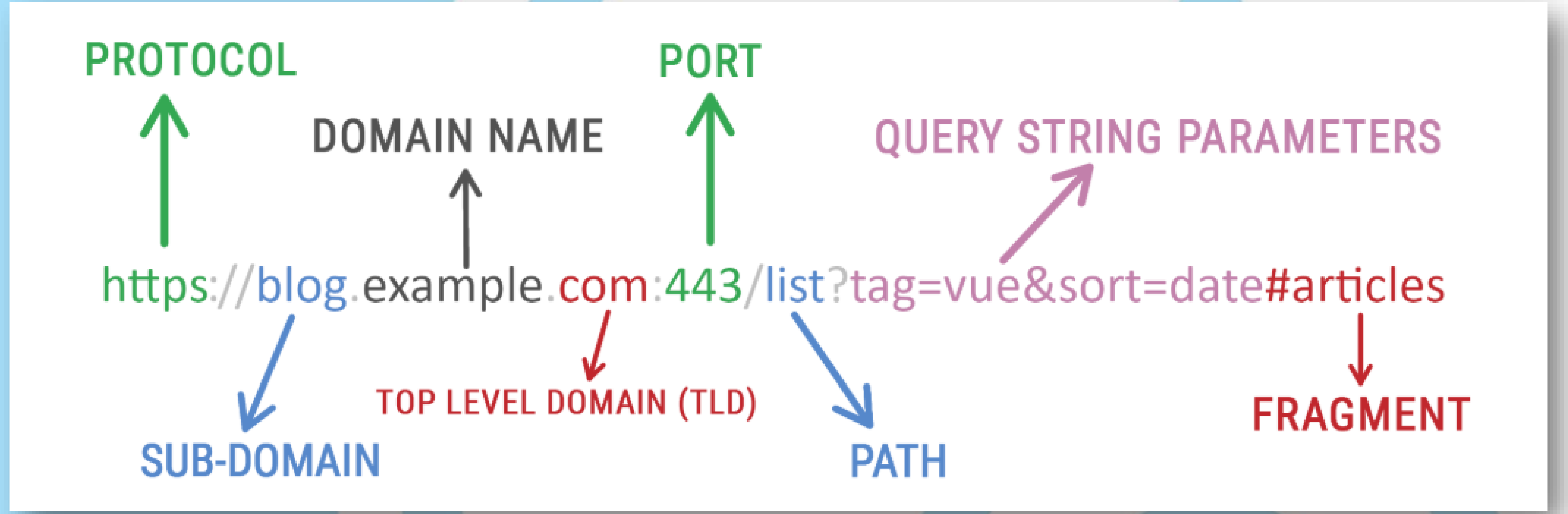
Module 2 Day 11

HTTP and Consuming APIs - Part 1

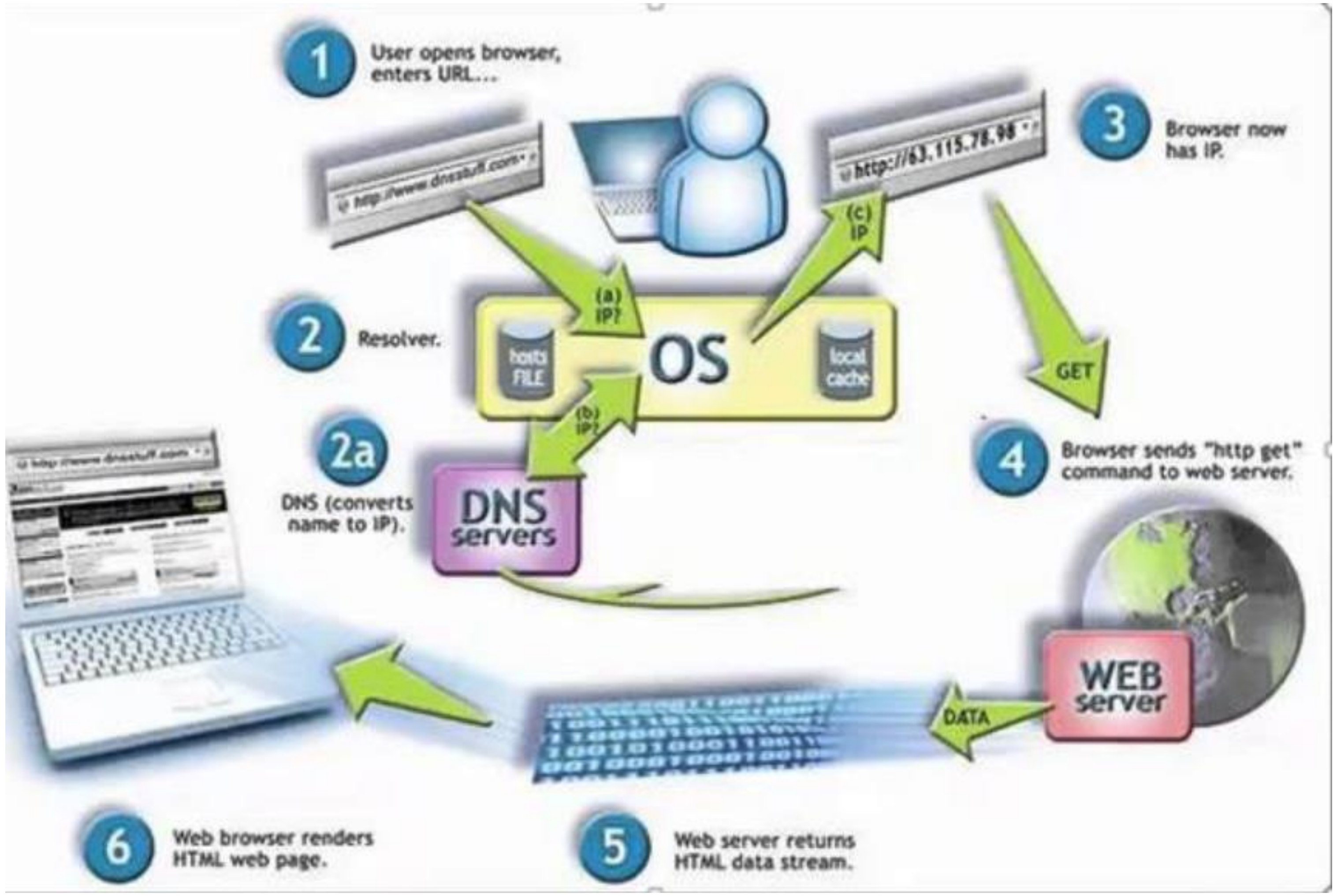
The Internet and the World Wide Web

- Are the Internet and WWW the same thing?
- If not, what is the difference?
- What is the protocol that defines the Internet?
- What is the protocol that defines the WWW?
- What other applications / protocols run on the Internet?

