GENERAL ASSEMBLY

JAVASCRIPT DEVELOPMENT

Sasha Vodnik, Instructor

HELLO!

1. Pull changes from the `svodnik/jsd5` repo to your computer
2. Navigate to the `starter-code` folder

AJAX & APIS

LEARNING OBJECTIVES

At the end of this class, you will be able to

- Identify all the HTTP verbs & their uses.
- Describe APIs and how to make calls and consume API data.
- Access public APIs and get information back.
- Implement an Ajax request with vanilla JS.
- Implement a jQuery Ajax client for a simple REST service.
- Reiterate the benefits of separation of concerns – API vs. Client.

AGENDA

- APIs
- HTTP
- Ajax & JavaScript
- Ajax & jQuery

THE DOM, JQUERY, & TEMPLATING — REVIEW

- In the channel for today (`08-dom-jquery-cont`), share your answers to one or both of the following questions:
  - **Significant thing**:
    "The most significant thing I learned about the DOM, jQuery, and templating is _____."
  - **Outstanding question**:
    "My biggest outstanding question on the DOM, jQuery, or templating is _____."

Checkin and questions

- The **most significant thing I learned** about the DOM, jQuery, and templating is _____.
- My **biggest outstanding question** about the DOM, jQuery, and templating is _____.

What kinds of data are available online?

APIs

WEB SERVICE

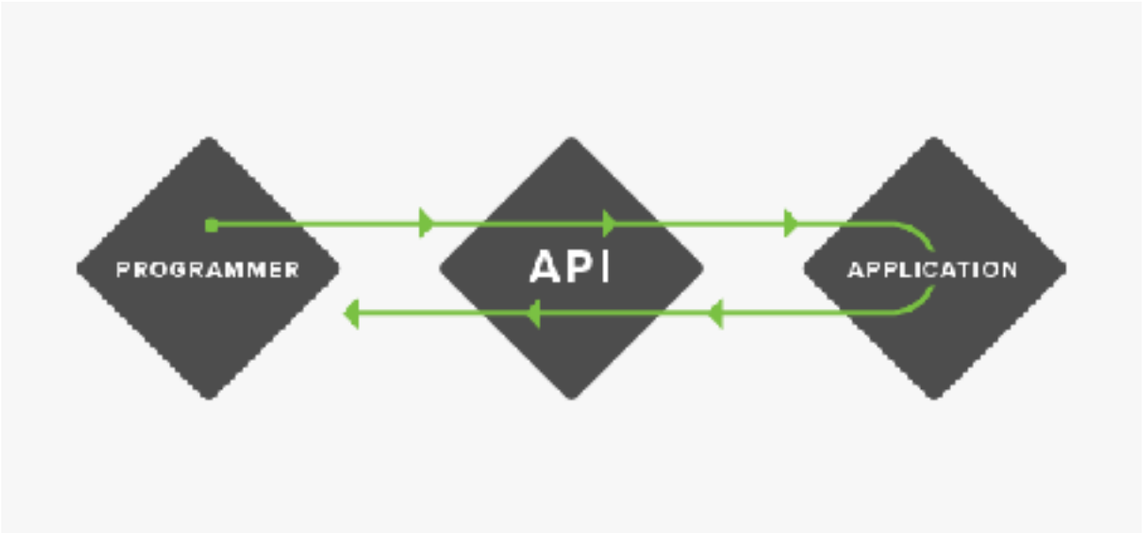
- An online source of data
- Communicate using HTTP, but instead of markup we receive data
- We can use multiple services in a single app
- This makes separation of concerns (DOM logic and data) even more important

API = application programming interface

- Each service has an API, which is a predefined set of objects, properties, and methods anyone can use to access that service
- Any service we access online through our apps will have an API
- Middleman; allows different pieces of software to communicate

APIS IN THE REAL WORLD

- Most APIs are unique, like separate languages
- API for devices (iPhone); for operating systems (macOS); for JavaScript libraries (jQuery API)



HOW WE WILL USE APIS

- We will focus on web-based APIs (for web services)
- Use HTTP to request/receive structured data from endpoints on a server
- Endpoints are addresses (URLs) that will return data (JSON) instead of markup (HTML)

WHAT WE NEED TO KNOW TO USE AN API

- Its terms of service (paid service? limit on usage?)
- How to make a request (URL and parameters)
- What kind of data is returned and how to parse it

HOW MIGHT A SERVICE REQUEST BE DIFFERENT THAN USING OUR OWN DATA?

