React JS – An Emerging Frontend Javascript Library

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Abstract- React JS is JavaScript library developed to design rich UI's. It is one of the famous frontend library among the others. It incorporates with 'View' concept from MVC model (Model-View-Controller). React JS is backed by Facebook, Instagram and community of frontend developers and organization. React JS is emerging as one of the fastest and easy frontend library to be used in web applications as it has fully component based architecture.

The purpose behind this paper is to showcase how and why React JS is emerging as one of the finest open-sourced JavaScript library.

Indexed Terms- React JS, Frontend Development, MVC model, Web application development.

I. INTRODUCTION

React JS is open-source JavaScript library built to develop UI's for web applications. React JS is an open-source JavaScript library designed at Facebook by Jordan Walke a Software Engineer in 2011 but released to the public in the month of May 2013. The core objective of React JS is to provide the best possible rendering performance. Its strength comes from the focus on individual components. Using reusable components, it is found to be easy development for developers to design rich UI's. React JS incorporates with View part from M-V-C (Model-View-Controller) model. React JS implements One-Way dataflow so that it gets easier than traditional data binding. React uses virtual DOM it offers not so complex programming with faster execution.

II. INSTALLATION

React JS can be installed on different operating systems like Macintosh, Microsoft Windows, Unix etc. Node JS & NPM are one of the platforms needed to develop any React JS application.

Node JS and NPM package manager can be installed with below link- https://nodejs.org/en/download/

Considering the current version of React JS 17.0.2   released on 22 March 2021 below are the few steps to install and create react application-

1. Open command window to install React. we use the command-
   npm install create-react-app
2. For creating React JS project we use command-
   npx create-react-app (application name here)
3. And finally, to run the project we use the command-
   npm start

NPM is a package manager which enables the server and runs the application at default server – http://localhost:3000.

III. APPLICATIONS OF REACT JS

React JS has numerous applications as a tool to create interactive, rich, and robust UI's.

A. Creation of dynamic applications with ease-
   React JS require less coding and offers more functionality which makes it easier to create dynamic web applications for developers.

B. Open-sourced library-
   React JS is JavaScript's open-sourced library is one of the reasons as React JS is emerging as fastest emerging JS library among the frontend developer's community and organizations.

C. Use of Re-usable components-
   React JS is all about components. Components are the main aspect of any React JS application. Multiple components could be there in the application which can be re-used and development times could be reduced.

D. Easy debugging tools-
Chrome extension is released by Facebook to debug the react applications which ultimately results in faster debugging of react applications. React Developer Tool is Chrome extension developed for open-source JavaScript library.

E. Backed by large developmentcommunity-
Facebook who designed and released React JS uses React JS in their application also Instagram, Reddit, Netflix are one of theleading companies uses React JS intheir web applications.
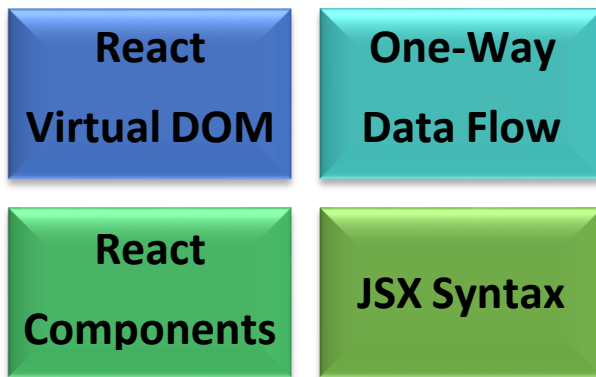
IV.   ARCHITECTURE

Figure 2. Architecture of React JS

Above are the four main aspects of ReactJS:

1. React Virtual DOM-
The virtual DOM (Virtualdocument object model) is one of the main elements of React JS. It is little similar to the DOM generated by the browser but only difference is that it is stored in the memory. Atpoint when changes are needs to bedone in page content, they are reflected to the memory residing virtual DOM first; then that a diff ()algorithm looks at the two DOM i.e., the virtual DOM and the browser DOM then changes done are reflected to the program DOMitself, rather than refreshing the whole DOM. This gives super boostto the application basically when a large data changes are to be made.

2. One-Way data flow-
React JS is built in such a way that data flow i.e., downstream isallowed and supported. Uni- directional flow ensures that data flows in single direction throughoutthe application which offer more control between the states and models in an application. Uni-directional flow also ensures that architecture of application is less complex and understandable. It does not make any cascading updates and updation in the view part.

3. React Components-
Components is small UI (UserInterface) elements that providedata to View which can also changes over the period of time. These reusable components are bind together to build an entire UI for the application. Components letdevelopers split UI in multiple parts and to design and build UI in most effective way. They are likeJavaScript functions; they perform the same task but in differentenvironment and approaches. They take input known as props and returns React elements (what one can see on the screen).

4. JSX Syntax-
It stands for JavaScript XML. It is asyntax extension in JavaScript. JSXis recommended to be used with React JS to design and build User Interface. JSX is faster, safer and easier since, JSX source code is compiled to JavaScript, it shows a very optimized result. Comparing tothe equivalent code written in JavaScript, the quality of application is way higher when developed with JSX.

V.   COMPARITIVE STUDY

React JS and Angular JS are widely embraced and advanced JavaScript technologies are being used to develop single-page applications. Here are the few fundamental differences between React JS and Angular JS.

Technology	Angular JS	React JS
DevelopedBy	Google	Facebook
Initial Release	October 2010	March 2013
Latest Version	1.8.2 / 21 October 2020	17.0.2 / 22 March 2021

Languagesused	JavaScript,HTML	JavaScript,JSX
Data-Binding	Two-way data binding	One-way data binding
DOM	Regular DOM	Virtual DOM
Dependencies	Dependencies are managed automatically.	It needs thirdparty tools,extensions to manage dependencies.
Performance	Slow	Fast
Best For	Single page applications which update a single viewat a time.	Single page applications that update multiple views at a time.

Table.1 Angular JS vs React JS

VI. LIMITATIONS

React JS has few Impediment while emerging as finest JavaScript library-

A. React only deal with the View from MVC so we need other tooling to finish the backend development too.
B. Aspiring developers complain about JSX programming in the learning phase and is considered as barrier.
C. Reacts environment changes so fast that developers often find it difficult to adopt to the new changes, relearn and implement them. Developer's always need to be updated with their skills and also with changes done in the React JS environment.

CONCLUSION

The purpose of this paper is to highlight how and why React JS library is in demand with developer's community and organizations. Facebook developed React JS for their own purpose and later open sourced it in 2013. Since then, within a veryshort time React JS has gained incredible popularity among the developers and tech industry.

Despite few limitations that React JS has itis surely revolutionary. It has brought a newdimension in the web applicationdevelopment. Clients requirements are upgrading rapidly and advancing so is React JS. React JS accelerates theapplication efficiency and it can be seen that React JS has a wider scope as well worth the efforts. React JS has it all which can fulfil the requirements of today's world. So, it can be said that React JS has the ability to affect modern day web development.

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