426 in Copenhagen

Lecture 0

Introductions

The magic of the World Wide Web 1.0...

- You can request disabroad.org in a web browser from Chapel Hill and instantaneously be delivered **hypermedia** from Denmark.

- Over 40 back and forth messages between your web browser and the disabroad.org web site occurred to load this site.

- A *lot* of incredible technology is at work to make this possible.

- Some questions this scenario raises:
  1. How did your **web browser** know where to find a **web site**?
  2. What does a **request** for a web site contain?
  3. What is on the other side of a web site? (Answer: at least a web server.)
  4. What even is a **web server**?
  5. How does the web server decide on a **response** to a request?
  6. How does the web browser **render** the response?
  7. Why does the web browser make *many* requests to load a single page?

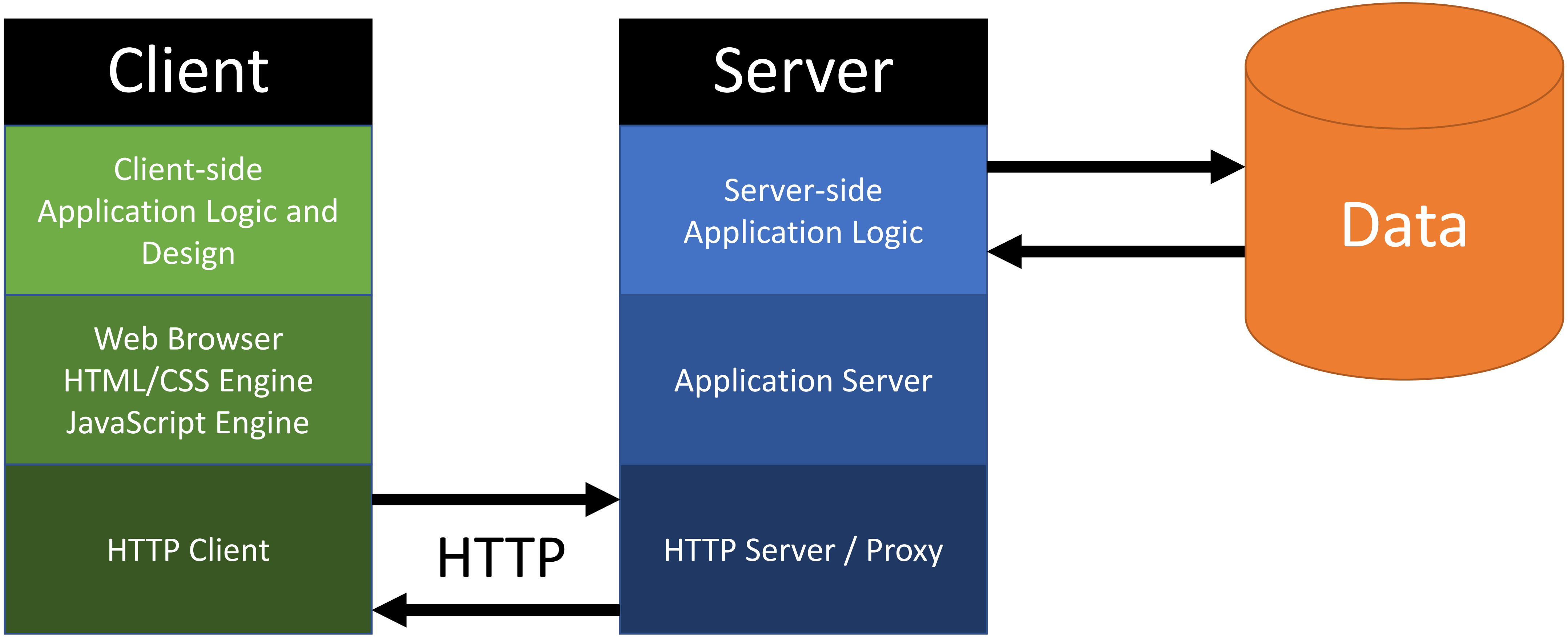
The magic of the World Wide Web 2.0...

- When you log in to Twitter.com, your feed depends on who you follow. You can compose a Tweet on Twitter.com, press "Tweet", and the page not only *updates* for you, but also appears on your followers' timelines.

- A *lot* of incredible technology is at work to make this possible, too.

- Some questions this scenario raises:
    1. How does a web site **authenticate** you when you log in?
    2. How does a web site deliver content **dynamically** to your personal account?
    3. How does a web site **authorize** you to post a Tweet to only your account?
    4. How can a page in your web browser be **interactive** and react to your input?
    5. How does your web browser send a request to the server *without reloading*?
    6. How does a web site **store** the information users post to it?
    7. How does a web site update with new information without a user doing anything at all?

