Getting started with React

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Introduction to SPA, MPA and React framework

Understanding Single Page Applications

- A Single Page Application (SPA) is an application that allows you to work inside a browser and does not require reloading the page when a person is using it.

- Many of the apps we use every day are single page applications. Navigation apps, many social media platforms, and some email providers are SPAs.

- A single-page application is a more modern approach to app development. It was used by Google, Facebook, Twitter, etc.

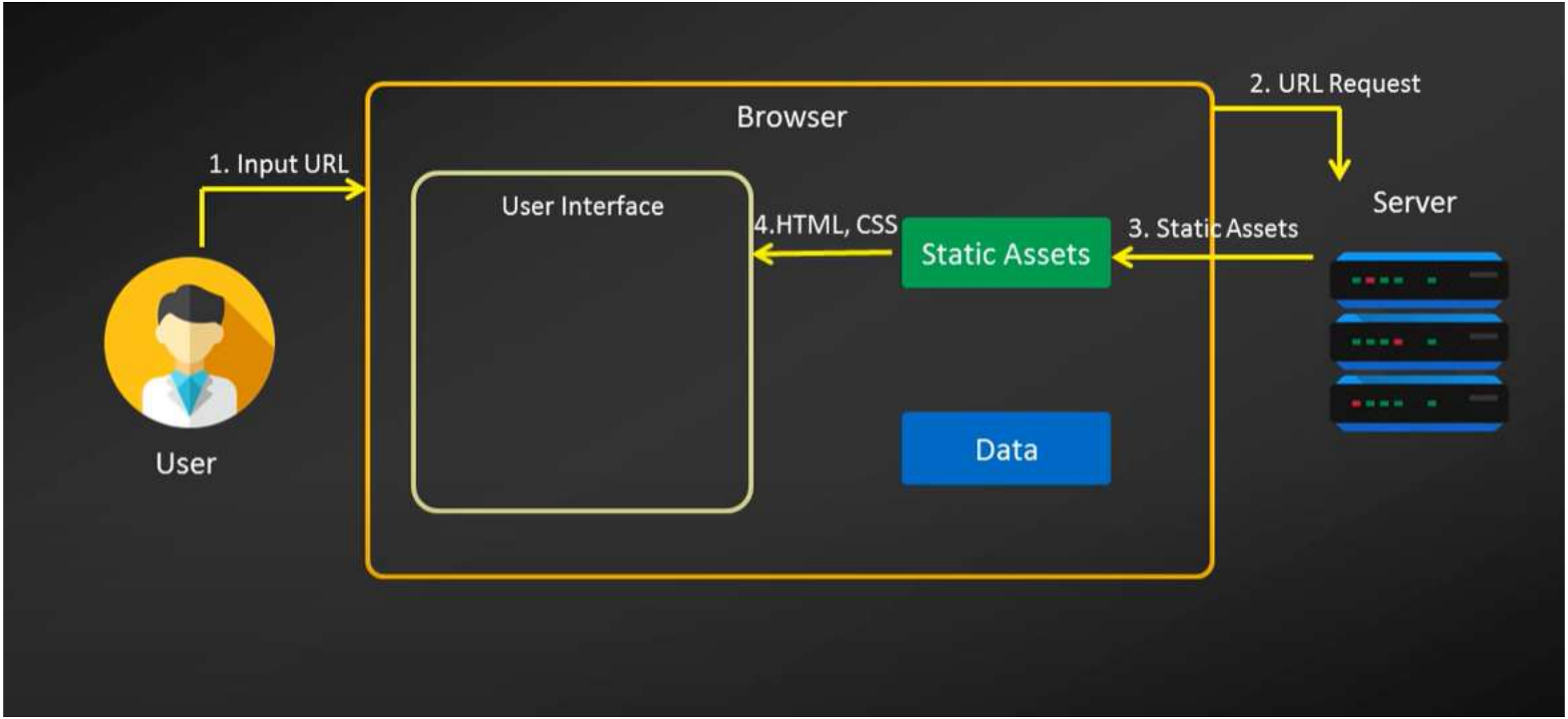
- SPAs display stunning UX that acts like a browser. It does so by maintaining the minimum possible code, or “shell” of a page. This code is usually dependent on JavaScript frameworks, and when used ensures the high performance of the SPA.