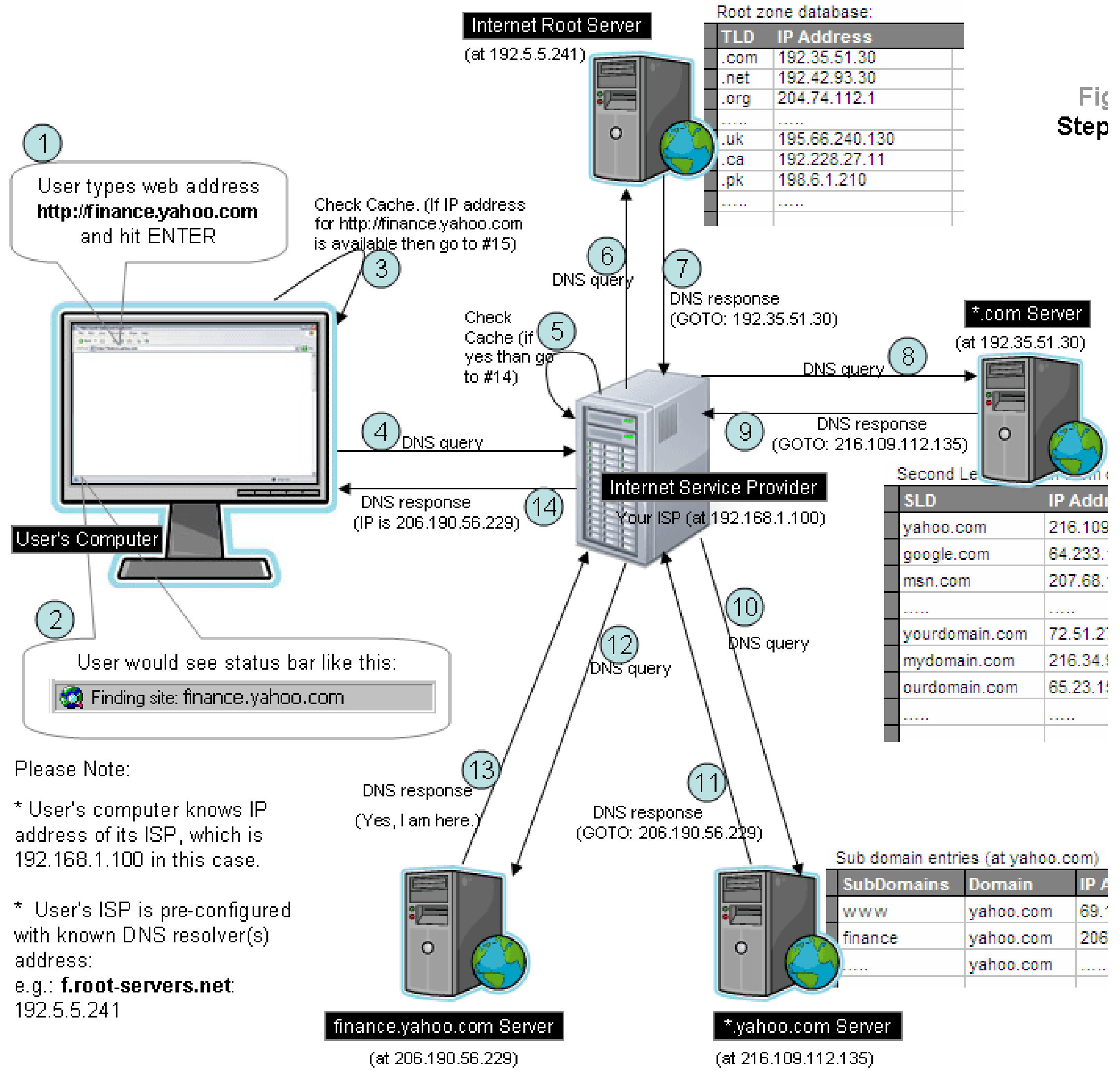
URL / URI


PROTOCOL
DOMAIN NAME
PORT
QUERY STRING PARAMETERS
https://blog.example.com:443/list?tag=vue&sort=date#articles
SUB-DOMAIN
TOP LEVEL DOMAIN (TLD)
PATH
FRAGMENT

Fetching a URL



1 User opens browser, enters URL...
http://www.dnsstuff.com
(a) IP?
2 Resolver.
hosts FILE
OS
local cache
(b) IP?
2a DNS (converts name to IP).
DNS servers
(c) IP
http://63.115.78.98
3 Browser now has IP.
GET
4 Browser sends "http get" command to web server.
WEB server
DATA
5 Web server returns HTML data stream.
6 Web browser renders HTML web page.


Internet Root Server
(at 192.5.5.241)
Fig
Step
1
User types web address **http://finance.yahoo.com** and hit ENTER
Check Cache. (If IP address for http://finance.yahoo.com is available then go to #15)
3
6
DNS query
7
DNS response (GOTO: 192.35.51.30)
*.com Server
(at 192.35.51.30)
Check Cache (if yes than go to #14)
5
8
DNS query
4
DNS query
9
DNS response (GOTO: 216.109.112.135)
Internet Service Provider
Your ISP (at 192.168.1.100)
DNS response (IP is 206.190.56.229)
14
User's Computer
2
User would see status bar like this:
Finding site: finance.yahoo.com
10
DNS query
12
DNS query
13
DNS response (Yes, I am here.)
11
DNS response (GOTO: 206.190.56.229)
finance.yahoo.com Server
(at 206.190.56.229)
*.yahoo.com Server
(at 216.109.112.135)

Root zone database:

TLD	IP Address
.com	192.35.51.30
.net	192.42.93.30
.org	204.74.112.1
.....	.....
.uk	195.66.240.130
.ca	192.228.27.11
.pk	198.6.1.210
.....	.....

Second Le

SLD	IP Addr
yahoo.com	216.109
google.com	64.233.
msn.com	207.68.
.....	.....
yourdomain.com	72.51.2
mydomain.com	216.34.
ourdomain.com	65.23.1
.....	.....

Sub domain entries (at yahoo.com)

SubDomains	Domain	IP A
www	yahoo.com	69.
finance	yahoo.com	206
.....	yahoo.com	.....

Please Note:

* User's computer knows IP address of its ISP, which is 192.168.1.100 in this case.