- May need to authenticate when requesting data
- May be a lag, requiring user notification
- Request may result in an error

REST (representational state transfer)

- architectural style of web applications
- transfers a representation of the state of a server resource to the client
- https://en.wikipedia.org/wiki/Representational_state_transfer

RESTful API

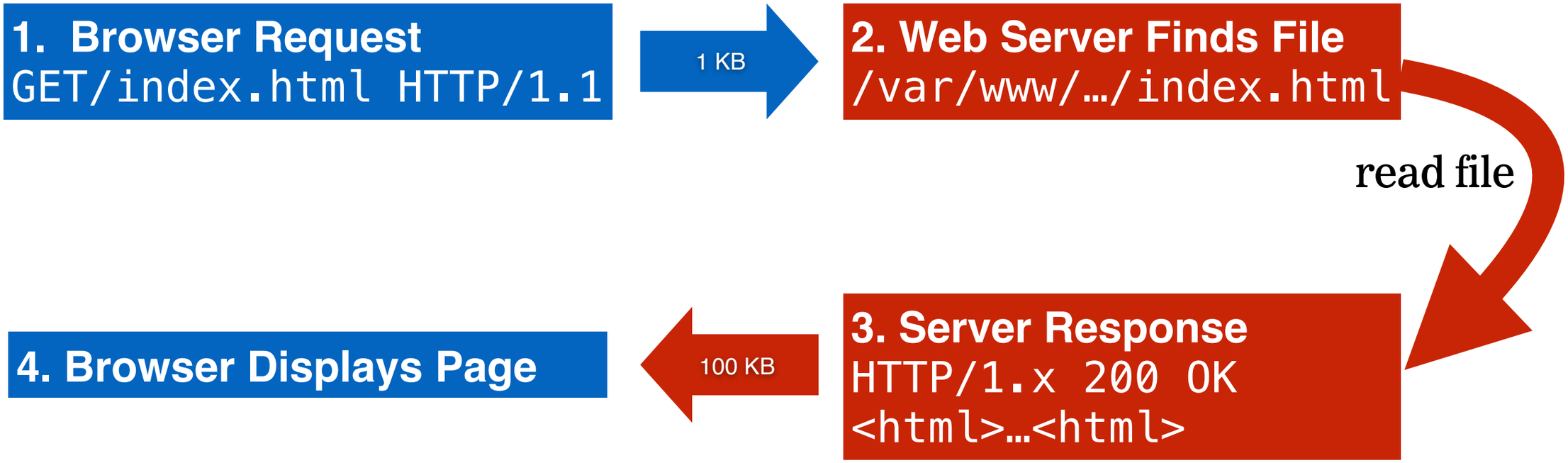
- adheres to REST architecture
- uses
  - a base URL
  - an Internet media type (such as JSON)
  - standard HTTP methods

HTTP

HTTP (hypertext transfer protocol)

- System of rules for how web pages are transmitted between computers
- Defines the format of messages passed between HTTP clients and HTTP servers
- A client sends a **request** to a server.
- A server sends a **response** back to a client.