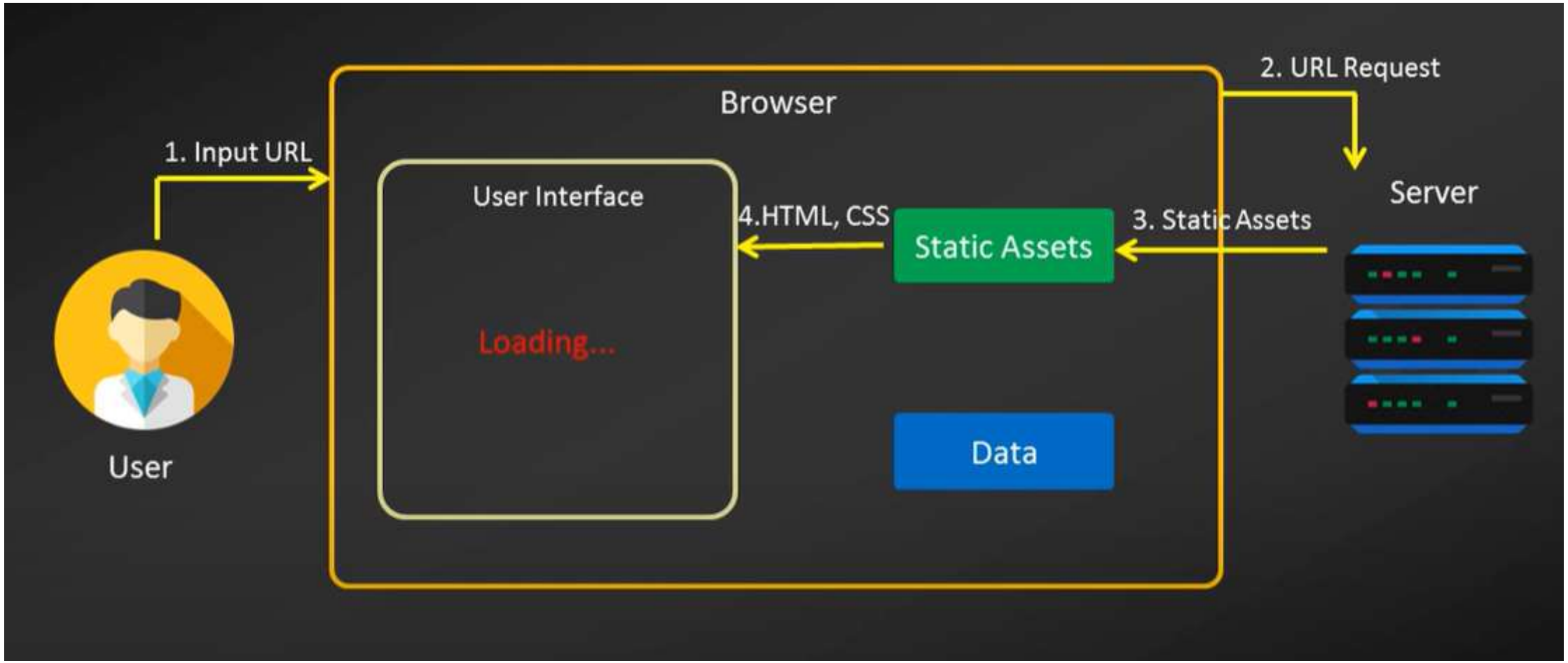
SPA

Multiple Page Applications (MPAs) built in static HTML and server-side technologies like PHP, ASP, Java, Ruby, and Python.

MPAs work by making multiple requests between the client and server. As websites have grown in complexity, so have the demands they make on servers.

The introduction of AJAX, which allows web pages to be updated without reloading, partly alleviate this issue.


