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Introduction to Full Stack Web Development

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وزارة الاتصالات وتقنية المعلومات
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

الاتحاد السعودي للأمن السيبراني والبرمجة والدرونز
SAUDI FEDERATION FOR CYBERSECURITY, PROGRAMMING & DRONES

مهارات المستقبل

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Objective

- Full Stack Web Development Concept
- The MERN Stack
- Web Developer Responsibilities
- Crucial Knowledge for Back-End Development
- Crucial Knowledge for Front-End Development

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Welcome to Level 2!

❖ Here is an overview of what will be covered in this level:

1: Introduction to Full Stack Web Development	2: Advanced JavaScript	3: ReactJS I (Introduction to ReactJS)	4: ReactJS II (Components)
5: ReactJS III (Events)	6: ReactJS IV (States)	7: Deploy your React app	8: React V (Fetching data)
9: React VI (Testing a React App)	10: Introduction to Node.js	11: Express Web Framework I	12: Express Web Framework II
13: Full stack with React and Express	14: Testing and Refactoring Express	**15: Capstone Project: ReactJS**	

Advanced features of JavaScript

React

Node.js and Express

Capstone Projects

Full Stack Web Development

- A web developer should create custom code for a client's unique needs
- Web development has 3 parts:
  1. Client-side scripting: executes in a web browser and determines what your customers or clients will see on your website
  2. Server-side scripting: executes on a web server and powers the behind-the-scenes mechanics of how a website works
  3. Database technology: stores and manages all data needed for your web application (this will come in level 3)

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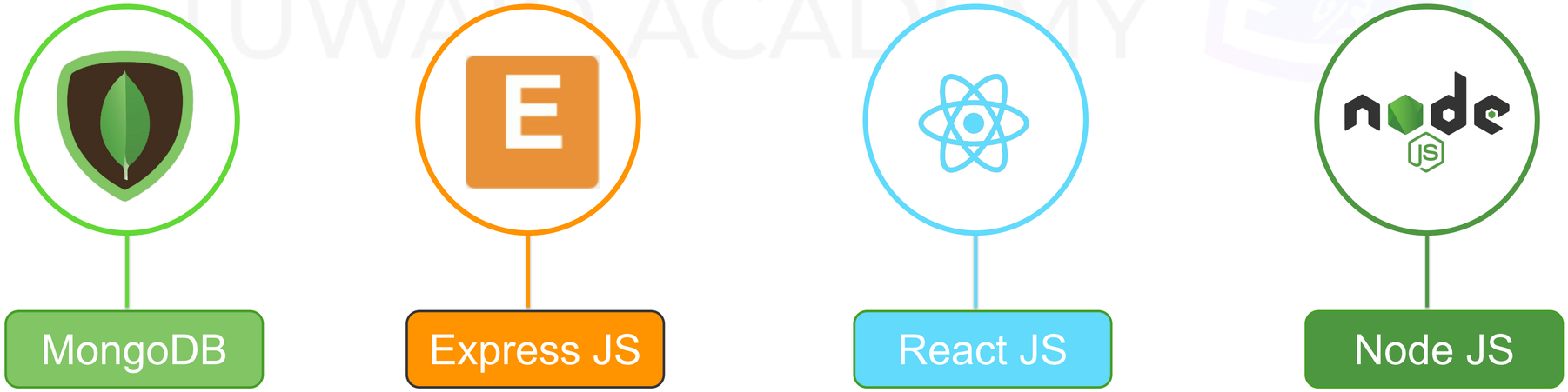
The MERN Stack

- Stack: a collection of technologies that are used together to create a web app (e.g. LAMP stack, MEAN stack & MERN stack)
- JavaScript is used for full stack web development using a combination of frameworks and libraries
- The most popular approach is the MERN stack



