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WEB SERVERS & APIS

LEARNING OBJECTIVES

- 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
- Read and write data in JSON format
- Use the requests library

WHAT IS AN API?

- Set of routines, protocols and tools for building software applications
- Specifies how software components should interact
- How developers abstract functionality to data, devices and other resources provided
- Basically, an API is a service that provides raw data for public use

EXAMPLES APIS

- Connectivity to a variety of databases
- Python modules that can turn LED lights on and off
- Application that runs on native Windows, OSX, or Linux
- Libraries that post content on Twitter, Facebook, Yelp, or LinkedIn
- Web services for accessing currency or stock prices

YOU DO: RESEARCH APIS (10 MINUTES)

Check out the following APIs and determine three capabilities they offer and three potential project ideas for each

- Facebook
- Yelp
- Echonest
- Got time? Check out more here: http://www.programmableweb.com/apis/directory

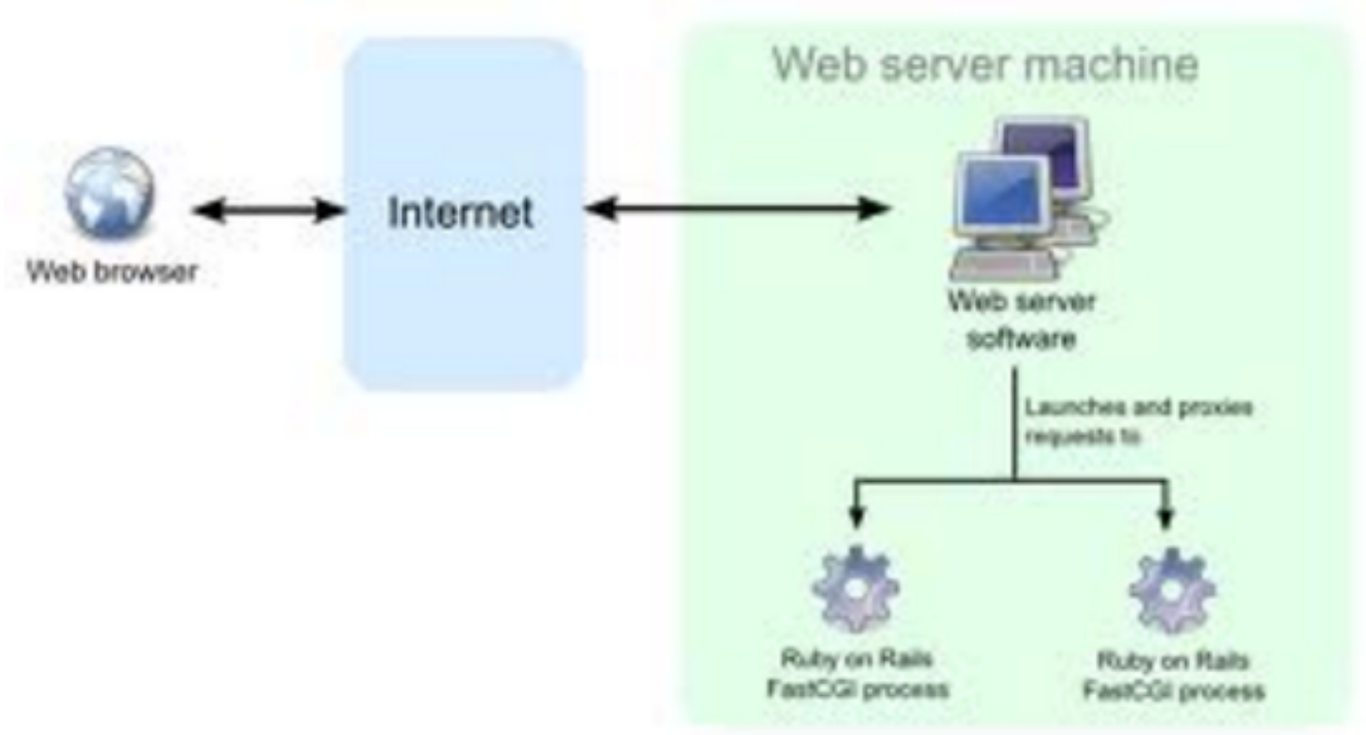
TEXT

WEB APIS

The prevalence of web API's have increased 10x with the rise of Javascript and advent of web programming techniques allowing the communication of small pieces of data, without having to refresh the entire page. AJAX is a programming technique from the client side that enables data exchange without a full page reload.

HTTP

API calls are really a fancy term for making HTTP requests to a server and sending/receiving structured data from that endpoint. We are still communicating with URLs, however instead of receiving markup, like we do with HTML pages, we receive data.



