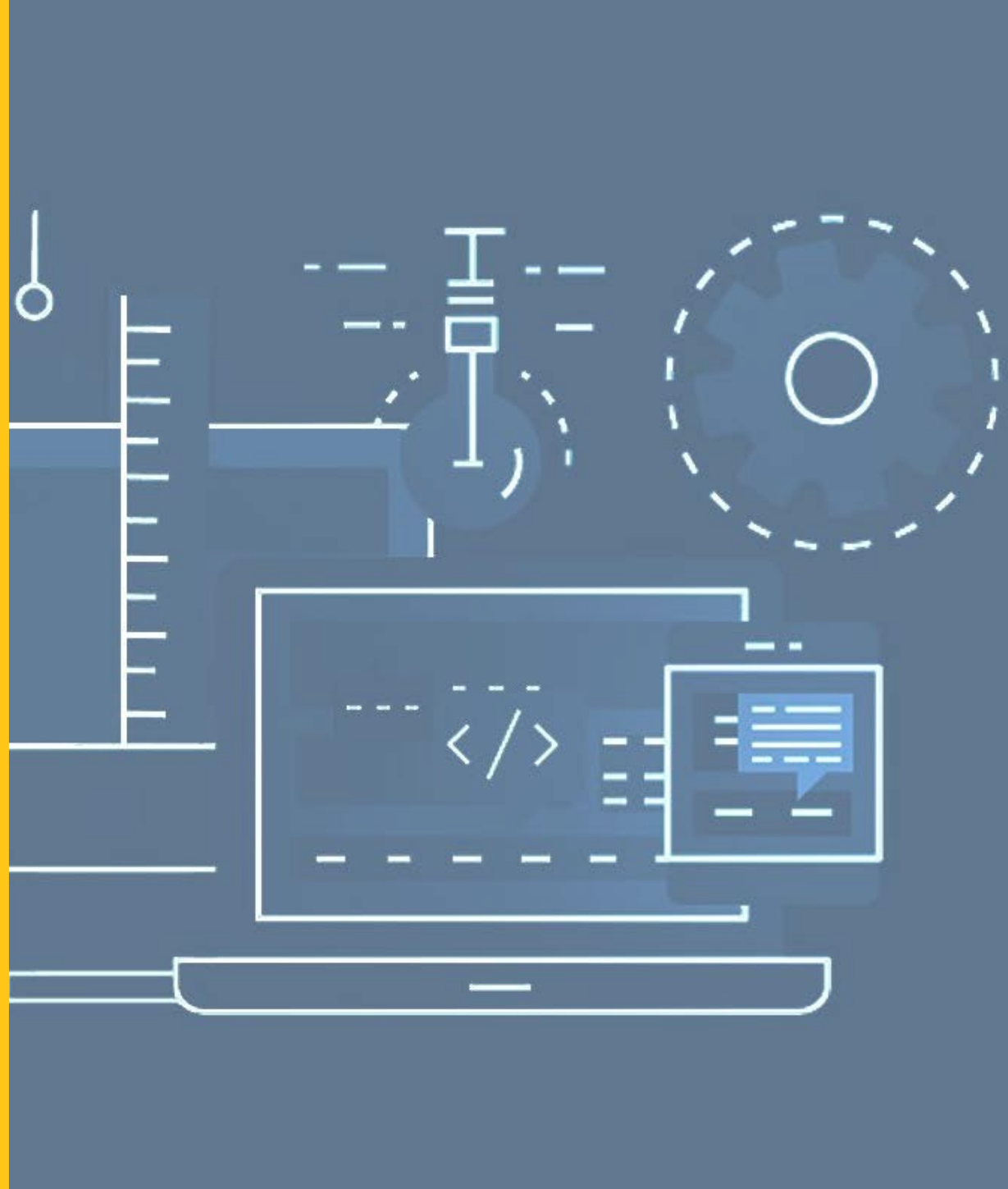
SHELLY GRAHAM, 08/08/2022

WEB DEV 4 SUMMER 2022

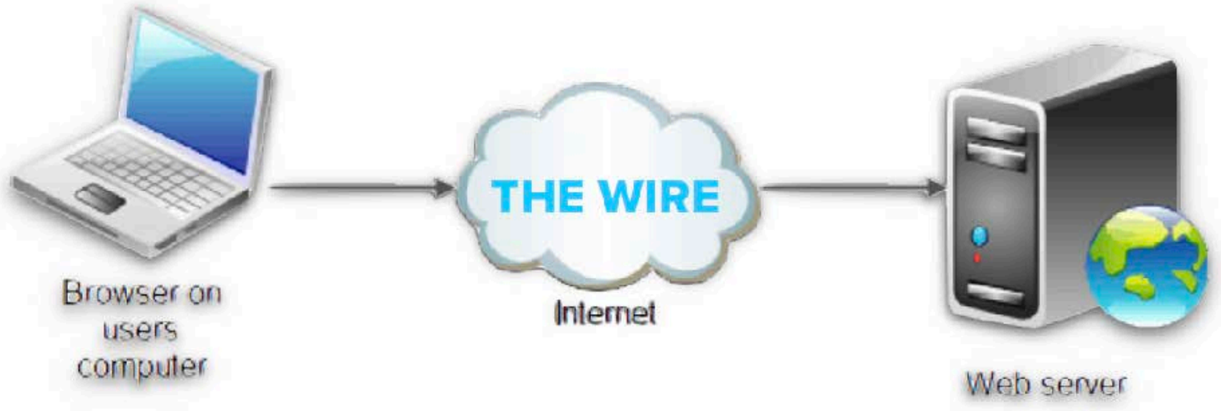
Week5: Web Servers



WEEK 5: WEB SERVERS

WHAT IS A WEB SERVER?

- Software that serves web content (websites, PDFs, Apps...)
- Uses the HTTP(s) protocol to send data
- Serves static and dynamic content
- Web 1.0 = static websites
- Web 2.0 = dynamic websites you can interact and therefore change
- Web 3.0 = Yet to be determined but generally speaking crazy shit!
- Fun fact: JS files are static files!