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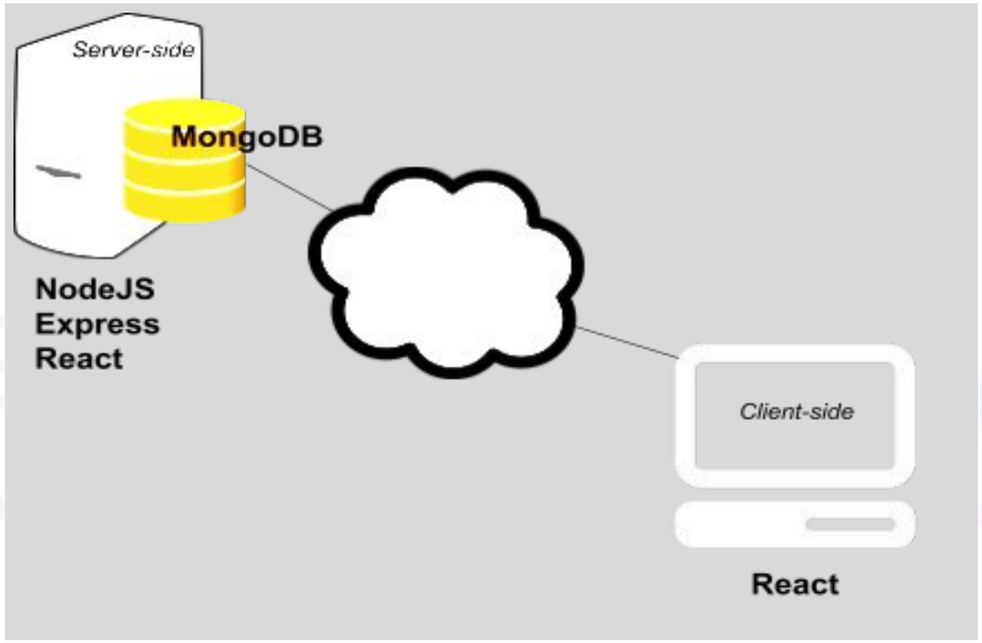
The MERN Stack

React: library created by Facebook to create views that are rendered in HTML. It is isomorphic.



MongoDB: non-relational database that stores data as documents or objects. It uses a query language based on JSON.

Node.js: allows JavaScript to be used on web servers, not just a browser.

Express: unopinionated web framework for development using Node.js.

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Web Developer Responsibilities

Front-End Developer:

- Prioritising user experience
- Bringing a designer's concept to life
- Production and maintenance of websites and web app user interfaces
- Creating tools that enhance user interaction in any browser
- Implementing responsive design for mobile sites
- Using a project management tool like GitHub to maintain software workflow management
- Looking at search engine optimisation (SEO) best practices
- Testing the site for usability and fixing bugs during development

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Web Developer Responsibilities

Back-End Developer:

- Database creation, integration and management
- Using back-end frameworks (e.g.Express.js) to build server-side software
- Web server technologies
- Cloud computing integration
- Server-side programming languages
- API integration
- Content management system development, deployment and maintenance
- Security settings and hack prevents
- Reporting, generating analytics and statistics
- Backup and restore technologies for a website’s

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Web Developer Responsibilities

Full Stack Developer:

- Server, Network and Hosting Environments
- Data modelling
- Business Logic
- User Interface
- User experience
- Customer and business needs

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Crucial Knowledge for Back-End Development

Web apps are usually backed up by 2 types of servers:

- Web servers
- Application servers

Web servers: computer with an internet connection and software to make web pages available to clients.

- Stores resources for web apps, e.g. images, HTML, CSS and JS files
- Must have software that allows it to act as an HTTP server

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Crucial Knowledge for Back-End Development

Application servers: contain the business logic needed to build resources to be passed back to the browser.

- Usually have a web framework running on it
- Framework is able to match requests and dynamically generate responses.

