

FULL STACK WEB DEVELOPMENT PROGRAM

Lecture 7: Static & Dynamic Websites

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OUTLINE

- Static vs Dynamic Websites
- SSR, CSR, SSG
- Template Engines
- Third-party libraries

STATIC VS DYNAMIC

- **Static website:** pages are hardcoded and are displayed the same to all users (plain HTML, CSS, JS).
 - Pages always have the exact same contents & structure
 - HTML is not generated when navigating to a page
 - express.static()
- **Dynamic website:** pages may have different contents & structure for different users.
 - HTML is programmatically generated when navigating to a page
- <https://blog.hubspot.com/website/static-vs-dynamic-website>

STATIC VS DYNAMIC (2)

	Static	Dynamic
HTML	Hardcoded, pre-built	Generated on request
Performance	Quick, easily served Cached	Server processing Not cached
Scalability	Create new files for each page Manually modify each page	Reuse page templates
Personalization (per user/region)	Challenging	Simple
Examples	Portfolio, documentation, blogs	Online stores, social media BeaconFire

SEO

- **Search engine optimization (SEO)**: the practice of maximizing visitors to your website by making it appear higher in search engine results.
 - **Web crawlers/bots**: programs that scan websites, collect data, and bring it back to search engines
- Performance (page loading/response time)
 - **First Contentful Paint (FCP)**: the time it takes for the first text/image to become visible on the page
 - **Time to Interactive (TTI)**: the time it takes for the page to become fully interactive (event handlers)

Citrous_Oyster +4 · 9 mo. ago

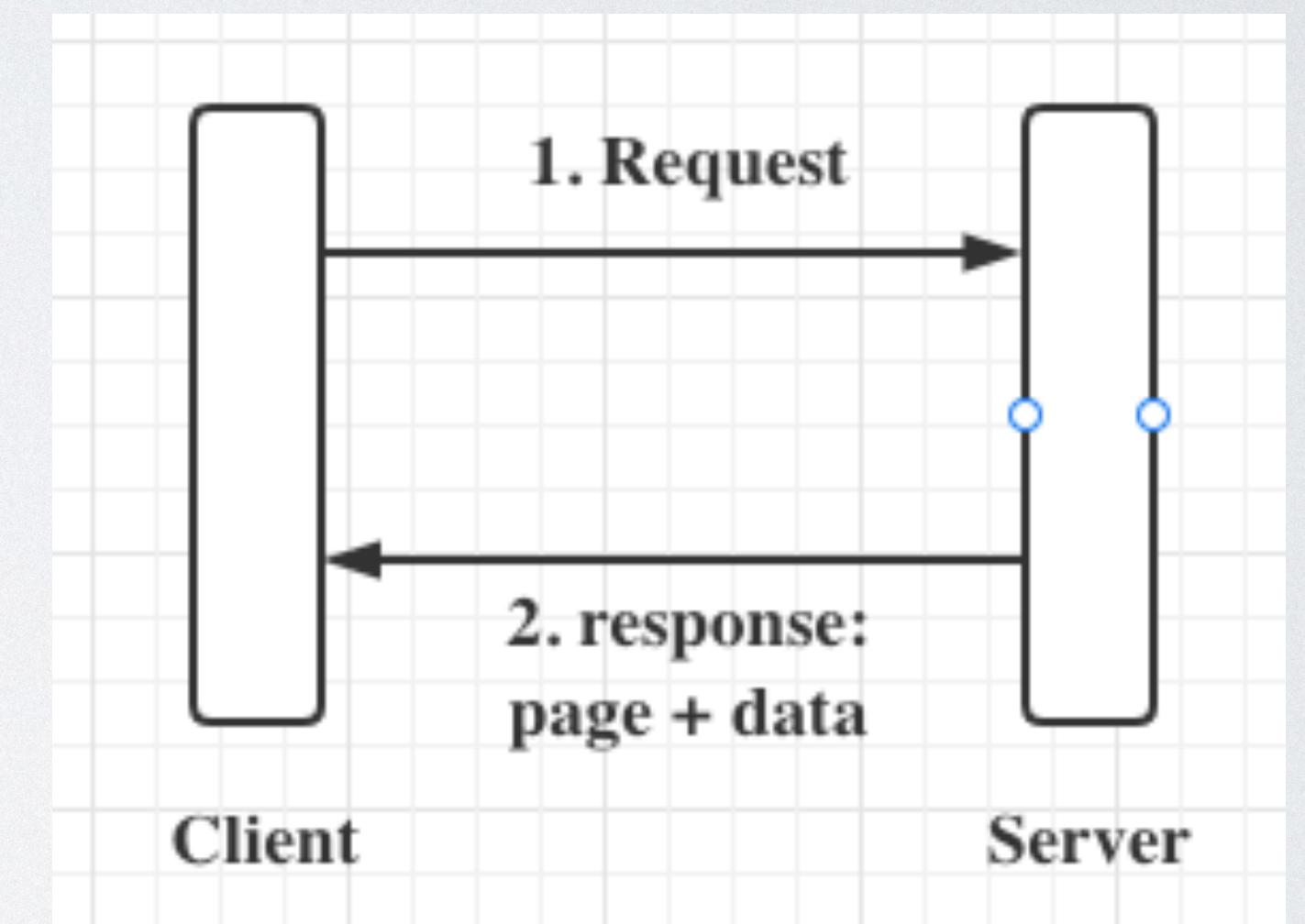
For a dev the only real SEO you should know is on page SEO. Which is what you can do on the page. Especially how to optimize your code and assets for page speed using picture element to serve different sized images based on screen size, compressing images, using semantic html, able to work with minimal third party scripts to minimize Load times, proper heading structure, web accessibility and proper aria attributes, lazy loading, alt tags, height and width attributes on all Images, resizing images to their actual display size if needed, mobile first css and coding, clean html that's easy to read, lazy loading background images, etc. things you can do as a dev. That's what I tell my clients when they ask what SEO I do. I tell them I do everything in the page including content, but the rest needs to be done by a traditional SEO specialist.