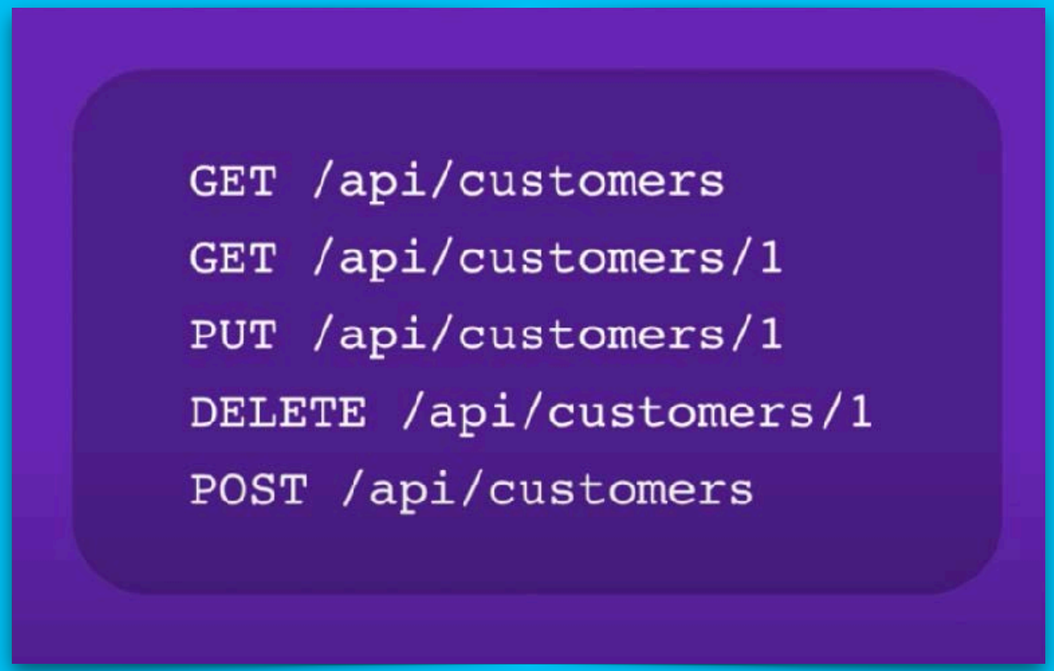


HOW DOES A WEB SERVER WORK?

- If the client requests a website, the server will process the request:
  - 1. Establish a connection between client and server through TCP = Transmission Control Protocol (standard that defines how to establish and maintain a network conversion)
  - 2. Depending on request, server will locate data on server, update data before it’s being displayed, log into database on server, etc.
  - 3. Respond with displaying the response result = website

WEB SERVER REQUEST TYPES

- HTTP Methods:
  - GET = Receive unaltered data from server/database
  - POST = Add new data to server/ database
  - PUT = Update existing data on server/ database
  - DELETE = Delete data from server/ database



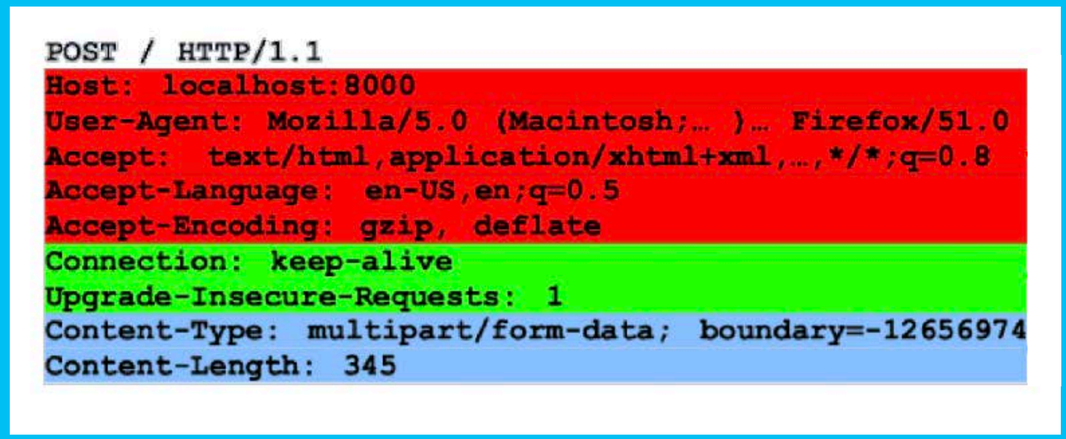
HTTP METHODS IN FORMS

- action attribute: defines where the data gets sent or where it comes from. Its value must be a valid relative or absolute URL. If this attribute isn't provided, the data will be sent to the current page
- method attribute: defines how data is sent, the most common being the `GET` method and the `POST` method

```
<form action="http://www.foo.com" method="GET">
  <div>
    <label for="say">What greeting do you want to say?</label>
    <input name="say" id="say" value="Hi">
  </div>
  <div>
    <label for="to">Who do you want to say it to?</label>
    <input name="to" id="to" value="Mom">
  </div>
  <div>
    <button>Send my greetings</button>
  </div>
</form>
```

STRUCTURE OF HTTP REQUEST

- Start line: Method + request target (URL) —> GET/ index.html
- Headers: see picture below
- Body: Usually empty in HTTP requests
- Detailed info: https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers



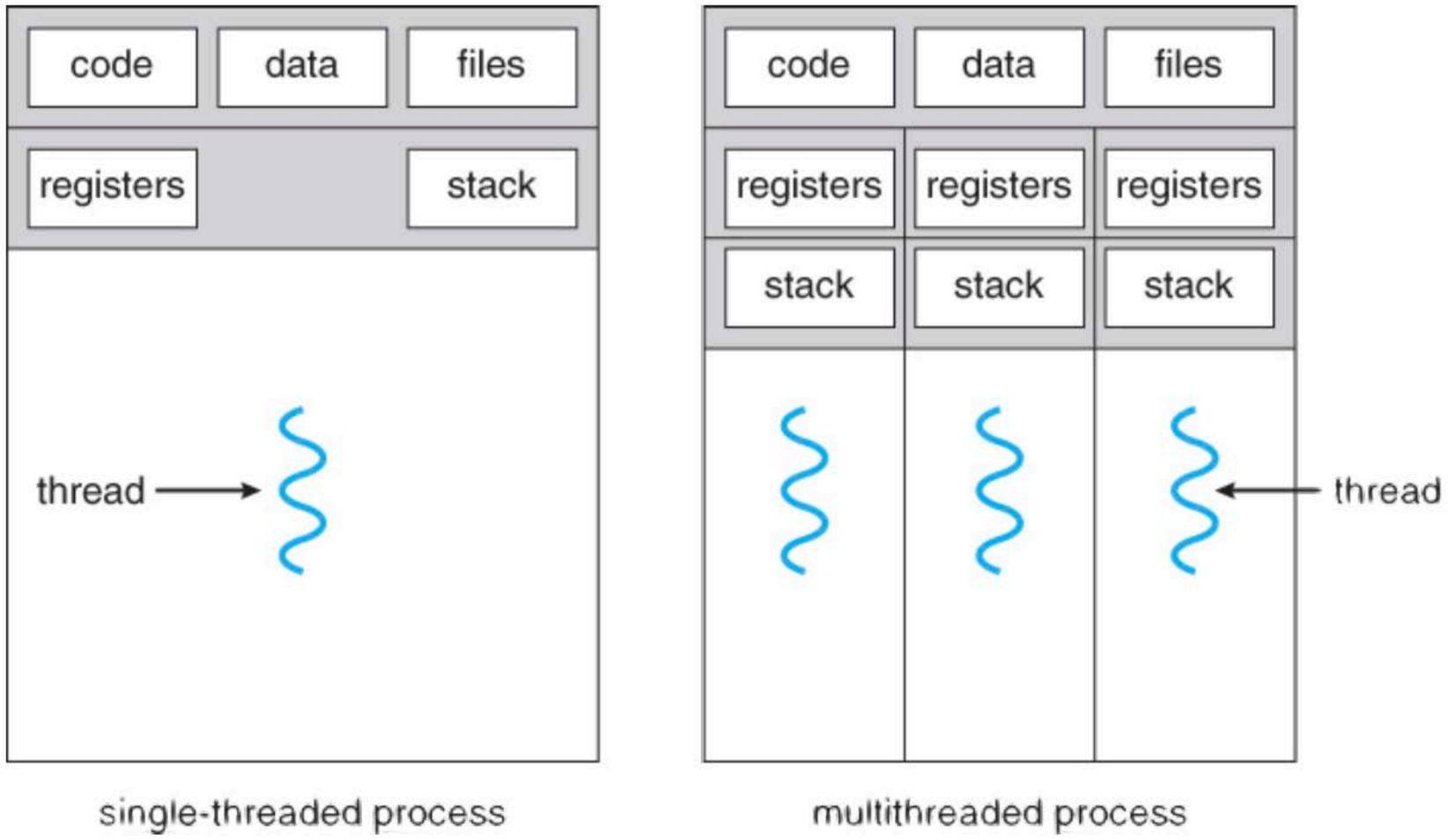
SERVER RESPONSES

- Provides us with lots of information
- Status codes:
- 1xx = informational
- 2xx = success —> 200 = success
- 3xx = redirection
- 4xx = Client Error —> 400 = Bad request, 403 = forbidden, 404 = not found
- 5xx = Server Error —> 500 = internal server error
- Details: https://www.restapitutorial.com/httpstatuscodes.html
- Server also makes memory of the client who requested data = Socket

STRUCTURE OF HTTP RESPONSE (FROM SERVER)

- Status line: Status code + Status text —> e.g. 404 - not found!
- Headers: see picture below
- Body: The content/data itself
- Detailed info: https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers

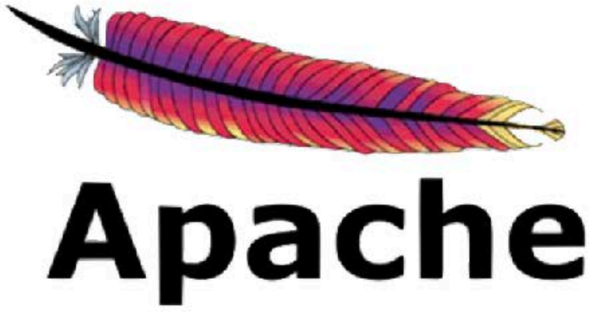
DIFFERENT TYPES OF SERVERS



single-threaded process

multithreaded process

SINGLE-THREAD SERVERS



Blocking Single-thread server:

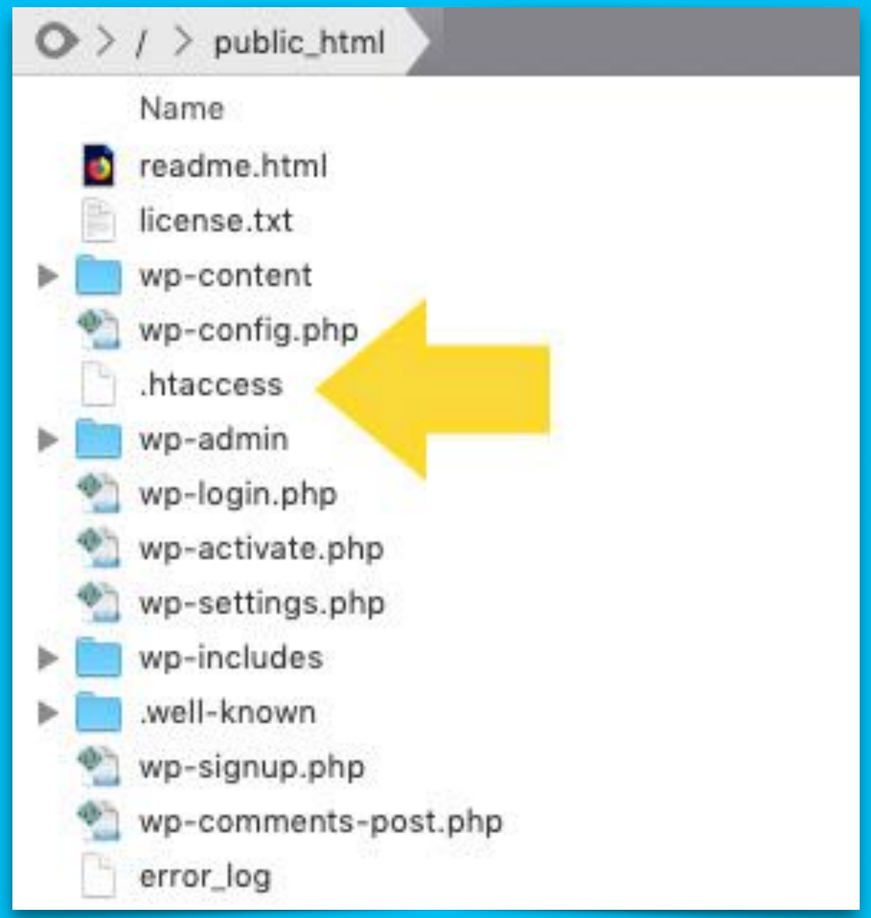
- Server can only serve 1 client at a time = synchronous
- Will make all other requests wait until initial request has been served
- Some servers create a new socket for every single client BUT takes of lots of memory on server
- Often uses PHP —> easy scripting language, good for beginners
- Old but stable technology: Great support but slow to adapt
- Many CMS (Wordpress, Drupal, Joomla) and Frameworks (Yii, Laravel, Code Ignitor, Cake PHP) use it

MULTI-THREAD SERVERS

Multi-thread server:

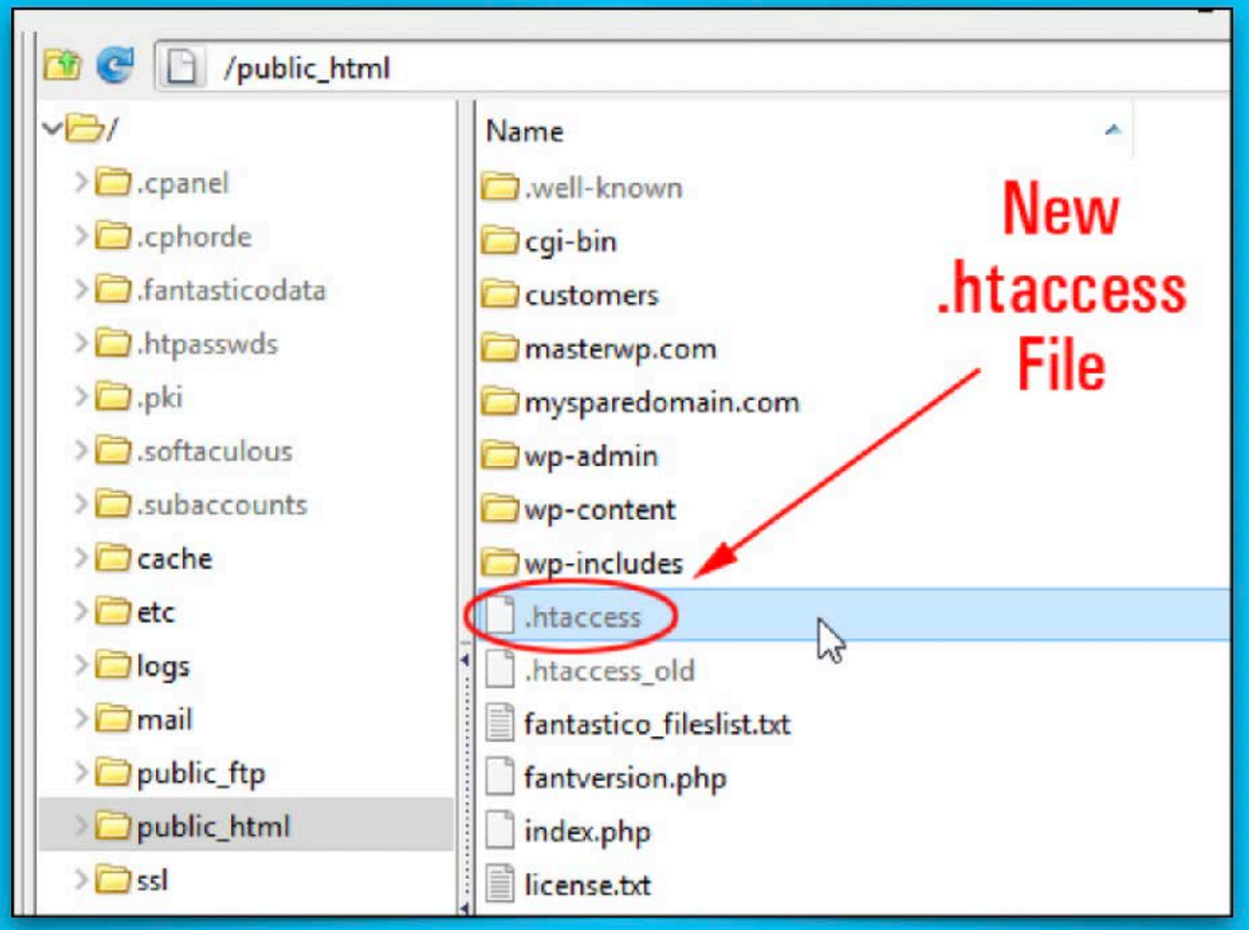
- Server can server thousands of threads at once = asynchronous
- Perfect for real time communication on the internet = web sockets
- Code written in JS! Which lets you be a full-stack developer with only 1 language!
- Relatively new concept but has large community that continuously adds modules to use
- Companies that use Node.JS: Netflix, LinkedIn, Walmart, Trello, Uber, PayPal, Ebay, NASA...