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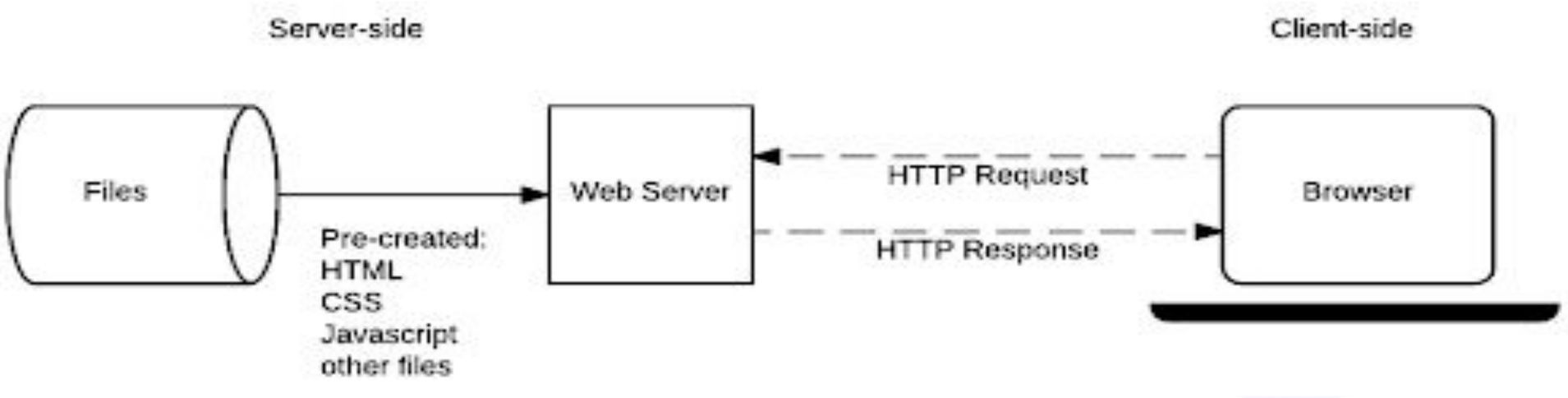
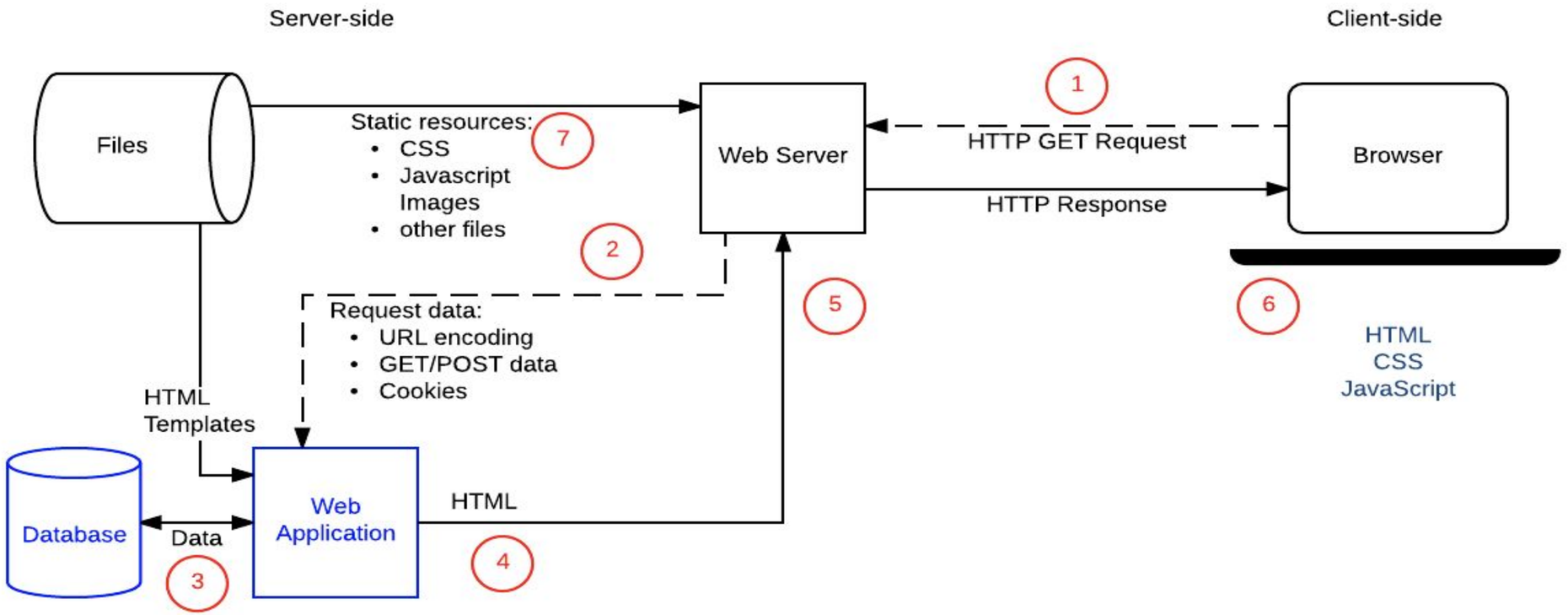
Crucial Knowledge for Back-End Development



Web Server Architecture for a Static Site (developer.mozilla.org)