The 3-Tier Architecture of Web Applications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Logistics and Travel Tips

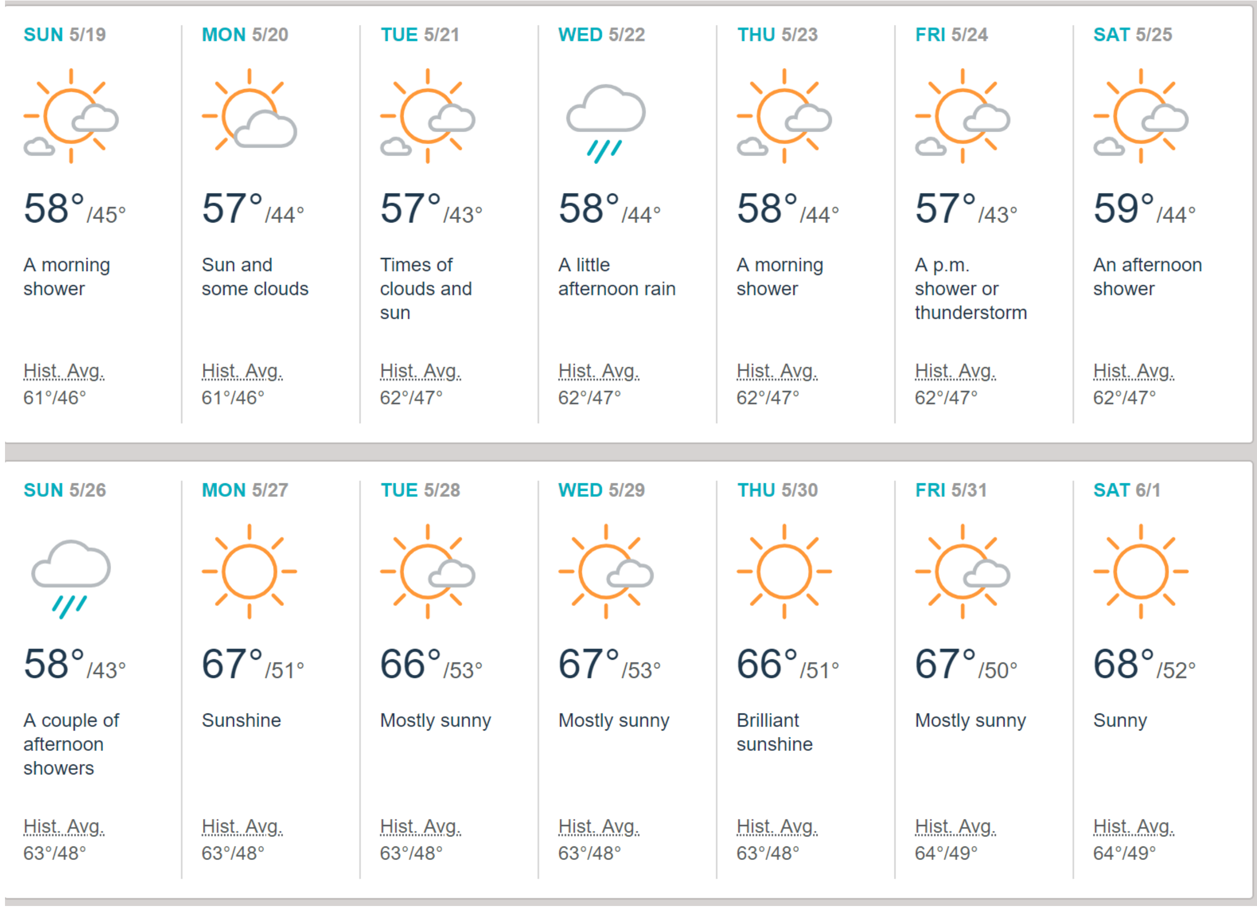
Clothing Advice: Layer for Cool Weather

- Current forecast to the right is *highly speculative* but generally reasonable to set expectations.

- Days *generally* in the 60s.

- Mornings and evenings as cool as the 40s.

- Lightweight rain jacket encouraged.



SUN 5/19	MON 5/20	TUE 5/21	WED 5/22	THU 5/23	FRI 5/24	SAT 5/25
58° /45°	57° /44°	57° /43°	58° /44°	58° /44°	57° /43°	59° /44°
A morning shower	Sun and some clouds	Times of clouds and sun	A little afternoon rain	A morning shower	A p.m. shower or thunderstorm	An afternoon shower
Hist. Avg. 61°/46°	Hist. Avg. 61°/46°	Hist. Avg. 62°/47°	Hist. Avg. 62°/47°	Hist. Avg. 62°/47°	Hist. Avg. 62°/47°	Hist. Avg. 62°/47°

SUN 5/26	MON 5/27	TUE 5/28	WED 5/29	THU 5/30	FRI 5/31	SAT 6/1
58° /43°	67° /51°	66° /53°	67° /53°	66° /51°	67° /50°	68° /52°
A couple of afternoon showers	Sunshine	Mostly sunny	Mostly sunny	Brilliant sunshine	Mostly sunny	Sunny
Hist. Avg. 63°/48°	Hist. Avg. 63°/48°	Hist. Avg. 63°/48°	Hist. Avg. 63°/48°	Hist. Avg. 63°/48°	Hist. Avg. 64°/49°	Hist. Avg. 64°/49°

Packing Advice: Embrace Danish Minimalism

- The less you pack the happier you'll be traveling!

- General advice:
  - Pick a single color palette (monochromatic gray/black common among Danes)
  - Aim to do laundry once per week
  - Be effectively out of outfits when you do laundry
  - Zero shame in wearing clothing that's still clean more than once in a cycle

- Kris and Mara's Packing Challenge: International Travel in a Carry-on Only
  - https://blog.tortugabackpacks.com/minimalist-travel-packing/
  - https://www.indietraveller.co/how-to-pack-light/

Bringing your own phone?
Invest in an external phone battery / charger

- If you're going the burner phone route, probably not needed

- If you are bringing your own phone, you will run out of battery at a really inconvenient time *guaranteed*

- Having an external charger will be a life saver!

Electrical Adapters vs. Converters

- For your laptop and phone chargers you only need a Europe adapter
- Adapters
- https://www.ricksteves.com/travel-tips/phones-tech/electric-adapters-converters

Avoiding Sketchiness

- Never go out for drinks or to clubs alone.