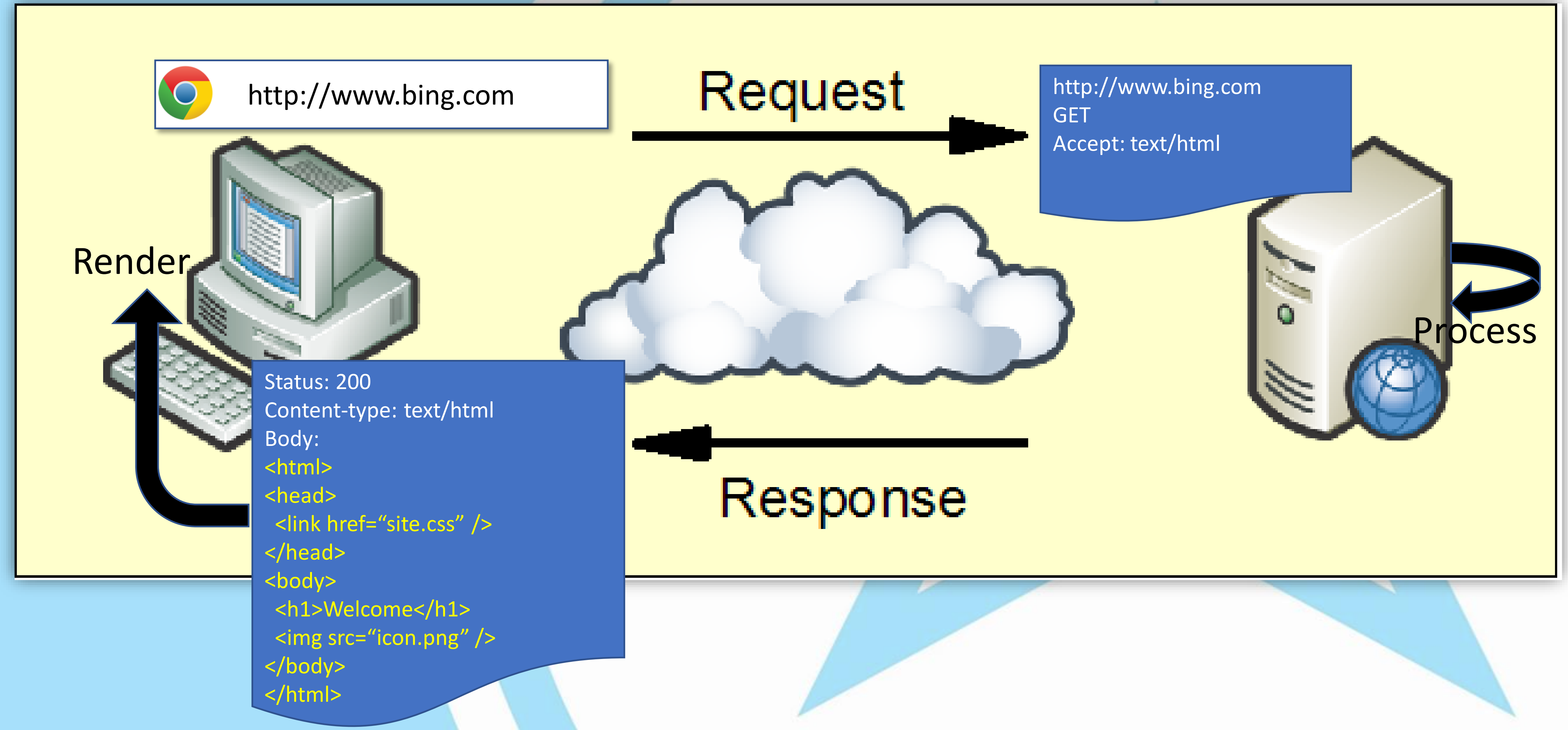
* User's ISP is pre-configured with known DNS resolver(s) address:
e.g.: **f.root-servers.net**: 192.5.5.241

Multi-level domain names

HTTP Request-Response

- Request
  - URL – Uniform Resource Locator
  - HTTP Method / Verb (GET, PUT, POST, DELETE)
  - Headers (auth, content-type, cookies)
  - Body (sometimes)
- Response
  - Status (2xx, 3xx, 4xx, 5xx)
  - Headers (content-type, set-cookie)
  - Body (sometimes)

HTTP Request-Response



http://www.bing.com
GET
Accept: text/html

```
Status: 200
Content-type: text/html
Body:
<html>
<head>
  <link href="site.css" />
</head>
<body>
  <h1>Welcome</h1>
  <img src="icon.png" />
</body>
</html>
```