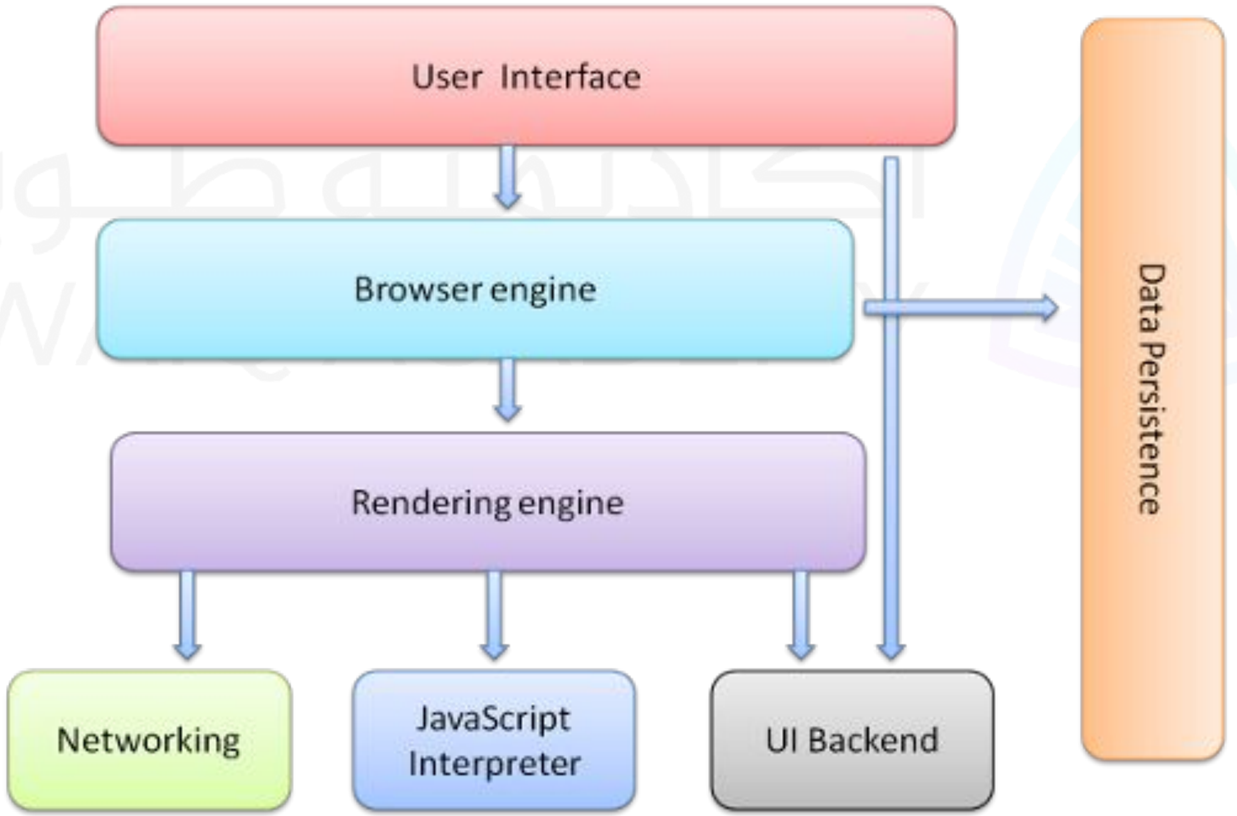
Crucial Knowledge for Back-End Development



Web Server Architecture for a Dynamic Site (developer.mozilla.org)

Crucial Knowledge for Back-End Development

How does a browser actually work?



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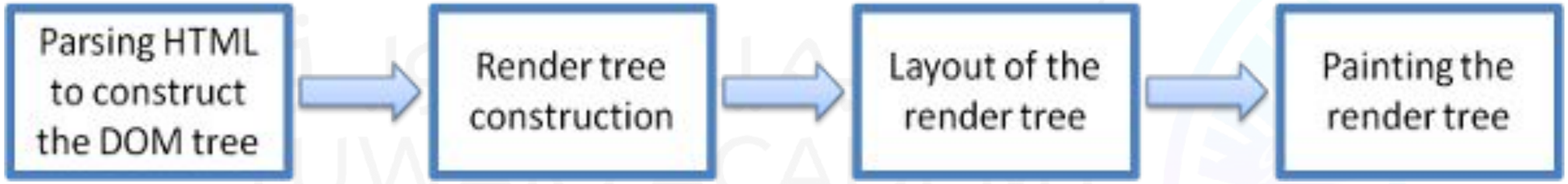
Crucial Knowledge for Back-End Development