HOW TO CHANGE YOUR HOSTING PREFERENCES: .HTACCESS FILE



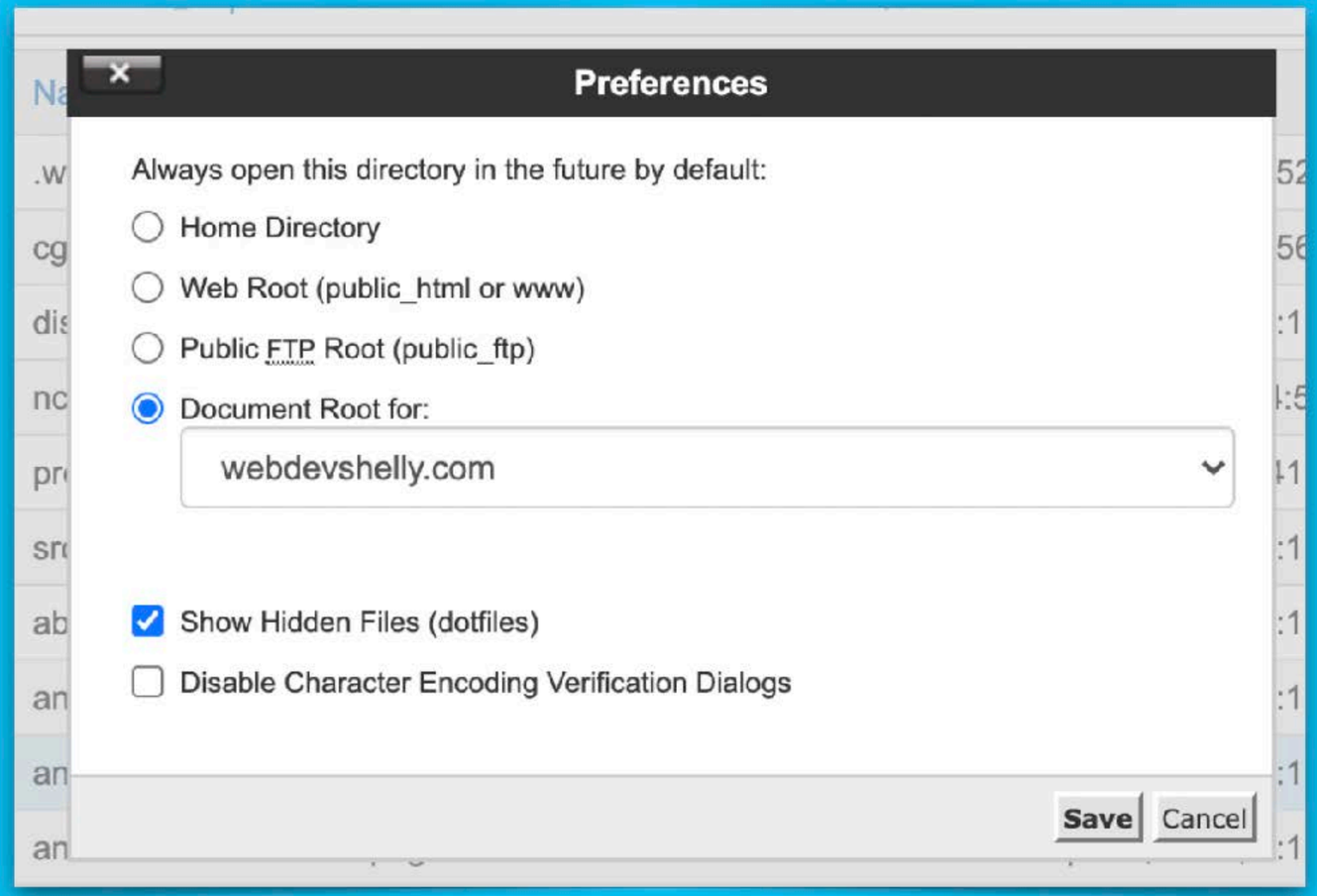
.HTACCESS FILE

- Short for Hypertext Access
- Configuration file used by apache-based web servers
- Lives at the root (top level of website) of your web server
- VERY powerful file that can alter the behavior of your web server
- If you plan to edit it, ALWAYS make a copy before you start
- Only 1 .htaccess file per project



.HTACESS FILE

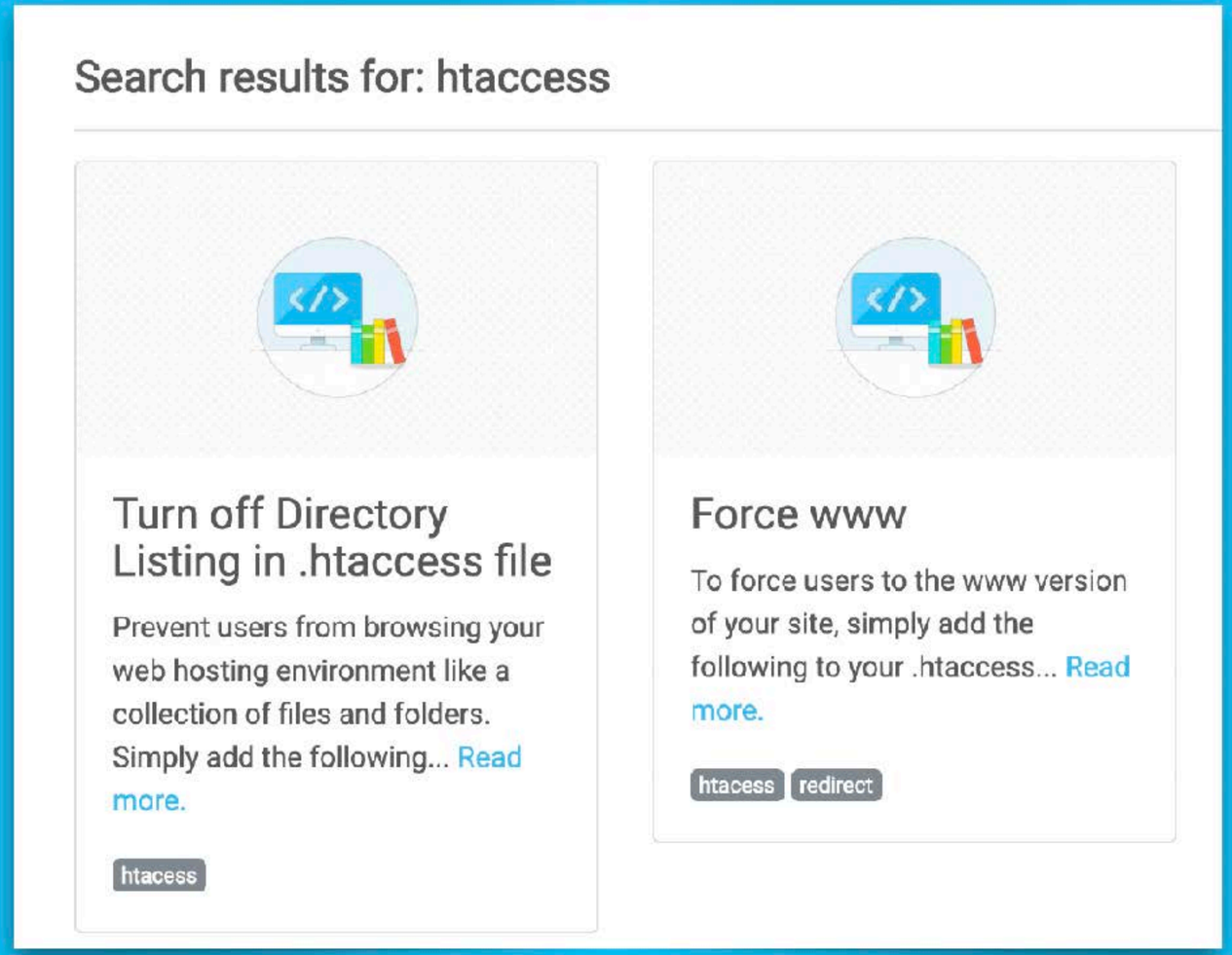
- You can view .htaccess file with your FTP server
- On Linux-based machine (Macs), files that start with a dot are invisible —> show hidden fils with COMMAND + SHIFT + DOT
- Cyberduck: COMMAND + SHIFT + R
- Transmit: COMMAND + SHIFT + B
- Show .htaccess file in cPanel through Settings > Show Hidden Files



.HTACCESS FILE RESOURCES

- Good starting point: HTML5 Boilerplate .htaccess file, well maintained and regularly updated:

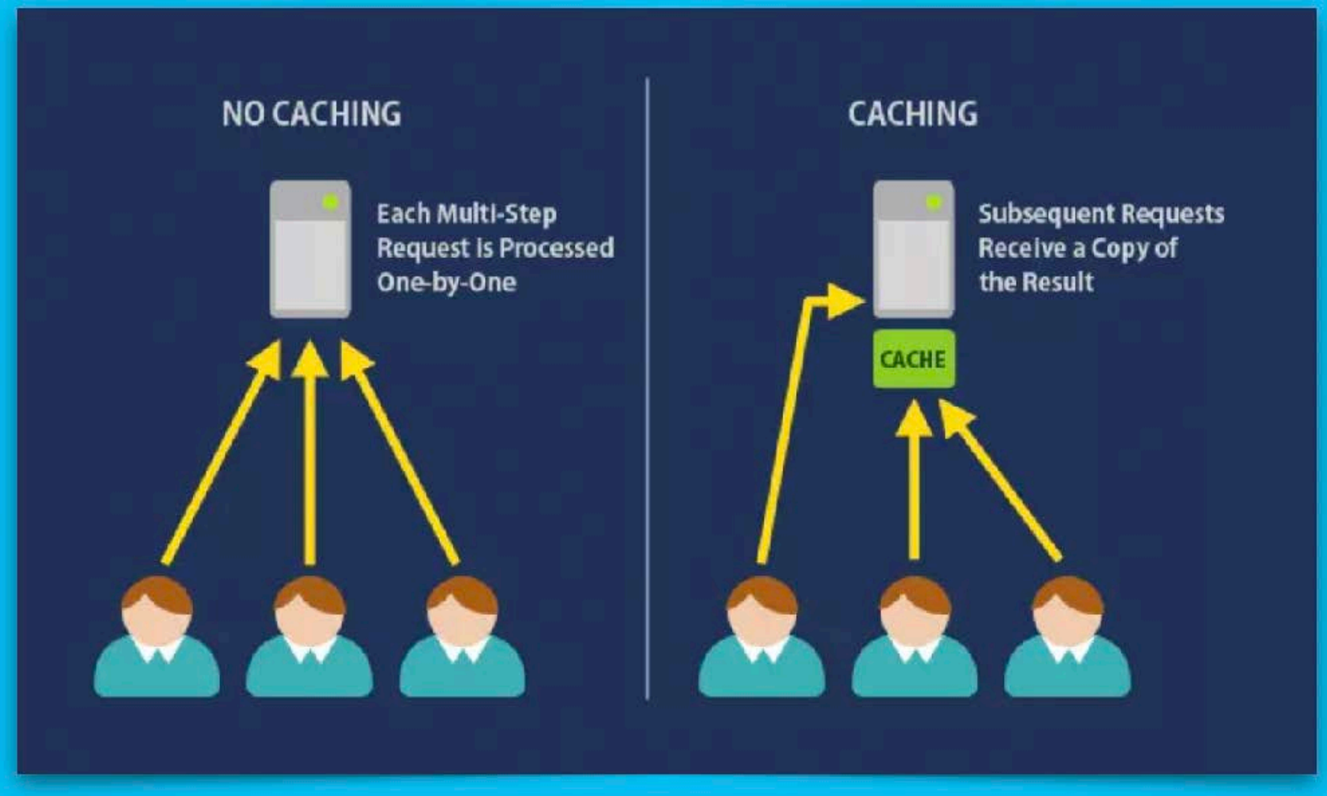
  https://github.com/h5bp/html5-boilerplate/blob/master/dist/.htaccess
- Weaver Tips: https://weaver.tips/search?q=htaccess
- Always turn off directory access!



CACHING

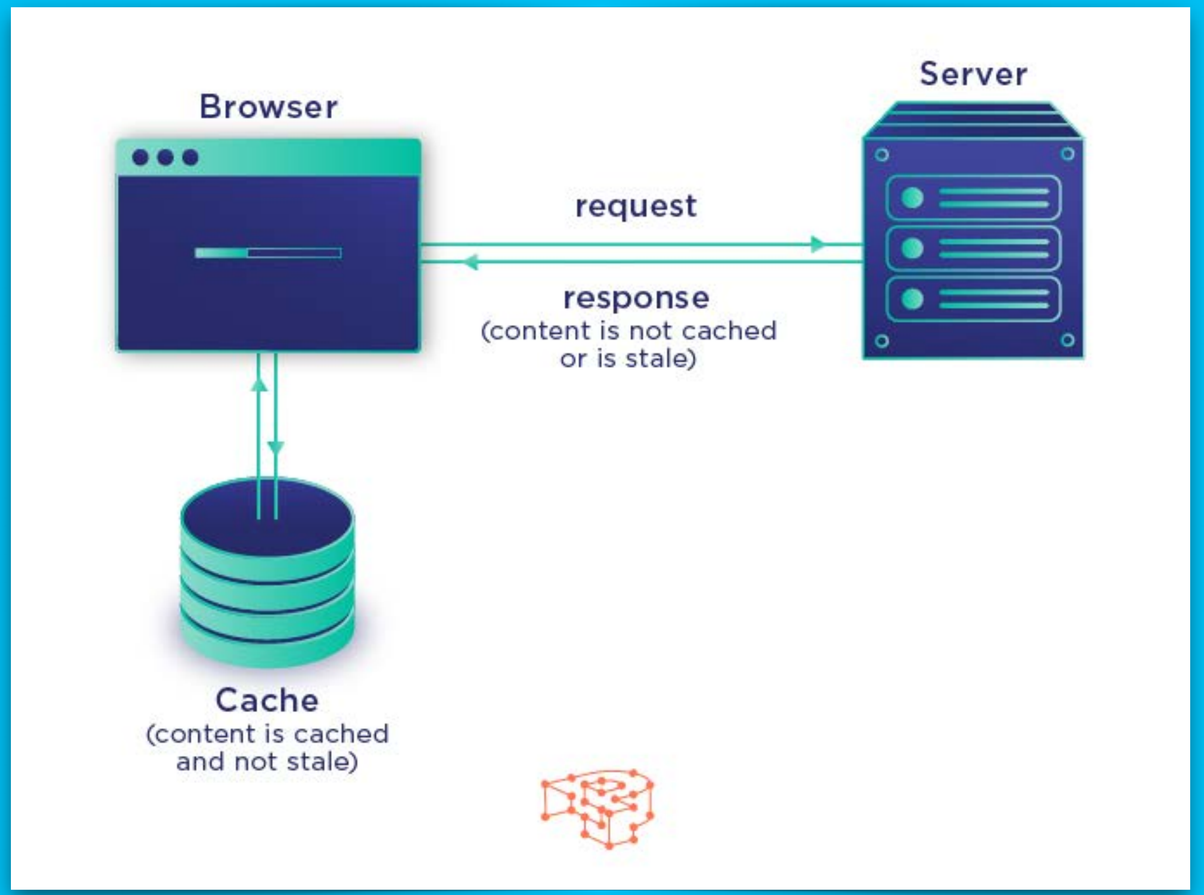
CACHING

- Cacheing means saving mostly static responses from web servers for future use
- Static: images, CSS files, JS files
- Reduces network activity (bandwidth) between client and server & helps with website speed