- Never let your drink leave your sight.

- Be aware of your surroundings and know your routes.

Avoiding Pickpockets

- Keep your wallet, keys, phone, and anything else of importance on the **front of your body** or **very multiple zips deep in a bag**

- These people are pros. You won't realize it until well after its happened.

- Be especially aware of your surroundings in busy places and big cities.
  - Town Squares
  - Public Transit
  - Busy Intersections / Walking Corners

- The more you stand out as a foreign traveler, the more you're targeted.

Group Expectations

- Form a pair with someone you do not know and **identify three ground rules** that will help the group work well together while we're abroad.
- Write them down!

Group Ground Rules

- Have fun and try your best!
    - Be nice.

- Have a buddy! (Have 19 buddies!)
    - Don't be afraid to make friends with anyone in the group.
    - Always have someone who knows where you are.

- Communicate
    - Be inclusive - open to asking people if they want to do an activity. Be inclusive in travelling as groups. Encourage group activities!
    - Communicate your location/whereabouts to roommates
    - If you have a problem with someone figure it out, don't let it fester
    - Have your phone on you, check slack

- Don't be afraid to ask for help – no judgement zone!

- Be Respectful
    - Respect each other.
    - Be on time when we have a schedule.
    - Respect local culture.
    - Be considerate of the shared spaces.
    - Of people's sleeping schedules

- Participate - Don't be passive!

- Talk to Kris about anything!

Code of Conduct

- The Study Abroad Code of Conduct and University Honor Code apply to this course while you are abroad.
- You are representing the *University of North Carolina at Chapel Hill*, you are representing the *Computer Science department*, and more personally you are representing *me* as the instructor of the course.
- You are expected to enjoy your time abroad responsibly while not negatively impacting your peers studying with you nor ruining opportunities for future cohorts to come.

Graded Components

- Prearrival Assignment & Prearrival GRQs - 10%
- Participation - 10%
- Quizzes & Abroad GRQs - 20%
- Final - 20%
- Course Project - 40%

Your Travel Blog - Predeparture Requirement

- Requirements:

https://cph426-2019.github.io/docs/predeparture-assignment

- Example: https://kris-travel-notes.netlify.com/

Course Text

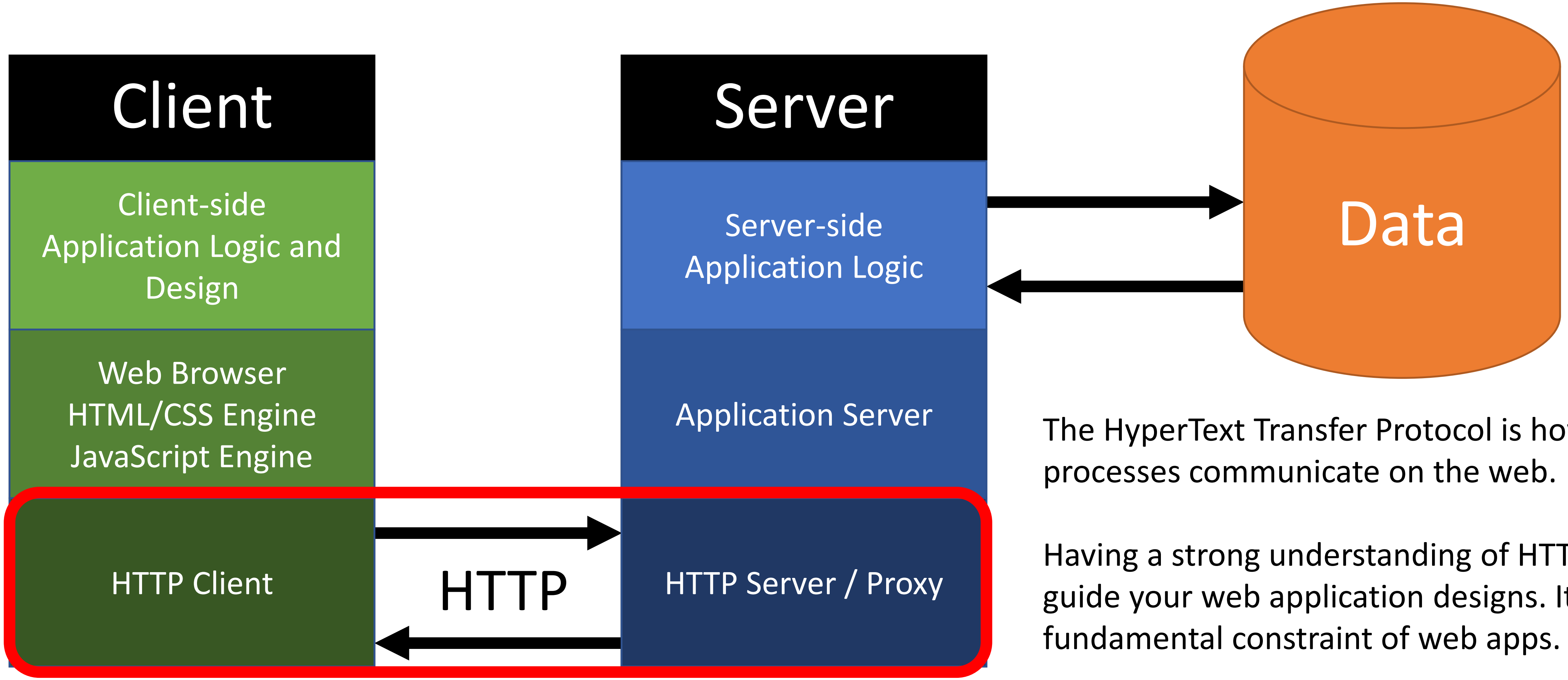
- HTML & CSS Is Hard (But it doesn't have to be): A friendly web development tutorial for complete beginners.
  - https://internetingishard.com/html-and-css/

- Pre-departure: No. 1 through No. 8

- While abroad: No. 9 through No. 14

- Each part has Guided Reading Questions (GRQs) on Gradescope
  - You can refer to your notes and/or the reading itself as you respond to GRQs.