Rendering engine does the following to render the page:



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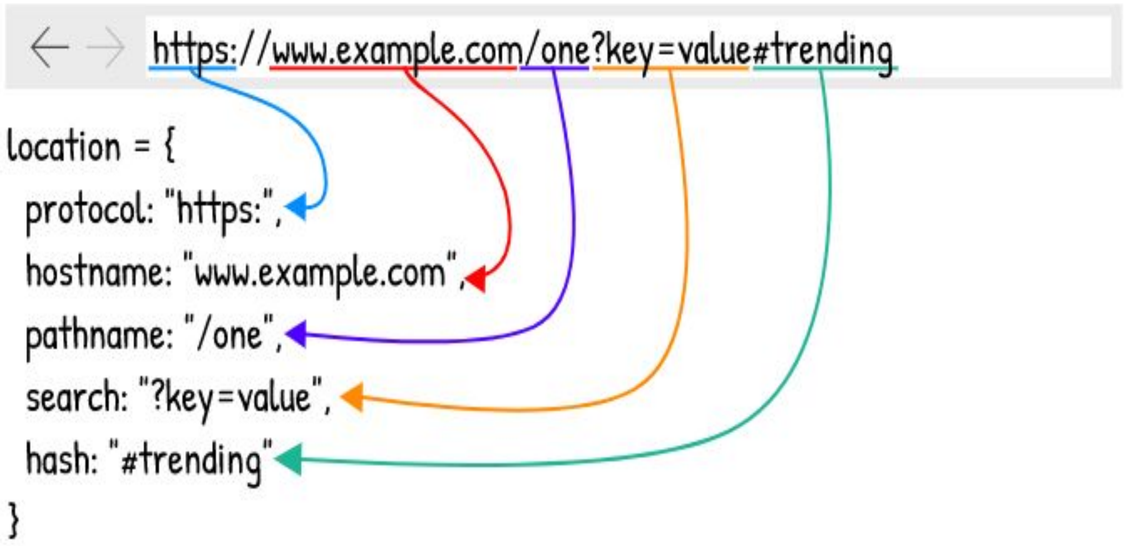
Crucial Knowledge for Back-End Development

Single Page Application (SPA): “an application that loads a single HTML page and all the necessary assets (such as JavaScript and CSS) required for the application to run. Any interactions with the page or subsequent pages do not require a round trip to the server which means the page is not reloaded.” (by React).



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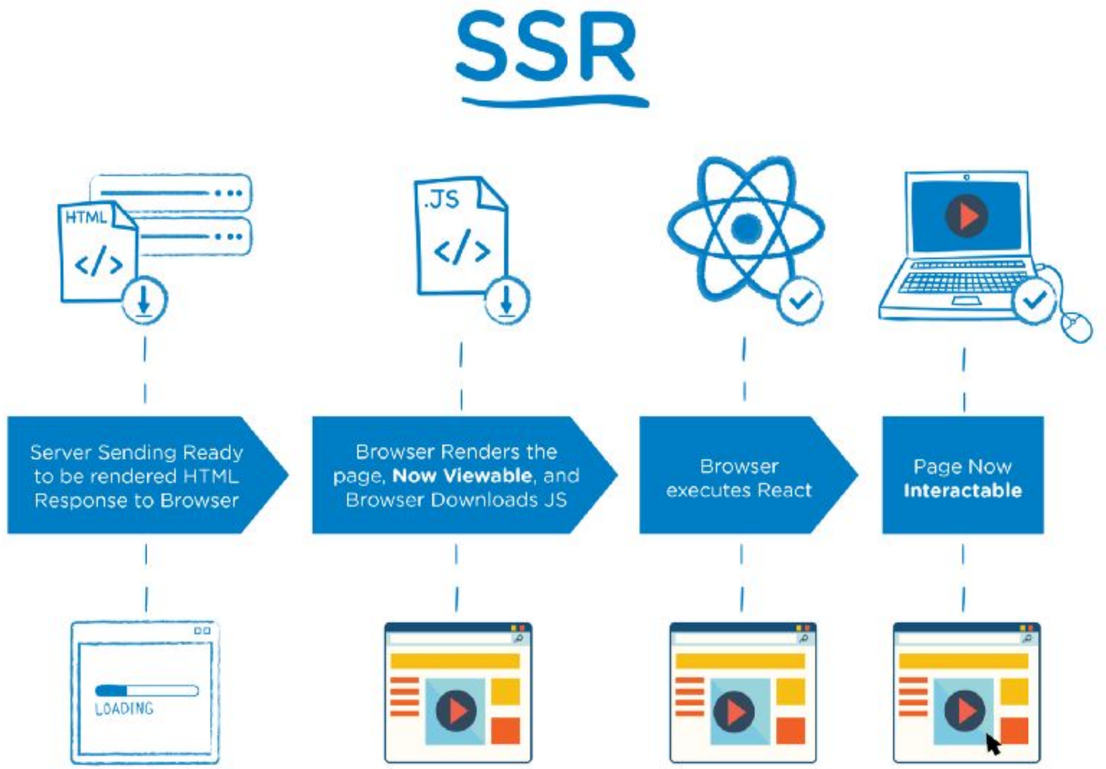
Crucial Knowledge for Back-End Development