HTTP Request-Response

- Stateless
  - server “remembers” nothing about the client between requests
- Cyclic
  - Response from server contains references, links and redirects
  - Client (e.g., Browser) responsible for making multiple requests to completely fulfill the user’s query and display a complete page
- Browser Developer Tools (F12)
  - Help you see all the requests that are taking place
  - Help understand performance issues

Demo

HTTP Headers

Header	What it does	Example
Accept	Request: tells server what type of content is acceptable	Accept: text/plain,application/json
Authorization	Request: Specifies the type of authorization to be sent	Authorization: Bearer
Content-type	Response: Tells what type of content has been sent	Content-type: application/json
Content-length	The length of the body of the request	Content-length: 255

HTTP Methods (Verbs)

Method	Definition
GET	Read and return the specified resource. Requests using GET should only retrieve data, never change server data.
POST	Create a new resource, often causing a change in state on the server. Not idempotent (duplicate calls might cause two new resources).
PUT	Update the specified resource with the request payload. Idempotent (duplicate calls may be made without side effects).
DELETE	Remove the specified resource from the server.

Tools

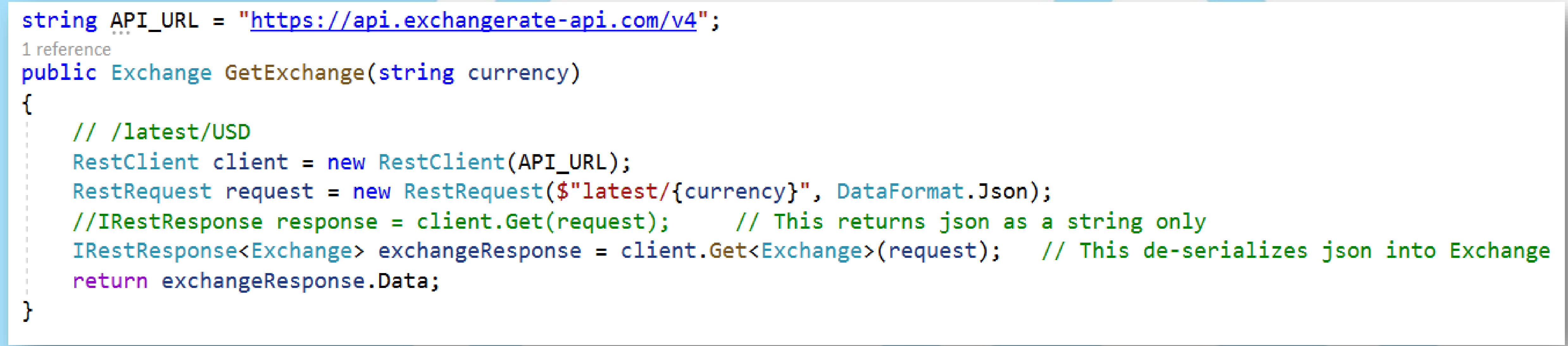
- JSON Viewer (Chrome extension)
- Browser Developer Tools (F12)
- Postman

- https://api.exchangerate-api.com/v4/latest/USD
- https://api.openweathermap.org/data/2.5/weather?zip=44101&units=imperial&appid=b49555ced86dc4c82f40c75e15906a2e

Demo

Consuming an API in C#

- RestSharp is the 3rd-party package we use
- Manage NuGet Packages



```
string API_URL = "https://api.exchangerate-api.com/v4";
1 reference
public Exchange GetExchange(string currency)
{
    // /latest/USD
    RestClient client = new RestClient(API_URL);
    RestRequest request = new RestRequest($"latest/{currency}", DataFormat.Json);
    //IRestResponse response = client.Get(request);     // This returns json as a string only
    IRestResponse<Exchange> exchangeResponse = client.Get<Exchange>(request);   // This de-serializes json into Exchange
    return exchangeResponse.Data;
}
```

Demo

Consuming an API in C#

- Json-server is a local "fake" api server
- We must prepare and start it
  - Npm install
  - Npm run serve
- Data shows up on http://localhost:3000
- Our lecture code shows hotels and reviews

Let's Code

Lists of Public API's

- https://imago.dev/10-free-public-apis/
- https://shkspr.mobi/blog/2016/05/easy-apis-without-authentication/
- https://apilist.fun/
- https://github.com/public-apis/public-apis
- https://public-apis.xyz/
- Https://rapidapi.com/ (this one's a little commercial)