The Foundation of the Web is HTTP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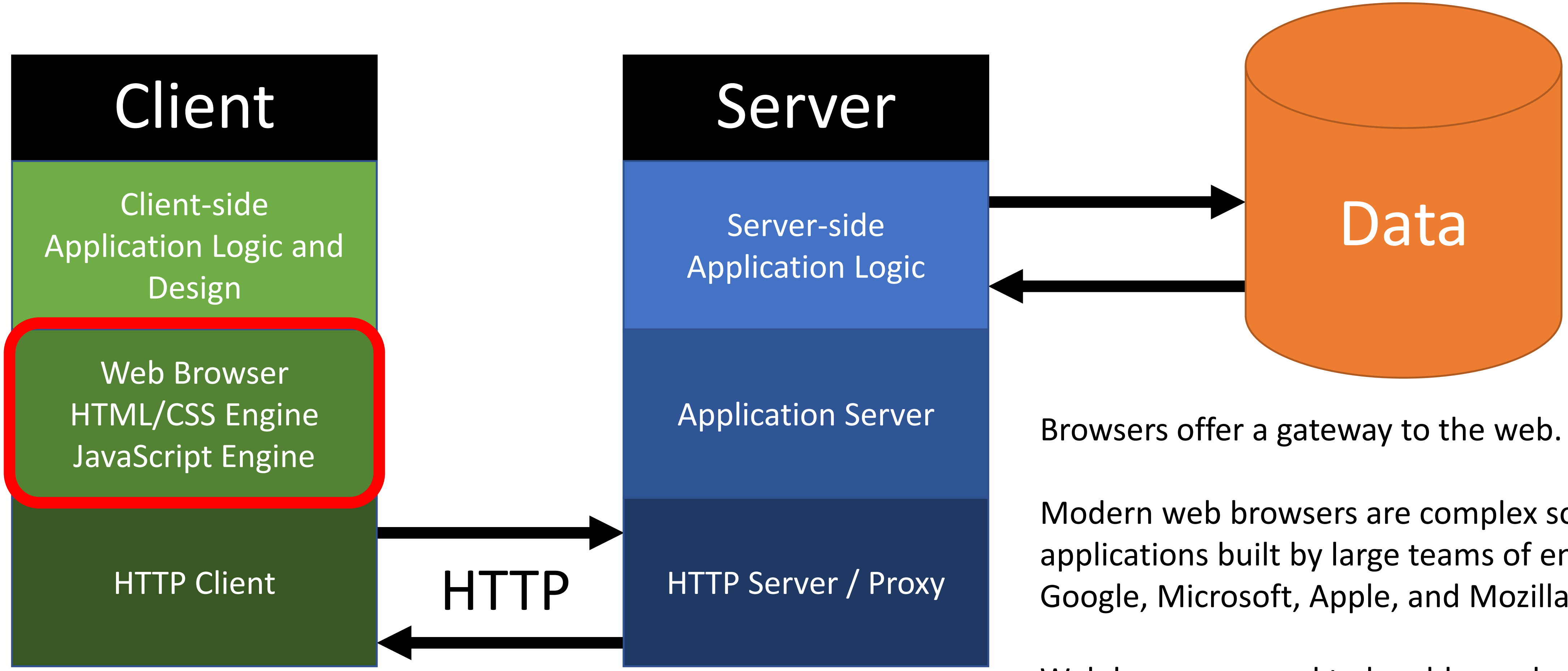
The HyperText Transfer Protocol is how processes communicate on the web.

Having a strong understanding of HTTP will help guide your web application designs. It is a fundamental constraint of web apps.

(Of course, there are networking protocols which sit beneath HTTP, notably TCP/IP, that receive full coverage in the networking course.)