Browser
1. Input URL
User Interface
2. URL Request
Server
4.HTML, CSS
Static Assets
3. Static Assets
Data
User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User Interface
Loading...
4.HTML, CSS
Static Assets
3. Static Assets
2. URL Request
Server
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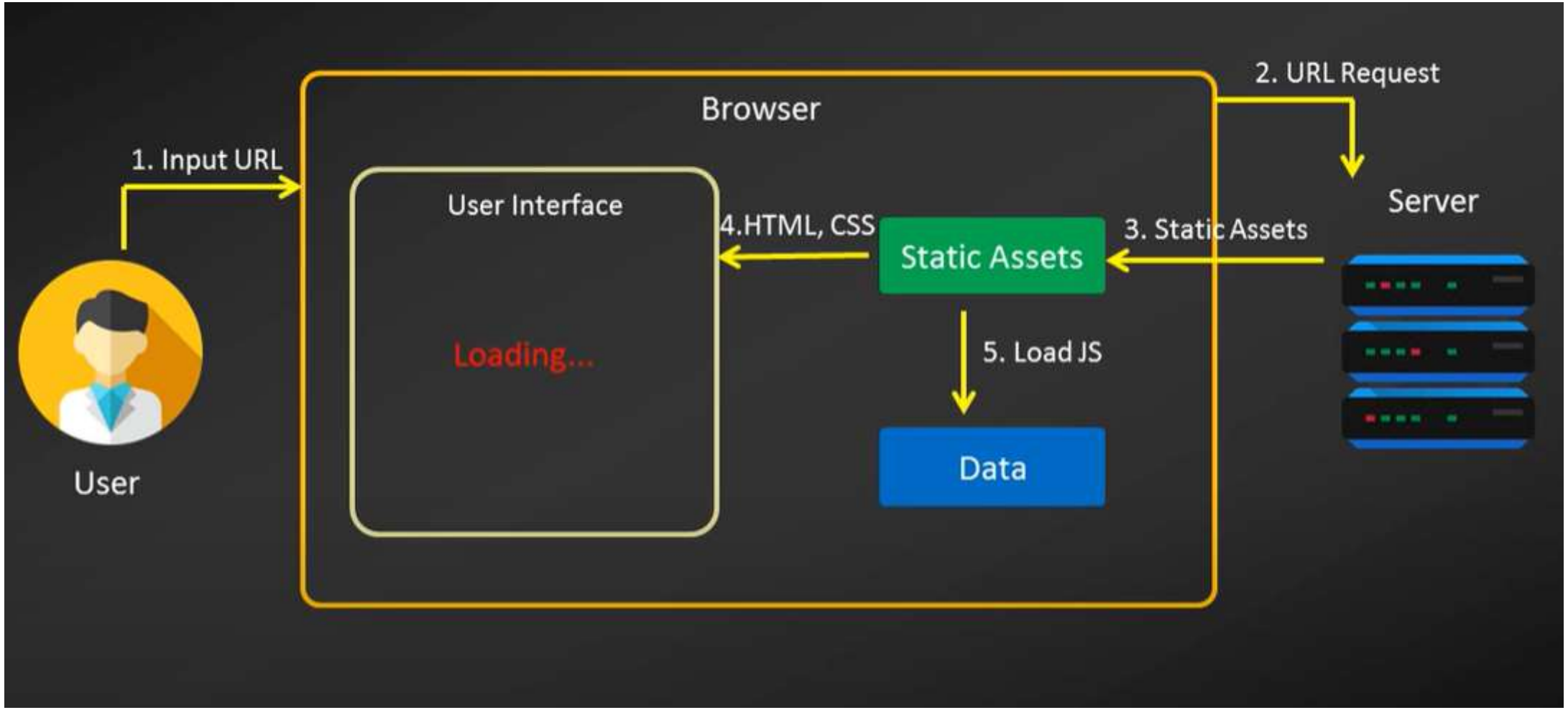
Browser
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User Interface
Loading...