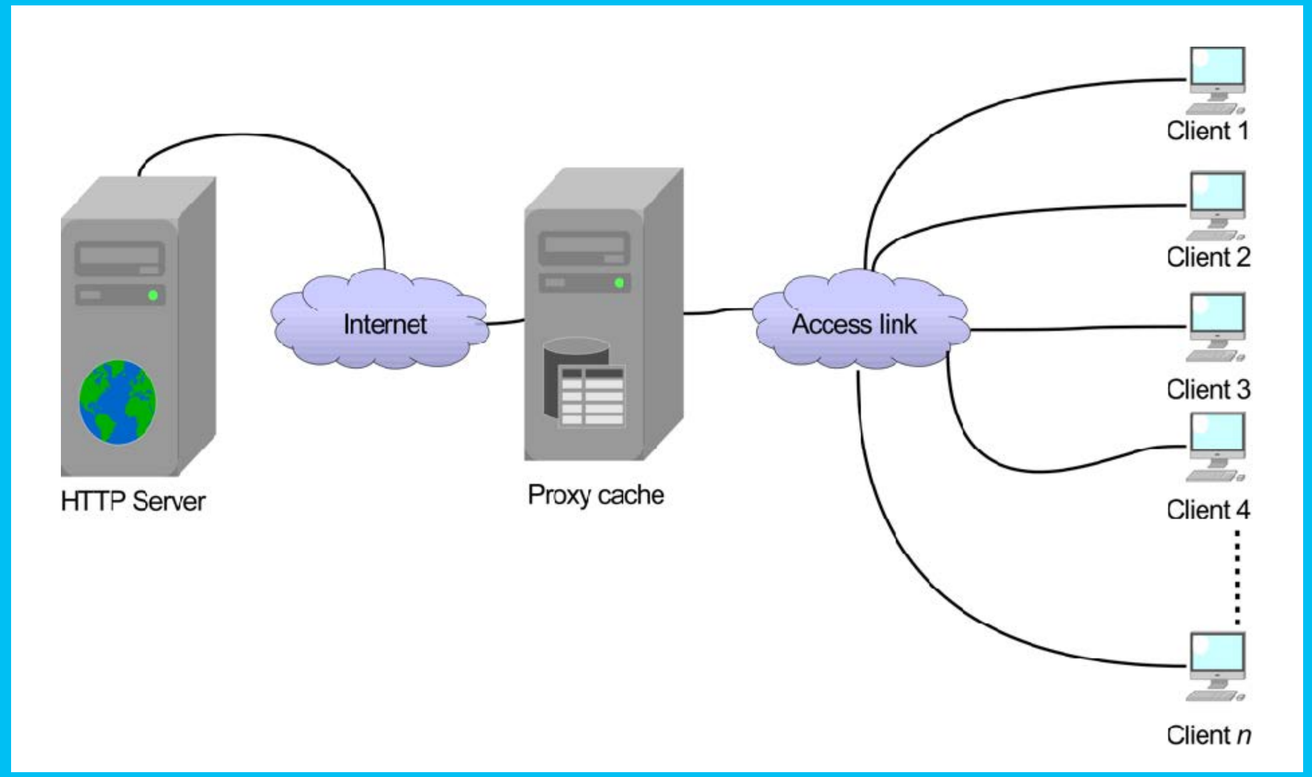
BROWSER CACHE

- Sets aside a section of your computer's hard disk to store representations that you've seen
- Especially useful when users hit the "back" button



PROXY CACHE

- Like browser cache but on a larger scale, also known as shared cache
- Serve thousands of users; large corporations and ISPs often set them up on their firewalls
- Proxy cache are out of network, requests have to be routed to them

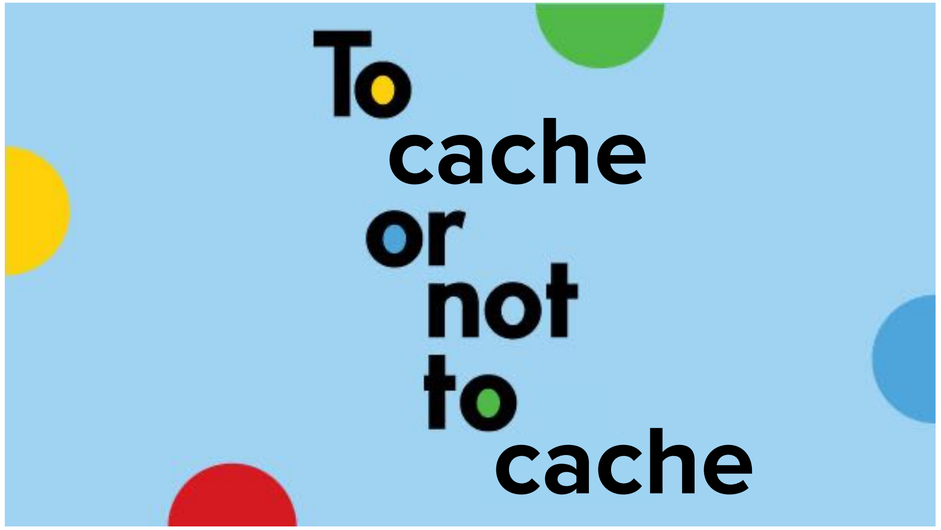


IS CACHE GOOD OR BAD?

- One of the most misunderstood technologies on the Internet
- It can help your website perform better (by storing static content)
- It can also prevent users from seeing the current/most recent updates made to your website
- Many companies spend $$$ setting up farms of servers around the world to replicate their content to make access as fast as possible
- Caches do the same for you, and they're even closer to the end user. Best of all, you don't have to pay for them.