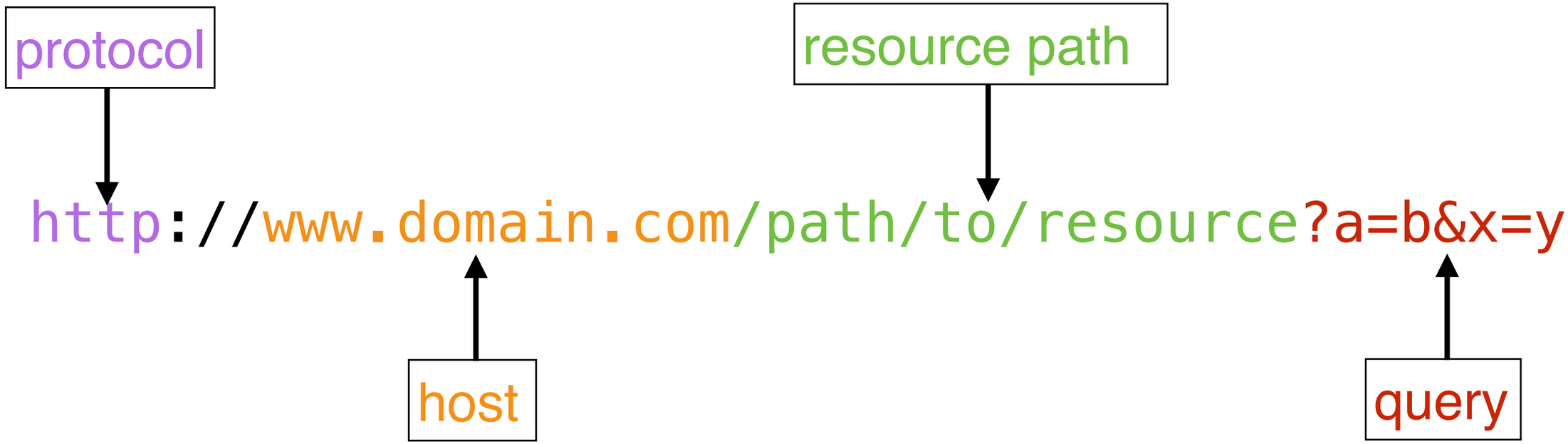
HTTP REQUEST AND RESPONSE



HTTP (hypertext transfer protocol)

- HTTP clients are generally web browsers (Chrome, Firefox, Safari, Edge, etc.)
- HTTP servers are web servers (Apache, Nginx, etc.)
- **Web applications** are programs that plug into a web server, process the HTTP requests that the server receives, and generate HTTP responses

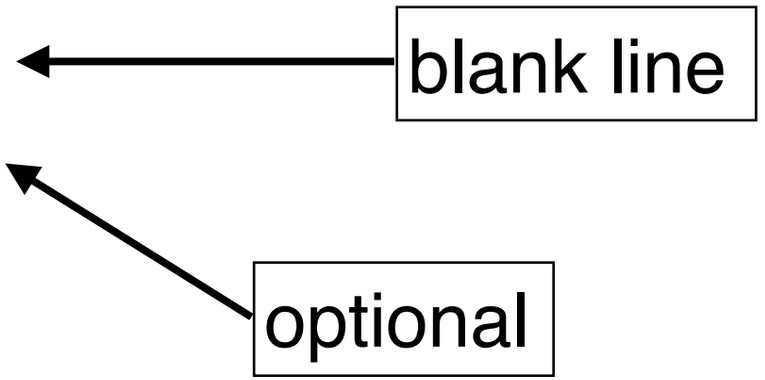
HTTP REQUESTS IN EVERYDAY LIFE



HTTP REQUEST STRUCTURE

```
[http request method] [URL] [http version]
[list of headers]

[request body]
```