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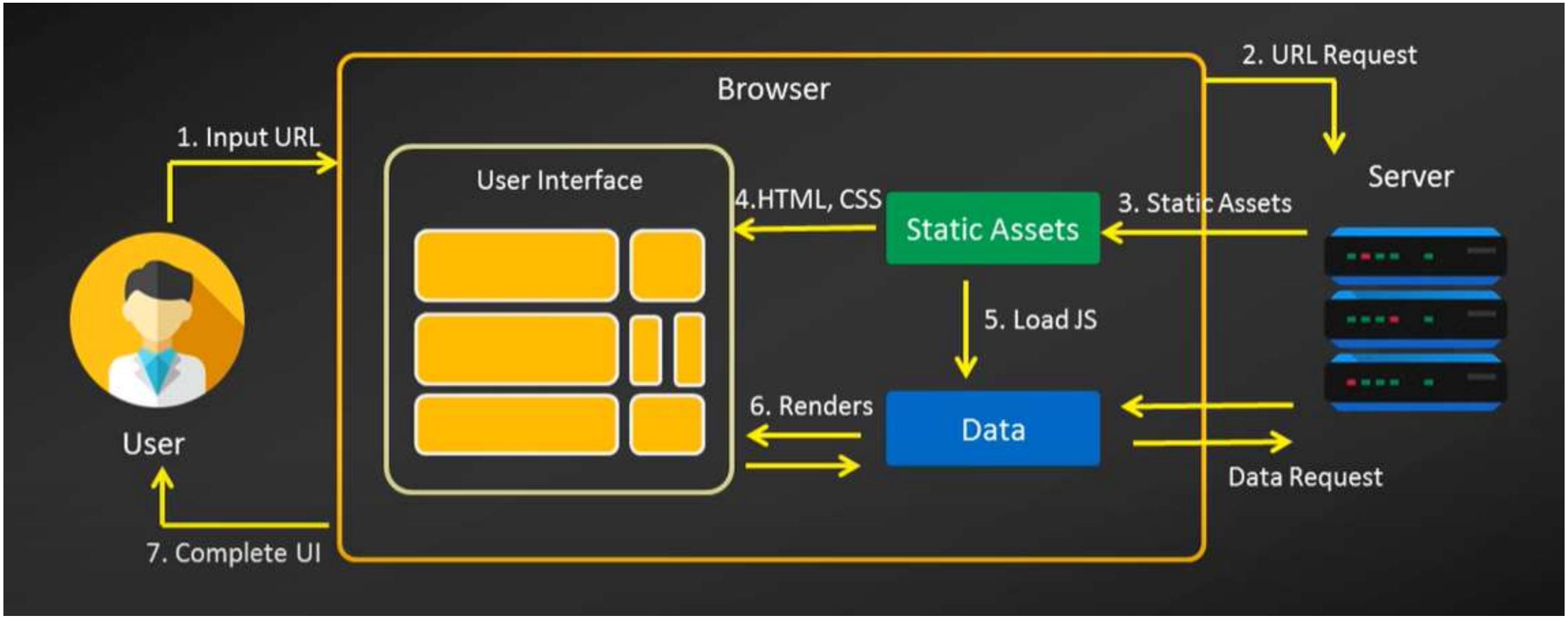
3. Static Assets
2. URL Request
Server
5. Load JS
Data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6. Renders
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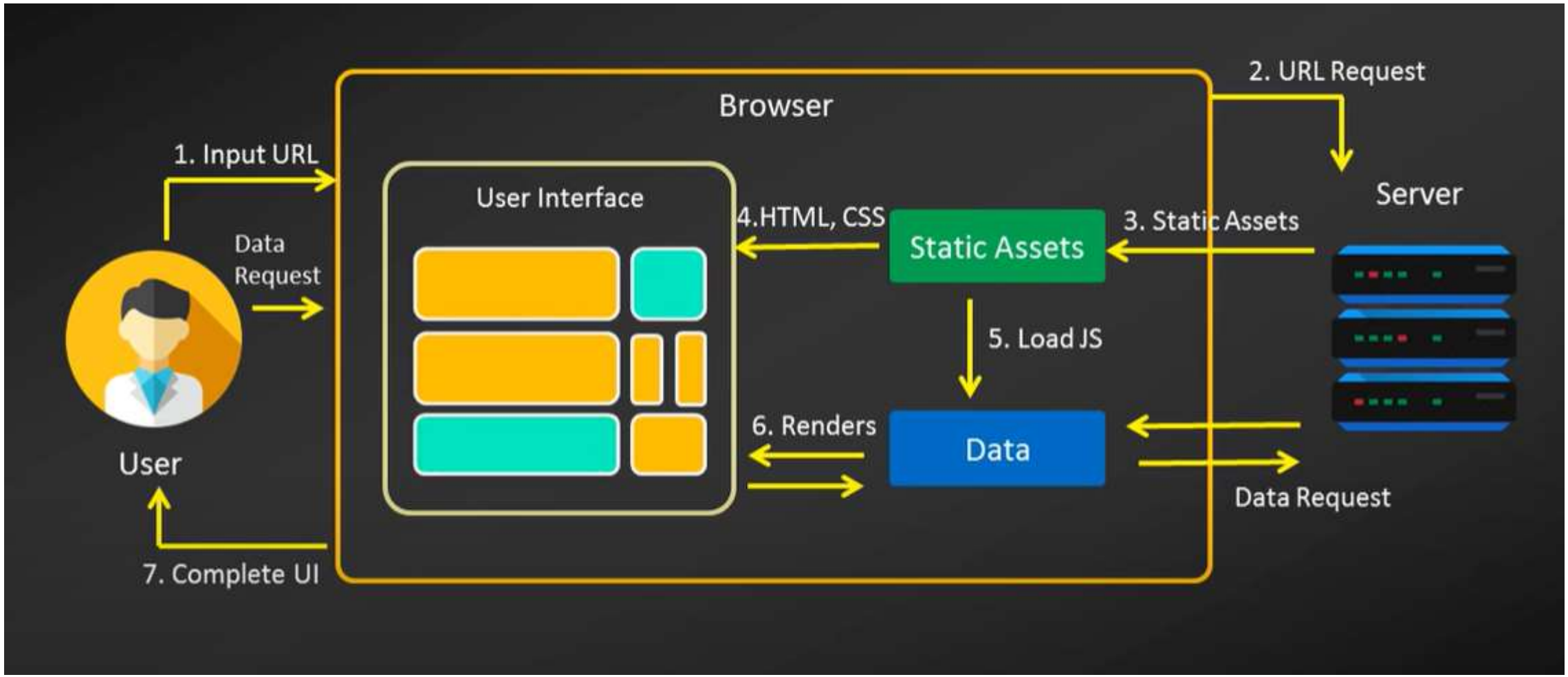
Data Request
7. Complete UI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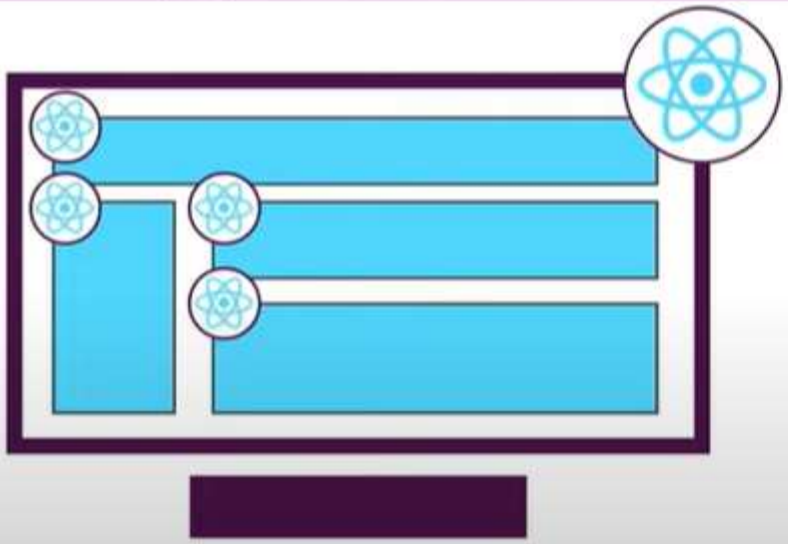
Two Kinds of Applications