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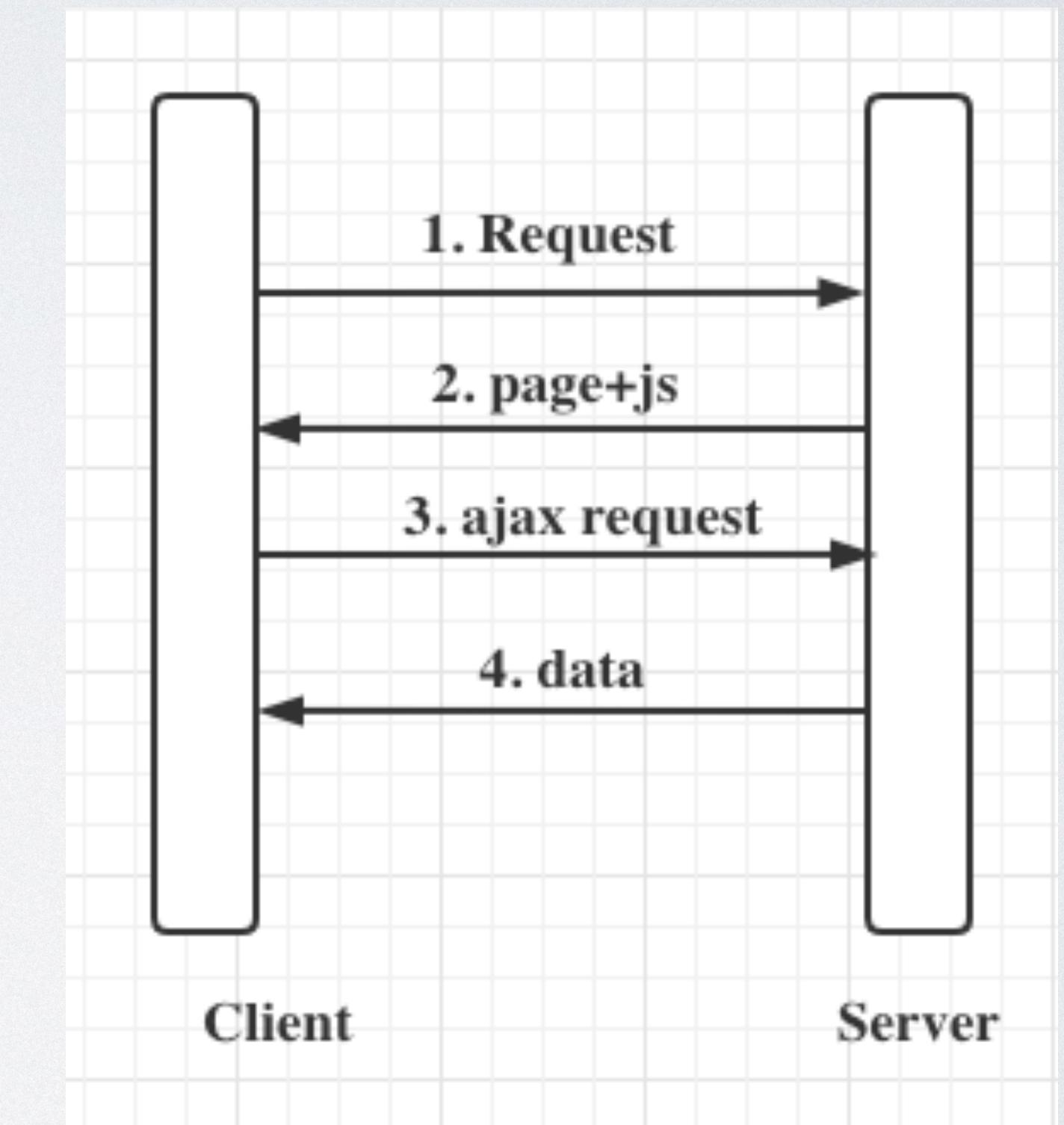
SSR