Server Side Rendering (SSR): taking a JavaScript framework (like React) and rendering it to static HTML and CSS on the server.



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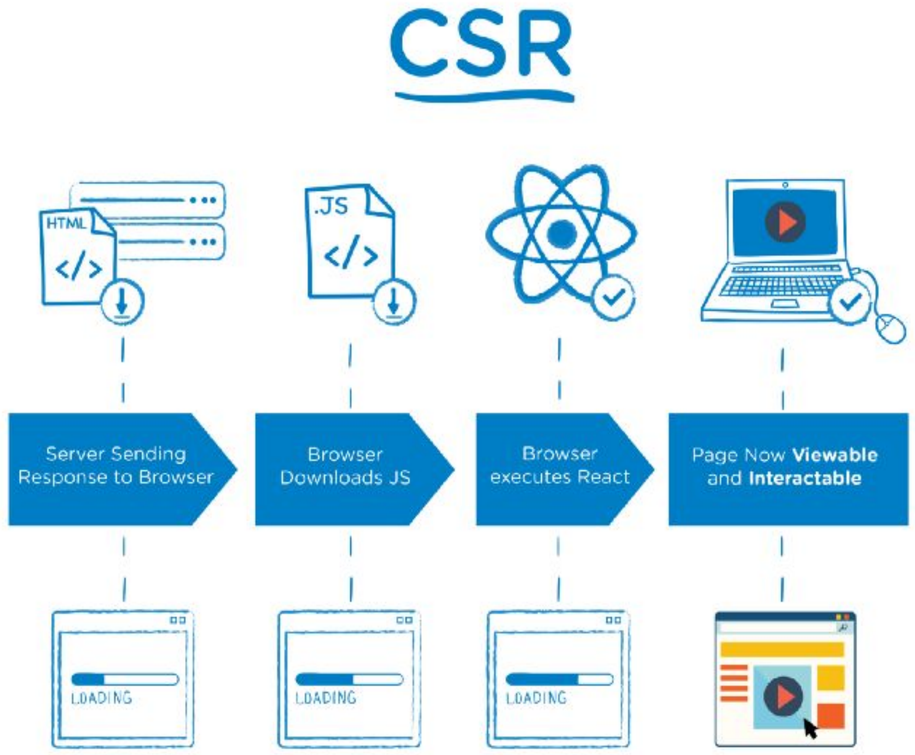
Crucial Knowledge for Back-End Development

Client Side Rendering (CSR): your browser will start rendering the HTML from your server without having to wait for all the JavaScript to be downloaded and executed.



When to use server-side rendering

- An application has very simple UI with fewer pages/features
- An application has less dynamic data
- Read preference of the site is more than write
- The focus is not on rich site and has few users

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When to use client-side rendering

- An application has very complex UI with many pages/features
- An application has large and dynamic data
- Write preference of the site is more than reading
- The focus is on rich site and a huge number of users

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Resources

- https://www.html5rocks.com/en/tutorials/internals/howbrowserswork/#The_browser_high_level_structure
- https://www.html5rocks.com/en/tutorials/internals/howbrowserswork/#The_main_flow
- *https://blog.pshrmn.com/entry/how-single-page-applications-work/*
- *https://medium.com/walmartlabs/the-benefits-of-server-side-rendering-over-client-side-rendering-5d07ff2cefe8*

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Summary

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