Single Page Applications

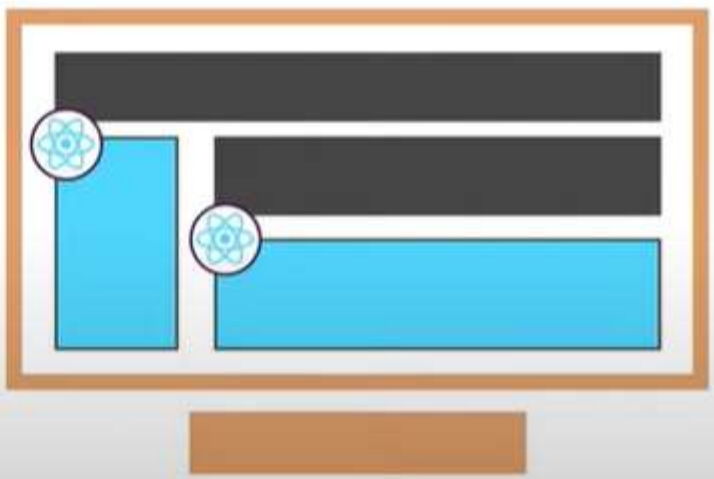
Only ONE HTML Page, Content is (re)rendered on Client



Typically only ONE ReactDOM.render() call

Multi Page Applications

Multiple HTML Pages, Content is rendered on Server



One ReactDOM.render() call per "widget"

What is an MPA?

- Multi-page applications, or MPAs, request rendering each time for a new page from the server in the browser.

- They’re perfect for applications larger than SPAs, and due to the amount of content, they have different levels of UI.

- The multi-page design pattern requires a page reload every time the content changes. It’s a preferred option for large companies with extensive product portfolios, such as e-commerce businesses.

SPA vs. MPA

Speed

As SPA loads the majority of app resources just once. The page doesn’t reload entirely whenever the user requests a new piece of data.

MPA is slower as the browser must reload the entire page from scratch whenever the user wants to access new data or moves to a different part of the website. The optimal loading time for a website is 0.4 seconds. If your website or app is image-heavy, then choosing a SPA is a safer option.

Coupling

SPA is strongly decoupled, meaning that the front-end and back-end are separate. Single-page applications use APIs developed by server-side developers to read and display data.