Web browsers make the web usable.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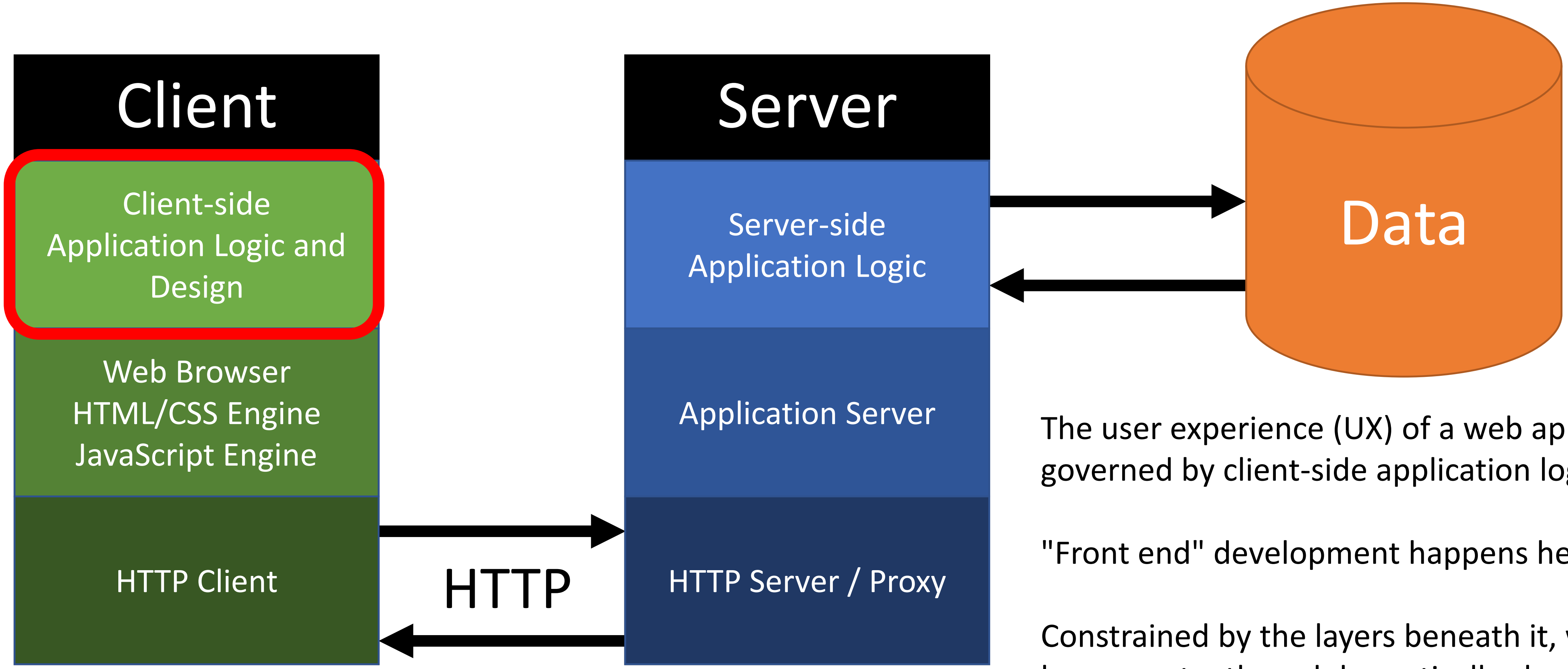
Browsers offer a gateway to the web.

Modern web browsers are complex software applications built by large teams of engineers at Google, Microsoft, Apple, and Mozilla.

Web browsers need to be able work with a wide variety of media types and specifically have engines for the languages of HTML/CSS/JS.

Client-side Apps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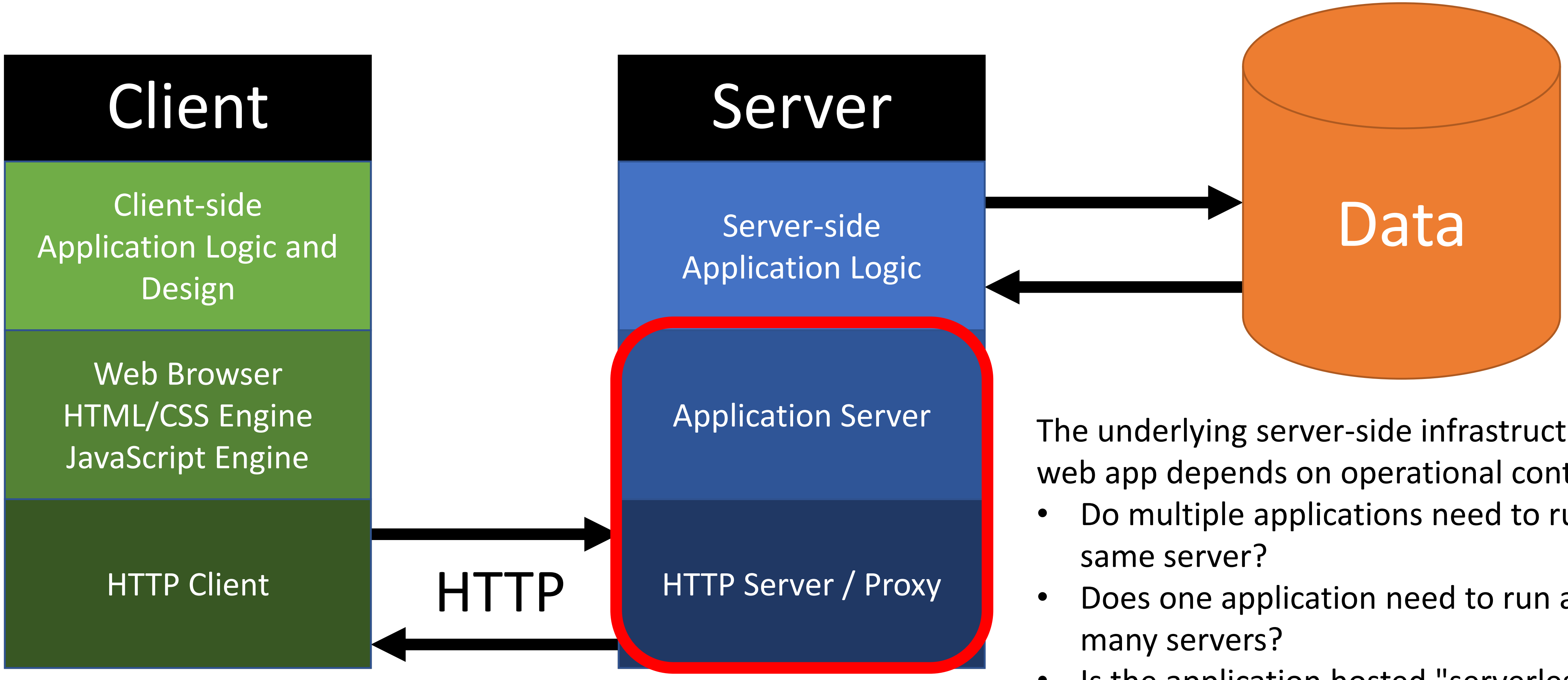
The user experience (UX) of a web application is governed by client-side application logic.