- **Server-side rendering (SSR)**: creating dynamic websites by programmatically generating HTML documents on the server during runtime.
 - On every page request, **create entire HTML document** based on user-specific data from the database and serve it



CSR

- **Client-side rendering (CSR)**: creating dynamic websites by programmatically generating HTML on the client browser (DOM manipulation).
- On first page request, serve **bare minimum HTML page with scripts** that will fully render the page
 - Navigate to new page => re-render part of the DOM according to the route.
 - Always manipulate DOM of the **same html document**
 - Send AJAX requests to get updated data
- **Single-Page Application (SPA)**: a web app that loads a single HTML document and rewrites the page with new data from the server.



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SSG

- **Static Site Generation (SSG)**: creating static websites by programmatically generating all possible HTML files on the server during build time (pre-rendering).
 - On every page request, serve the static files immediately
- **Content Delivery Network (CDN)**: a set of geographically-distributed servers that cache the static files needed to load a website.
 - User browsers download files from the closest server
 - ex: html, js, stylesheets, images, videos

COMPARISON

	SSR	CSR	SSG
Generate HTML where & when?	server runtime	client runtime	server build time
SEO/FCP/TTI	good	bad	best
Use-case	Customized page contents per user	Content on a page frequently changes	Static page contents
Pros	Simpler logic	Responsive (UX), less server load	Speed, CDN, low cost, security
Cons	Server load	Initial page delay, more logic	Rebuilding, data must be known
Technology	Template engines	React, Angular, Vue	Next.js, Gatsby https://jamstack.org/generators/ BeaconFire

TEMPLATE ENGINE

- **Template engine:** software that transforms static template files into HTML files by substituting variables with actual values during server runtime.
 - Embedded JavaScript (EJS)
 - Pug (Jade)
 - Handlebars
- <https://expressjs.com/en/guide/using-template-engines.html>

EJS

- **Embedded JS (EJS)**: a template engine inspired by Embedded Ruby (ERB) that allows JS expressions in markup.