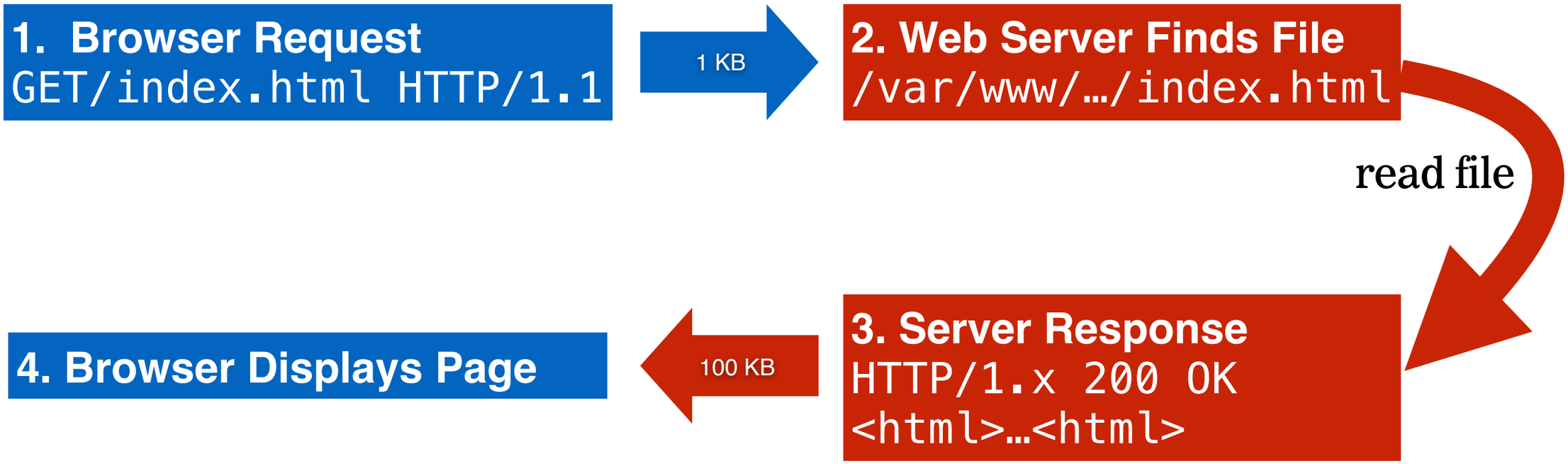


HTTP REQUEST METHODS ("HTTP VERBS")

`GET`	Retrieve a resource
`POST`	Create a resource
`PATCH`	Update an existing resource (same as `PUT`, but `PATCH` is recommended)
`DELETE`	Delete a resource
`HEAD`	Retrieve the headers for a resource