In MPA’s, the front-end and back-end are more interdependent. All coding is usually housed under one project.

Search Engine Optimization

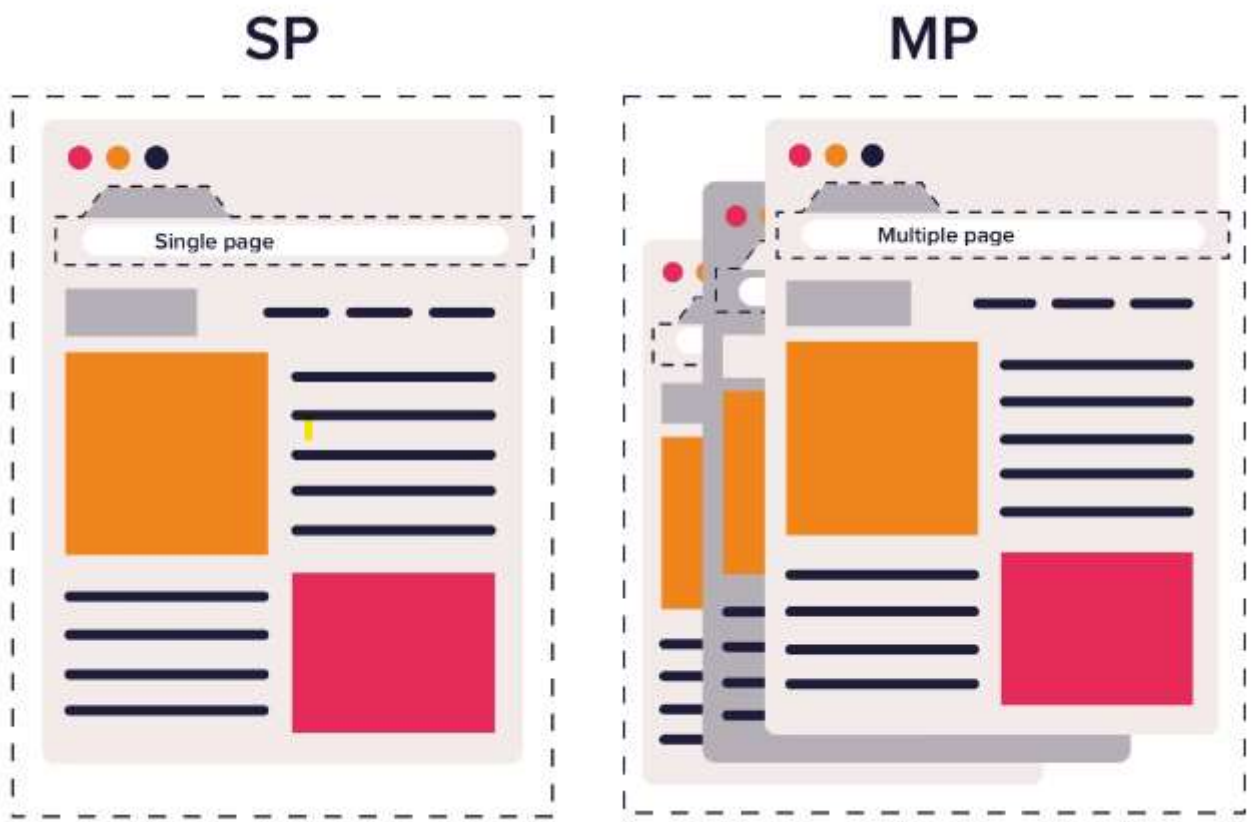
One of the weaknesses of the SPA is SEO. Unfortunately, they aren't as SEO-friendly as MPA's. It's primarily because most single-page applications are run on JavaScript, which most search engines do not support. Web pages are indexed through "crawling" or "spidering". Search engine crawlers download the page's HTML files which makes static HTML web-pages are easier to rank.

MPA enables better website positioning, as each page can be optimized for a different keyword. Also, meta tags can be included on every page – this positively impacts Google rankings.

User experience

A good user experience is no longer an option but a requirement. SPA's are more mobile-friendly, which is worth remembering as a lot of traffic comes from mobile devices. Even Google started to prioritize mobile experience over the desktop. Frameworks applied in SPA development enable you to develop mobile apps.

MPA's, on the other hand, enable better information architecture. You can create as many pages as required, and you can include as much information on a page as you need without any limits. Navigation is clear, so the user can easily find their way around the website, which positively impacts their experience.