HTTP CLIENTS

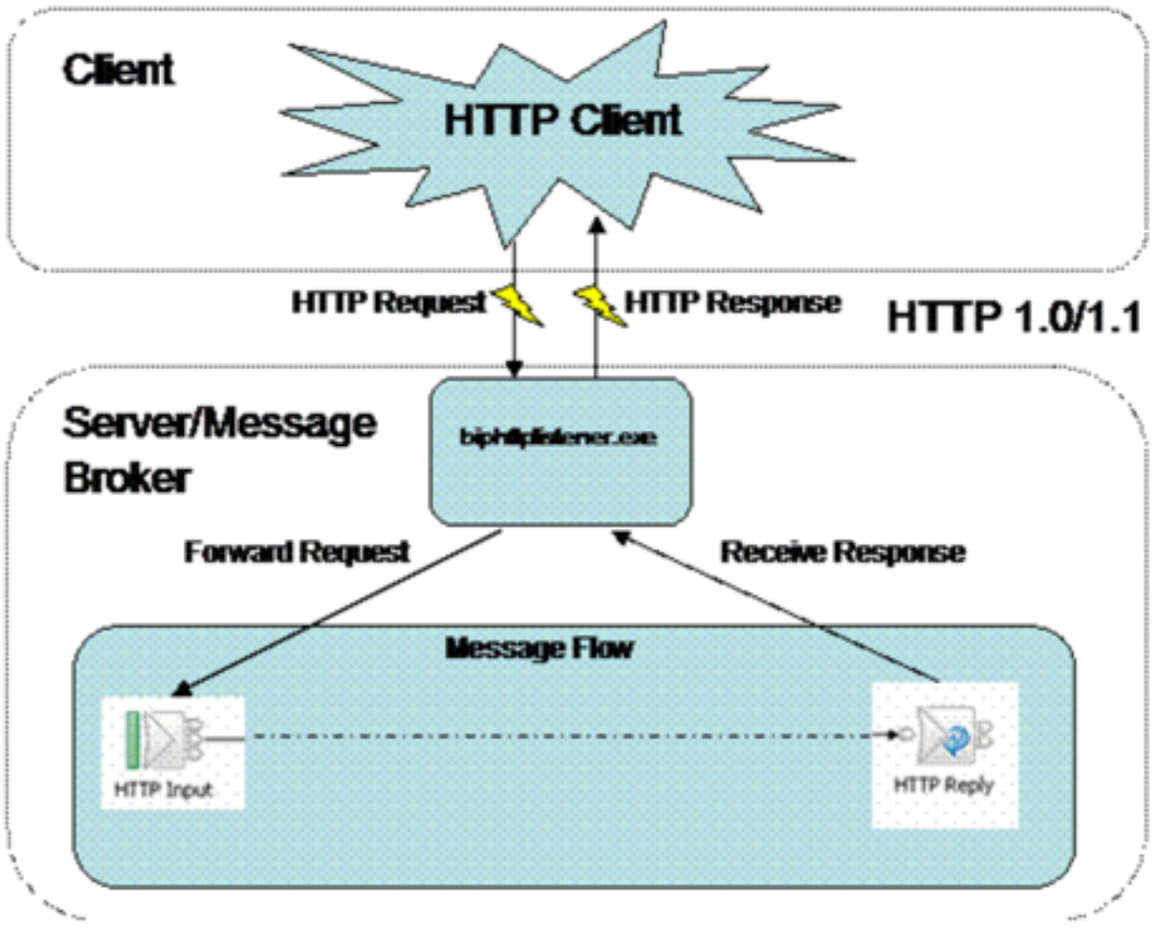
- Since the web is a service, it works through a combination of clients which make requests and servers (which receive requests).
- HTTP Clients make or generate HTTP Requests. Some types of clients are: Browsers - Chrome, Firefox and Safari; Command Line programs - curl and wget

HTTP SERVERS

- HTTP Clients respond to HTTP Responses from a Web Server. They process the data being returned form a Web Server, aka HTTP Server.
- All Web Servers receive HTTP Requests and generate HTTP Responses.