HOW A BROWSER DETERMINES CACHE CONTENT:

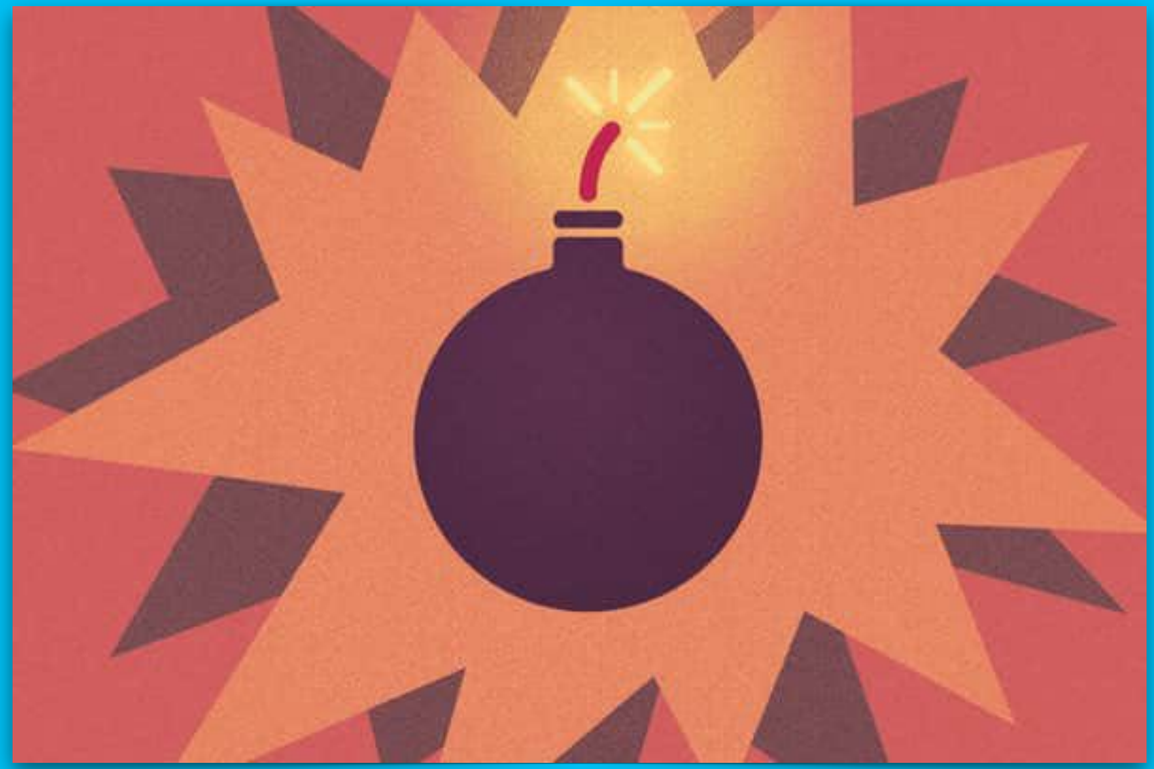
- If the response's headers tell the cache not to keep it, it won't
- If the request is secure (HTTPS) it won't be cached
- A cached representation is considered *fresh* (that is, able to be sent to a client without checking with the origin server) if:
  - It has an expiration time or other age-controlling header set, and is still within the fresh period, or
  - If the cache has seen the representation recently, and it was modified relatively long ago.
- Fresh representations are served directly from the cache, without checking with the origin server



CACHE BUSTING

WHAT IS CACHE BUSTING?

- AKA Fingerprinting
- Updating the file names or paths to your files to force the browser to reload your site/ certain files from the server
- Helps to serve latest content
- 3 ways to do this:
  - 1. Query Strings
  - 2. File Name Versioning
  - 3. File Path Versioning
- Great resource: https://css-tricks.com/strategies-for-cache-busting-css/



WHAT IS CACHE BUSTING?

- Use program to do the work for you:
  - Gulp Cache Bust https://www.npmjs.com/package/gulp-cache-bust
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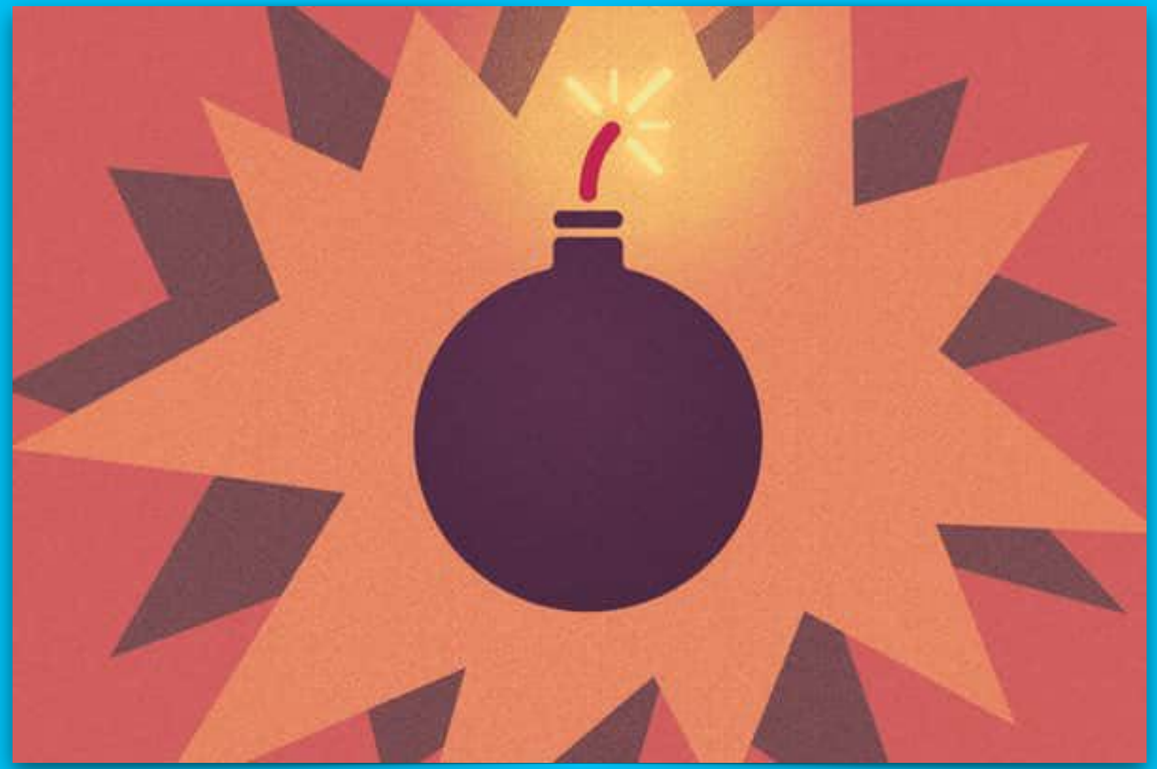
- In your .htaccess file
- Write your own rule with Node.js



QUESTIONS?

HOMEWORK

- Update your Project 2 website with in-class feedback.
- Make sure you re-upload your updated files to your domain (via cPanel or FTP server) to have the new changes reflected.
- Create a subdomain in your cPanel.
- Upload your files for Project 1 to your new subdomain and have both projects displayed online.
- Submit your domain link along with both project GitHub links to Google Classroom.

FIN