"Front end" development happens here.

Constrained by the layers beneath it, which have constantly and dramatically changed since the birth of the web, there is a proliferation of technology and ideas at play here.

Server-side Foundations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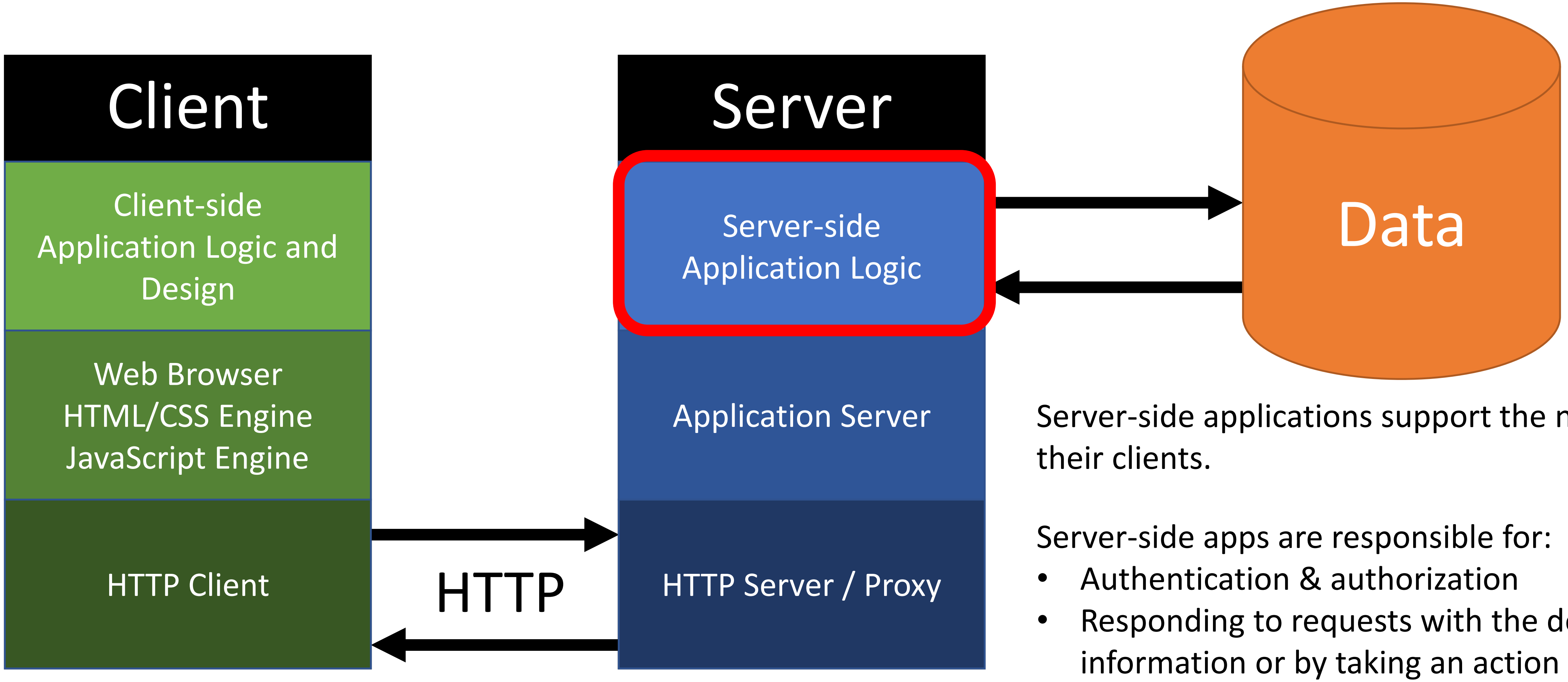
The underlying server-side infrastructure of a web app depends on operational context.

- Do multiple applications need to run on the same server?
- Does one application need to run across many servers?
- Is the application hosted "serverless"?

We won't spend a great deal of time on this area, but you should know enough about common options.