WEB APPLICATIONS

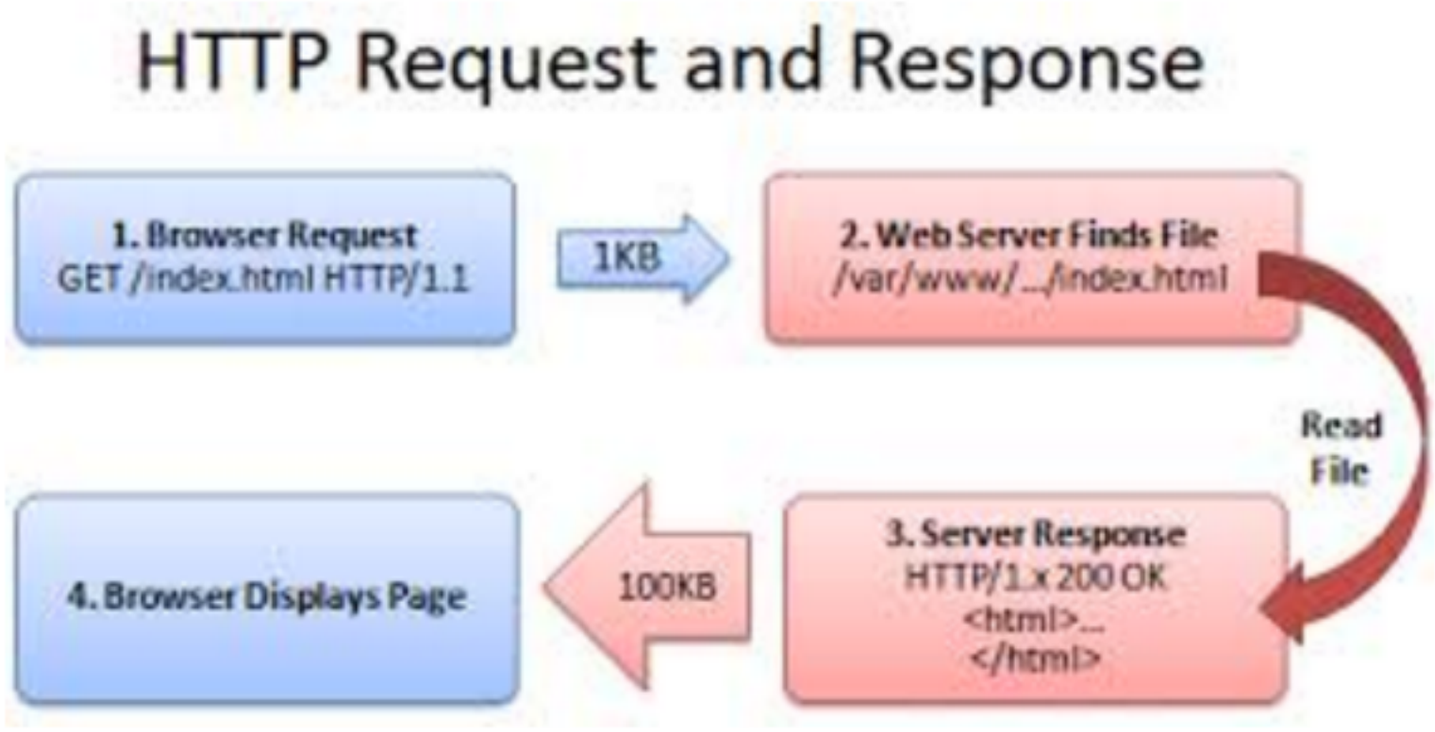
- Web Applications are programs that run on a web server, process the HTTP requests that the server receives, and generate HTTP Responses.



HERE'S THE RUNDOWN

- A client sends a HTTP Request to a HTTP Server running on a remote machine. The hostname given in the URL, indicates which server will receive the request.
- The HTTP server processes the HTTP Request. This may entail passing the request to some Web Application, which creates a HTTP Response.
- The response gets sent back to the client.
- The client processes the response

HTTP REQUEST & RESPONSE



HTTP REQUEST METHODS

- GET => Retrieve a resource
- POST => Create a resource
- PATCH (or PUT, but PATCH is recommended) => Update an existing resource
- DELETE => Delete a resource
- HEAD => Retrieve the headers for a resource

GET and POST are the most widely used

STATUS CODES

Code	Reason
200	OK
301	Moved Permanently
302	Moved Temporarily
307	Temporary Redirect
400	Bad Request
403	Forbidden
404	Not Found
500	Internal Server Error

JSON

- JavaScript Object Notation
- Gives us a human-readable collection of data that we can access in a really logical manner

JSON

JSON is built on two structures:

- A collection of name/value pairs. In various languages, this is realized as an object, record, structure, dictionary, hash table, keyed list, or associative array.
- An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

PULLING DATA FROM API (10 MINUTES)

- Download Postman: https://www.getpostman.com/
- Type in the "url" of an API call
- Ensure the "method" is “GET"
- Press "Send"

APIS TO TRY: SAMPLE URLS

- This for that: http://itsthisforthat.com/api.php?json
- iTunes: http://itunes.apple.com/search?term=adele
- Giphy: http://api.giphy.com/v1/gifs/search?q=funny+cat&api_key=dc6zaTOxFJmzC
- OMDB: http://www.omdbapi.com/?t=Game%20of%20Thrones&Season=1
- Star Wars: http://swapi.co/api/people/3
- Stocks: http://dev.markitondemand.com/Api/Quote/json?symbol=AAPL
- Google Geocode: https://maps.googleapis.com/maps/api/geocode/json?address=033+BELDEN+PL+San+Francisco+CA

OAUTH

Many APIs are not free to access. You first need to register as a developer and obtain an authorization key. In most cases, this is also accompanied by a temporary token that needs to be renewed after some time. This is a way to prevent abuse on the server's resources.

You can read more about it here: http://oauth.net/2/

PAIR PRACTICE: PYTHON APIS (10 MIN)

- form pairs and do the following
- go to http://www.pythonapi.com/
- choose 1 API: what data you can get?
- install python module, try to extract data
- discuss: how could you leverage that api? how could you use the data?