Most widely used

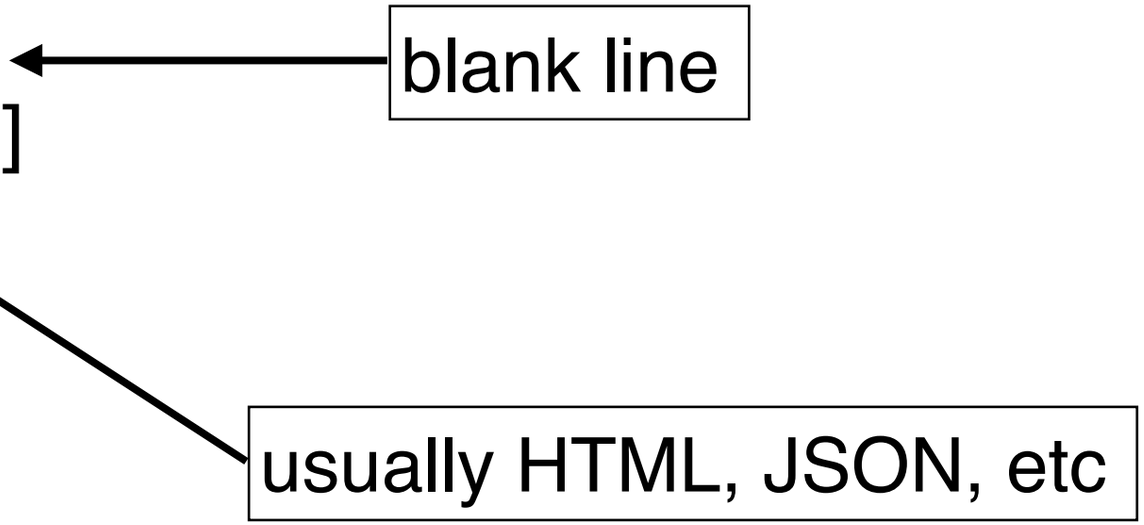
HTTP REQUEST AND RESPONSE



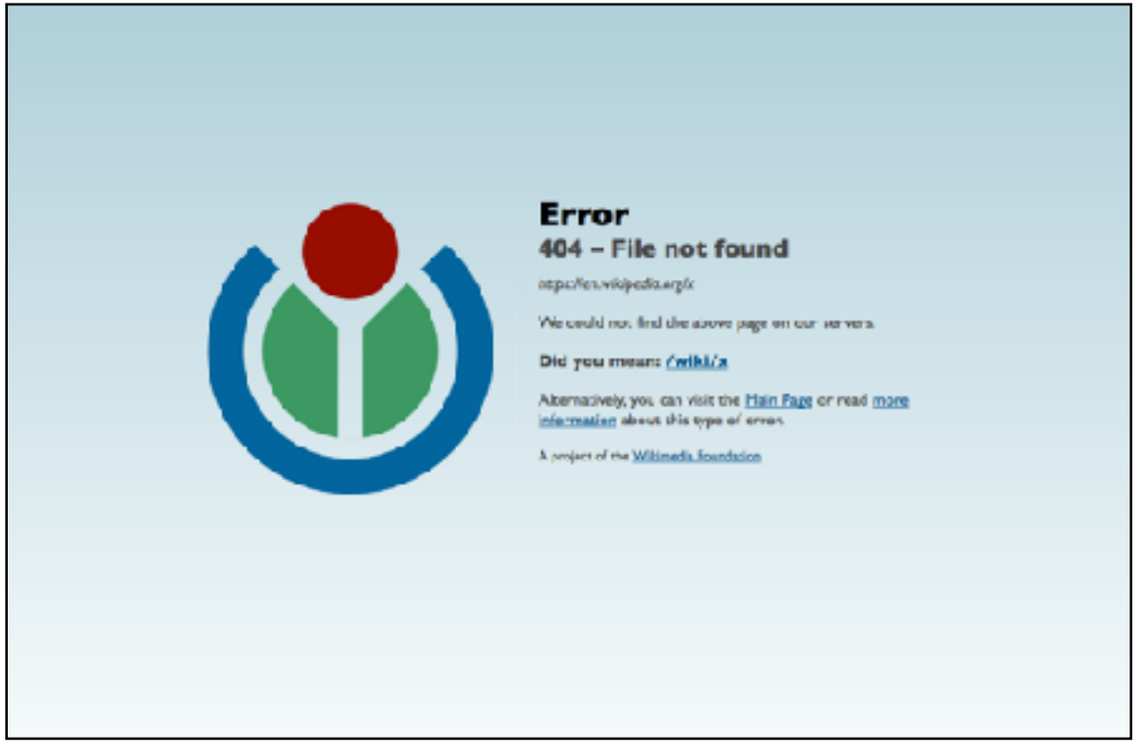
HTTP RESPONSE STRUCTURE

```
[http version] [status] [reason]
[list of headers]

[response body]
```



HTTP STATUS CODES



HTTP STATUS CODES

200	Okay
301	Moved permanently
302	Moved temporarily
400	Bad request
403	Forbidden
404	Not found
500	Internal server error

BREAK (5 MINUTES)

Ajax

Ajax

- Originally AJAX (Asynchronous JavaScript and XML)
- XML is a format for data interchange that's derived from the same markup language that HTML comes from.
- Since JSON was codified, it's become the standard for data interchange on the web, so Ajax is no longer functionally an acronym.

What does Ajax let us do?

- Communicate with servers from within our apps
- Make the communication asynchronous (in the background)
- We can update interfaces and content without refreshing the page

XMLHttpRequest

- Standard object that we create an instance of for an HTTP request

method	description
`onreadystatechange`	we assign a custom function that specifies how we want to handle the HTTP response
`open`	opens HTTP connection; we specify request type and URL as parameters
`send`	sends request; generally no parameters needed

XMLHttpRequest.readyState

- Property that stores the state of the request

value	state	description
0	UNSENT	Client has been created. open() not called yet.
1	OPENED	open() has been called.
2	HEADERS_RECEIVED	send() has been called, and headers and status are available.
3	LOADING	downloading; responseText holds partial data.
4	DONE	The operation is complete.

BREAK (5 MINUTES)

jQuery Ajax

Using Ajax with jQuery

method	description
`$.get()`	loads data from a server using an HTTP GET request
`$.ajax()`	performs an Ajax request based on parameters you specify

LEARNING OBJECTIVES - REVIEW

- Identify all the HTTP Verbs & their uses.
- Describe APIs and how to make calls and consume API data.
- Access public APIs and get information back.
- Implement an Ajax request with vanilla JS.
- Implement a jQuery Ajax client for a simple REST service.
- Reiterate the benefits of separation of concerns – API vs. Client.

NEXT CLASS PREVIEW

Asynchronous JavaScript and Callbacks

- Store and use anonymous functions in variables.
- Pass functions as arguments to functions that expect them.
- Write functions that take other functions as arguments.
- Return functions from functions.

HOMEWORK – DUE TUESDAY 12/7

Open Weather Map project

- Finish Open Weather Map project (input boxes and Kelvin -> Fahrenheit conversion optional)
- Add forecast.io as a second data source (documentation at https://developer.forecast.io). How you integrate the new data into the web page is up to you — it can replace the temperature returned by Open Weather Map, you can show both forecasts, or you can create an interface that gives users a choice of which to view.

Exit Tickets!

Q&A