Server-side Applications

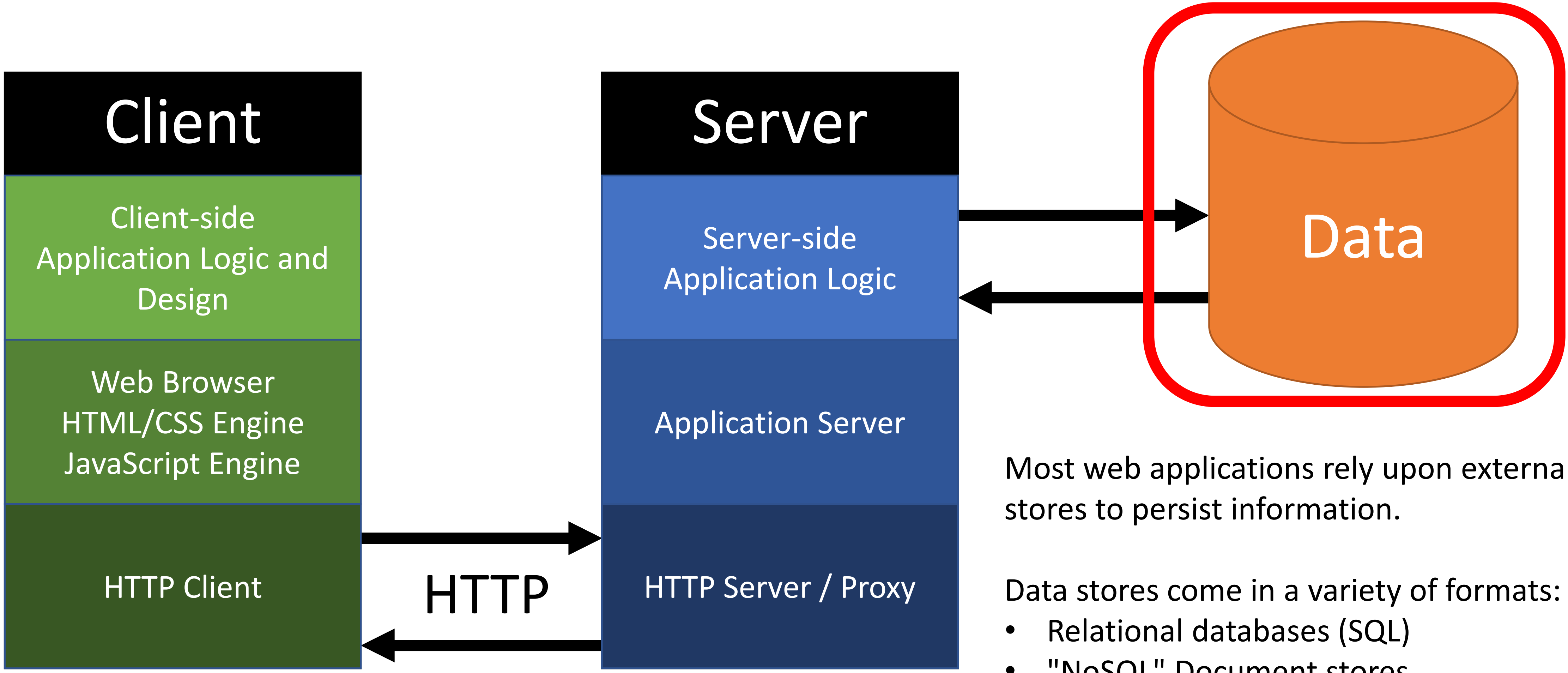


Server-side applications support the needs of their clients.

Server-side apps are responsible for:

- Authentication & authorization
- Responding to requests with the desired information or by taking an action
- Persisting data in the data tier

Data Tier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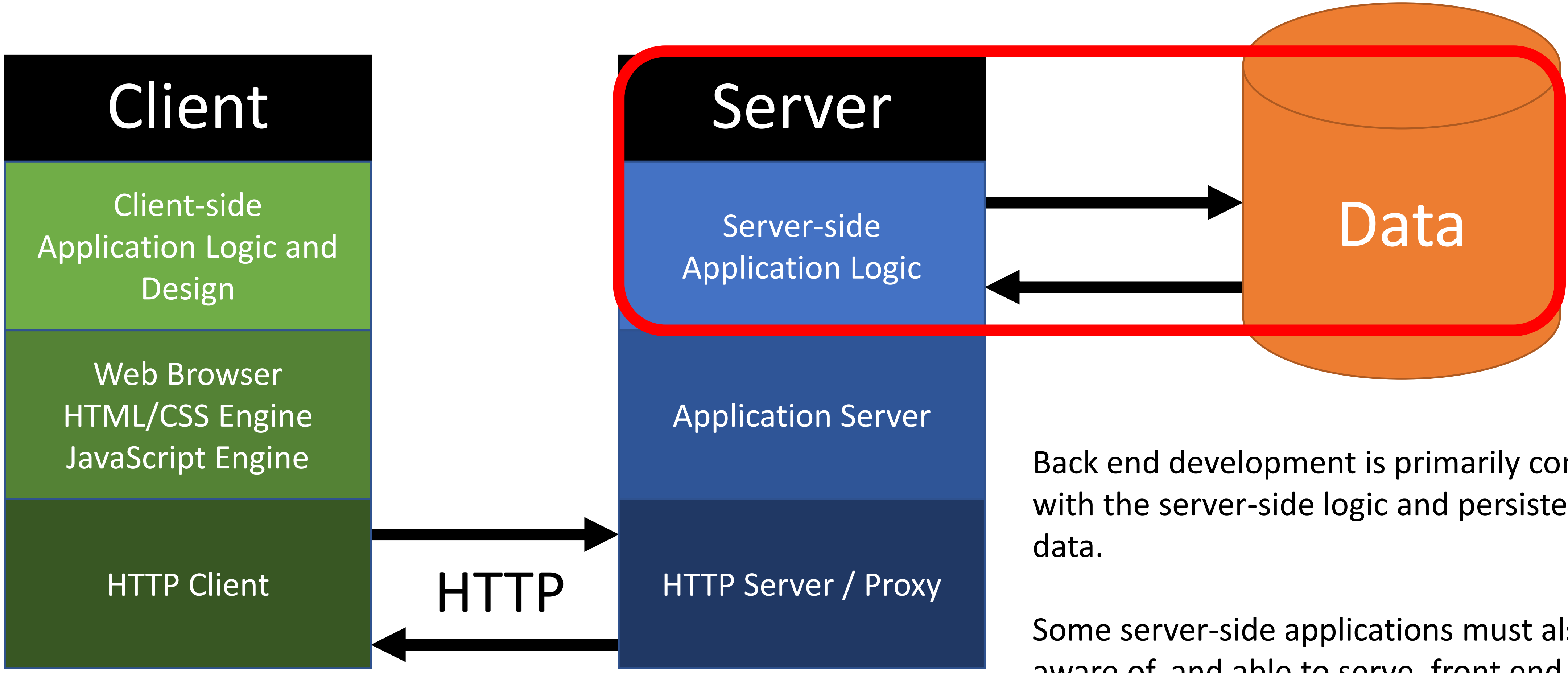
Most web applications rely upon external data stores to persist information.