- partials, define variables, loops, conditional

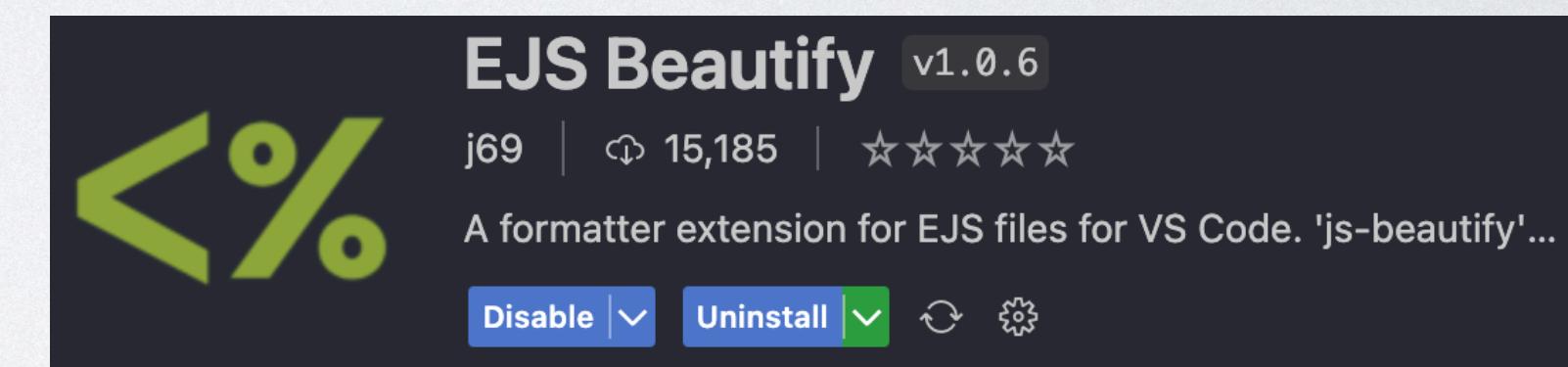
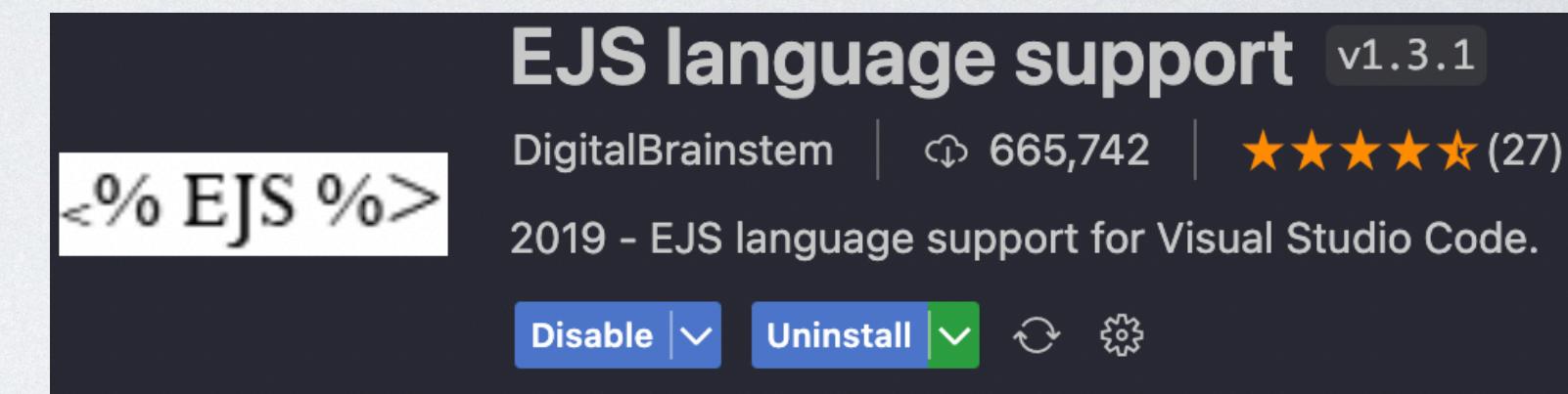
<https://ejs.co/>

<https://github.com/mde/ejs>

- **Scriptlet**: tags that allow JS logic in the template.

- **npm i ejs**

```
// Template engine configuration
app.set("views", path.join(__dirname, "/views")); // where template files are located
app.set("view engine", "ejs"); // default engine, dont need to specify .ejs extension
```



EJS TAGS

<https://github.com/mde/ejs/blob/main/docs/syntax.md>

Tag	Outputs HTML?	Used for...
<%	No	Control flow, defining variables, JS logic
<%#	No	Comments
<%=	Yes	Escapes output Evaluate variables or JS expressions
<%-	Yes	Doesn't escape output Import partials: include(path, {options});
<%_	Yes	Remove preceding whitespace
%>	—	Standard ending tag
-%>	—	Remove trailing new lines
_%>	—	Remove trailing whitespace

DRY

- **Don't Repeat Yourself (DRY)**: the software development principle of avoiding repeated/duplicated code, usually by replacing it with abstractions.
 - JS: functions, classes, modules
 - SCSS: partial, mixin, extend
 - EJS: partial, loops



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CRUD

- **Create Read Update Delete (CRUD)**: the four basic operations that users should be able to do in software applications.
 - C: post
 - R: get
 - U: put, patch
 - D: delete
- Setting up routes:
 - One router per entity (ex: users, posts)
 - Make separate routes & HTTP methods for different CRUD operations

SEED FILE

- How do we create test data?
- **Seed file:** script that programmatically populates the data store with as much fake data as needed.
 - (If database) Connect to the data store
 - Erase everything
 - Generate all the fake data
 - Save it to the store

THIRD-PARTY LIBRARIES

- **Env**: stores environment variables in a file for things that shouldn't/don't need to be uploaded publicly (credentials, API keys, environment type).
- Uuid**: generate a unique ID
- Multer**: parsing incoming requests that have multiple media types (images, videos)
- Formidable**: parsing incoming requests that have multiple media types (images, videos)
- Morgan**: logging
- Nodemailer**: sending an email
- Moment**: working with anything time/timestamp/timezone related
- Lodash**: write less code to deal with built-in methods for strings, arrays, objects, dates, ...
- Cloudinary**: cloud service (file storage/hosting)

ANY QUESTIONS?

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