SP
Single page
MP
Multiple page

Introduction to React framework

ReactJS is a declarative, efficient, and flexible JavaScript library for building reusable UI components.

It is an open-source, component-based front end library which is responsible only for the view layer of the application.

It was initially developed and maintained by Facebook and later used in its products like WhatsApp & Instagram.

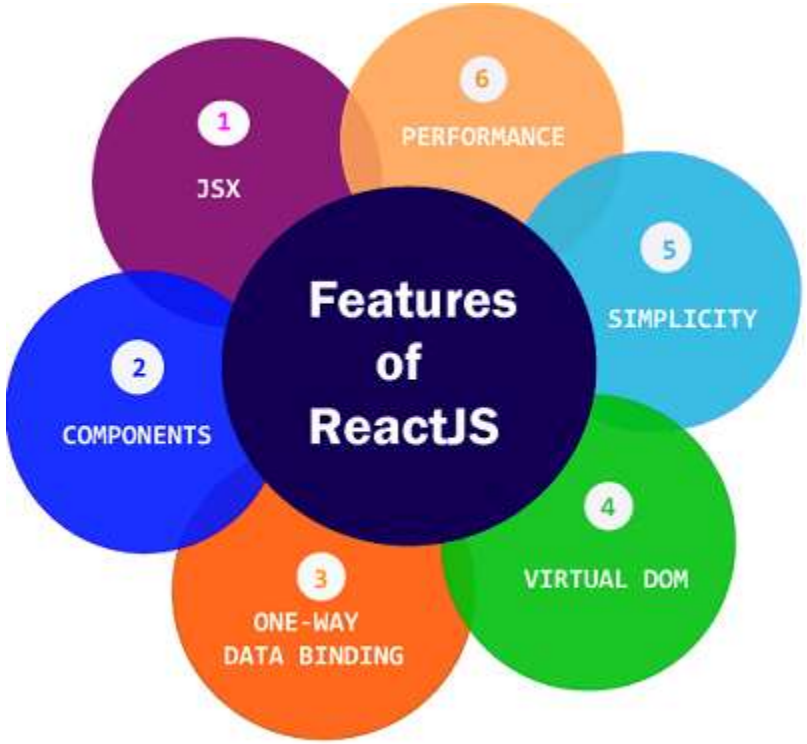
Why we use ReactJS?

- The main objective of ReactJS is to develop User Interfaces (UI) that improves the speed of the apps.
- It uses virtual DOM (JavaScript object), which improves the performance of the app.
- The JavaScript virtual DOM is faster than the regular DOM

React Features

The important features of ReactJS are as following.

- JSX
- Components
- One-way Data Binding
- Virtual DOM
- Simplicity
- Performance



JSX

JSX stands for JavaScript XML.

It is a JavaScript syntax extension.

Its an XML or HTML like syntax used by ReactJS. This syntax is processed into JavaScript calls of React Framework.

It extends the ES6 so that HTML like text can co-exist with JavaScript react code. It is not necessary to use JSX, but it is recommended to use in ReactJS.

Components

ReactJS is all about components.

ReactJS application is made up of multiple components, and each component has its own logic and controls.

These components can be reusable which help you to maintain the code when working on larger scale projects.

One-way Data Binding

ReactJS is designed in such a manner that follows unidirectional data flow or one-way data binding. The benefits of one-way data binding give you better control throughout the application. If the data flow is in another direction, then it requires additional features. It is because components are supposed to be immutable and the data within them cannot be changed. Flux is a pattern that helps to keep your data unidirectional. This makes the application more flexible that leads to increase efficiency.

Virtual DOM

A virtual DOM object is a representation of the original DOM object. It works like a one-way data binding. Whenever any modifications happen in the web application, the entire UI is re-rendered in virtual DOM representation. Then it checks the difference between the previous DOM representation and new DOM. Once it has done, the real DOM will update only the things that have actually changed. This makes the application faster, and there is no wastage of memory.

Simplicity

ReactJS uses JSX file which makes the application simple and to code as well as understand. We know that ReactJS is a component-based approach which makes the code reusable as your need. This makes it simple to use and learn.

Performance

ReactJS is known to be a great performer. This feature makes it much better than other frameworks out there today. The reason behind this is that it manages a virtual DOM. The DOM is a cross-platform and programming API which deals with HTML, XML or XHTML. The DOM exists entirely in memory. Due to this, when we create a component, we did not write directly to the DOM. Instead, we are writing virtual components that will turn into the DOM leading to smoother and faster

Pros and Cons of ReactJS

Advantage of ReactJS

1. Easy to Learn and USe

ReactJS is much easier to learn and use. It comes with a good supply of documentation, tutorials, and training resources. Any developer who comes from a JavaScript background can easily understand and start creating web apps using React in a few days. It is the V(view part) in the MVC (Model-View-Controller) model, and referred to as ?one of the JavaScript frameworks.? It is not fully featured but has the advantage of open-source JavaScript User Interface(UI) library, which helps to execute the task in a better manner.