Data stores come in a variety of formats:

- Relational databases (SQL)
- "NoSQL" Document stores
- Graph databases

Full coverage of databases is left to COMP521.

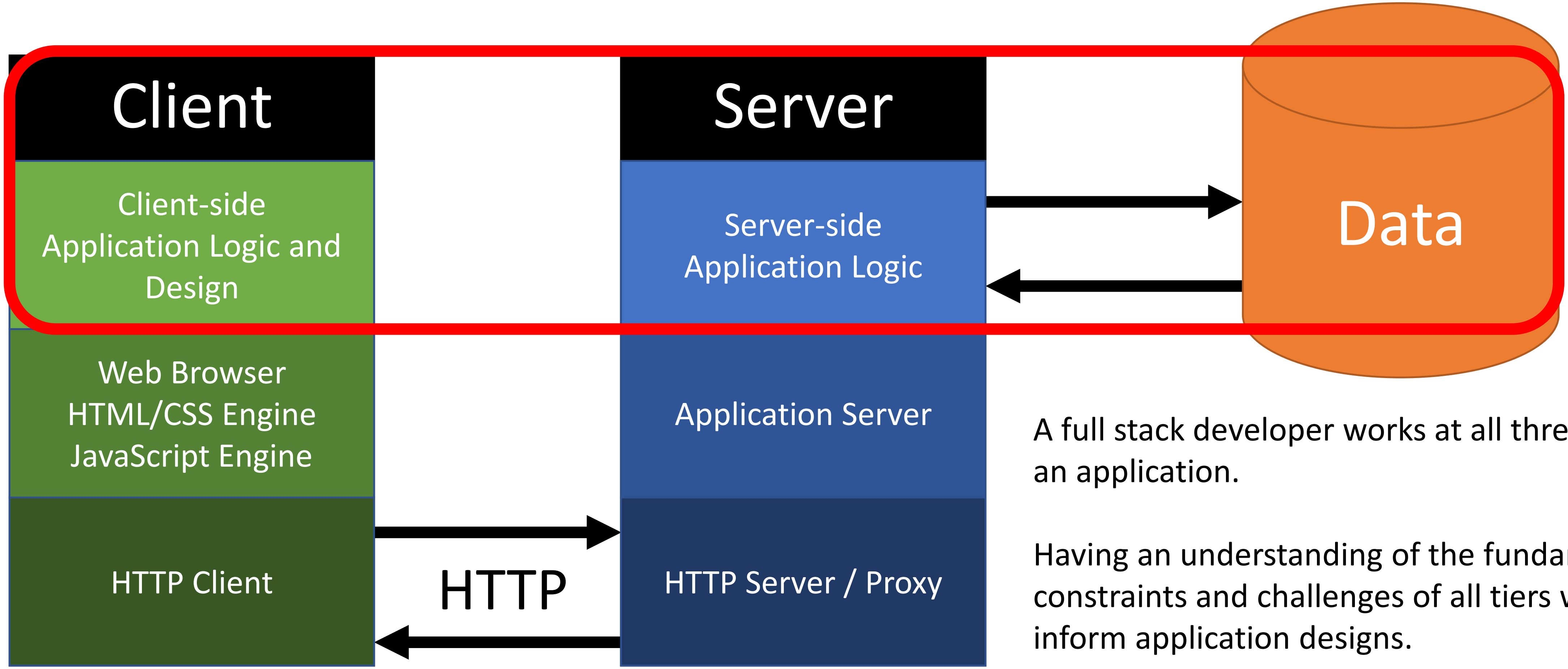
Back end Development



Back end development is primarily concerned with the server-side logic and persistence of data.

Some server-side applications must also be aware of, and able to serve, front end content (such as HTML).

Full Stack Development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A full stack developer works at all three tiers of an application.

Having an understanding of the fundamental constraints and challenges of all tiers will help inform application designs.

A goal of this course is to familiarize you with the full stack.

COMP426 Notes from Fall 2018

- KMP regularly teaches COMP426 on-campus

- He teaches the course off of a Workflowy outline:
  - Fall 2018 - https://workflowy.com/s/xCS.2HzXtzLXjq

- Our course will not align 1:1 with Fall 426, but we'll occasionally step through the outline to be sure we're not skipping

Getting Started on the Travel Blog

- GitHub Classroom Starter:
  - https://classroom.github.com/a/POsq1az4
- This will setup a repository in our GitHub organization
- Then, from a Terminal on your host machine, cd to the VM directory:
  - Don't have the VM setup yet? No problem: just $ cd $HOME
  - Then run:

```
$ mkdir travel-notes-<YourGitHubUserName>
$ cd travel-notes-<YourGitHubUserName>
$ git init
$ mkdir public
$ code public/index.html
```

- Add: <html><body>Hello World</body></html>
- Save and then back at the command-line:

```
$ git add .
$ git commit –m 'Initial commit'
```