Pros and Cons of ReactJS

Advantage of ReactJS

2. Creating Dynamic Web Applications Becomes Easier

To create a dynamic web application specifically with HTML strings was tricky because it requires a complex coding, but React JS solved that issue and makes it easier. It provides less coding and gives more functionality. It makes use of the JSX(JavaScript Extension), which is a particular syntax letting HTML quotes and HTML tag syntax to render particular subcomponents. It also supports the building of machine-readable codes.

Pros and Cons of ReactJS

Advantage of ReactJS

3. Reusable Components

A ReactJS web application is made up of multiple components, and each component has its own logic and controls. These components are responsible for outputting a small, reusable piece of HTML code which can be reused wherever you need them. The reusable code helps to make your apps easier to develop and maintain. These Components can be nested with other components to allow complex applications to be built of simple building blocks. ReactJS uses virtual DOM based mechanism to fill data in HTML DOM. The virtual DOM works fast as it only changes individual DOM elements instead of reloading complete DOM every time.

Pros and Cons of ReactJS

Advantage of ReactJS

4. Performance Enhancement

ReactJS improves performance due to virtual DOM. The DOM is a cross-platform and programming API which deals with HTML, XML or XHTML. Most of the developers faced the problem when the DOM was updated, which slowed down the performance of the application. ReactJS solved this problem by introducing virtual DOM. The React Virtual DOM exists entirely in memory and is a representation of the web browser's DOM. Due to this, when we write a React component, we did not write directly to the DOM. Instead, we are writing virtual components that react will turn into the DOM, leading to smoother and faster performance.

Pros and Cons of ReactJS

Advantage of ReactJS

5. The Support of Handy Tools

React JS has also gained popularity due to the presence of a handy set of tools. These tools make the task of the developers understandable and easier. The React Developer Tools have been designed as Chrome and Firefox dev extension and allow you to inspect the React component hierarchies in the virtual DOM. It also allows you to select particular components and examine and edit their current props and state.

Pros and Cons of ReactJS

Advantage of ReactJS

6. Known to be SEO Friendly

Traditional JavaScript frameworks have an issue in dealing with SEO. The search engines generally having trouble in reading JavaScript-heavy applications. Many web developers have often complained about this problem. ReactJS overcomes this problem that helps developers to be easily navigated on various search engines. It is because React.js applications can run on the server, and the virtual DOM will be rendering and returning to the browser as a regular web page.

Pros and Cons of ReactJS

Advantage of ReactJS

7. The Benefit of Having JavaScript Library

Today, ReactJS is choosing by most of the web developers. It is because it is offering a very rich JavaScript library. The JavaScript library provides more flexibility to the web developers to choose the way they want.

8. Scope for Testing the Codes

ReactJS applications are extremely easy to test. It offers a scope where the developer can test and debug their codes with the help of native tools.

Disadvantage of ReactJS

1. The high pace of development

The high pace of development has an advantage and disadvantage both. In case of disadvantage, since the environment continually changes so fast, some of the developers not feeling comfortable to relearn the new ways of doing things regularly. It may be hard for them to adopt all these changes with all the continuous updates. They need to be always updated with their skills and learn new ways of doing things.

Disadvantage of ReactJS

2. Poor Documentation

It is another cons which are common for constantly updating technologies. React technologies updating and accelerating so fast that there is no time to make proper documentation. To overcome this, developers write instructions on their own with the evolving of new releases and tools in their current projects.

3. View Part

ReactJS Covers only the UI Layers of the app and nothing else. So you still need to choose some other technologies to get a complete tooling set for development in the project.

Disadvantage of ReactJS

4. JSX as a barrier

ReactJS uses JSX. It's a syntax extension that allows HTML with JavaScript mixed together. This approach has its own benefits, but some members of the development community consider JSX as a barrier, especially for new developers. Developers complain about its complexity in the learning curve.

https://www.javatpoint.com/javascript-array

Question 1

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A. A combination of JavaScript and XML
B. A new version of JavaScript
C. The output of a React project

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Question 2

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B. JSX allows for good code management. It injects the necessary logic with your HTML.
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