React vs Angular JS

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When you browse Indeed or other job posting websites, you may notice that more and more web development jobs don't require jQuery, instead, they require you have strong knowledge about React or Angular JS. Why do people begin to lose interest on jQuery? One reason is that React and Angular JS are designed to be scalable, they help developers make their code more manageable and reusable when they are building a large web application. However, this raises a question, if I can only choose one of them, which one should I pick?

Before we compare React and Angular JS, we need to first clarify one thing: React is only a JavaScript library for building user interfaces, but Angular JS is a structural framework for dynamic web apps, which has a fully MVVM model. To be clear, the library is a collection of functions which are useful when writing web apps, your code is in charge and it calls into the library when it sees fit, the framework is a particular implementation of a web application, where your code fills in the details, it is in charge and calls into your code when it needs something app-specific. So I will focus on view layer between React and Angular JS, mainly on rendering speed.

React is declarative, which makes it painless to create interactive UIs, design simple views for each state in your application will make your code more predictable and easier to debug. Besides, React is component-based, each component manages their own state and then composes them to make complex UIs, React will efficiently update and render just the right components when your data changes, which is achieved by virtual DOM tree. The philosophy behind the virtual DOM tree is "I have no idea what changed so I'll just re-render everything and see what's different now." When a React UI is rendered, it is first rendered into a virtual DOM, which is not an actual DOM object graph, but a light-weight, pure JavaScript data structure of plain objects and arrays that represents a real DOM object graph, a separate process then takes that virtual DOM structure and creates the corresponding real DOM elements that are shown on the screen. When a change occurs, a new virtual DOM is created from scratch, which means now React has two virtual DOM data structures in memory, it then runs a diffing algorithm on the two virtual DOM trees to get the changes between them and only changes are applied to the real DOM. The algorithm achieves O(N) time complexity, it is fast but memory consuming.

As described by the document of Angular JS, Angular is a framework for building client applications, it is modularity, which help developer develop reusable code and manage their code more efficiently when their application grows bigger. NgModules (Angular modules) consolidate components, directives, and pipes into cohesive blocks of functionality, to be specific, components are responsible for the view and pipes take in data as input and transform it to the desired output. Modules can also add services to the application. Such services might be internally developed, such as the application logger. Services can come from outside sources, such as the Angular router and Http client. You can write Angular applications by

composing HTML templates with Angularized markup, writing component classes to manage those templates, adding application logic in services, and boxing components and services in modules. Then you launch the app by bootstrapping the root module. Angular takes over, presenting your application content in a browser and responding to user interactions according to the instructions you've provided.

In view layer, Angular JS used a different way for rendering the DOM, the philosophy behind it is "I have no idea what changed, so I'll just check everything that may need updating." This is achieved by watchers, which are attached to each component and each time a component is changed, watchers check if they should modify something else; and if needed, make appropriate modifications. The good part of it is that you can use anything in your data models, Angular puts no restrictions on that. The bad part is that Angular has to be conservative and run all the checks every single time because the JavaScript language does not give an object mutation guarantee. However, the Angular team takes advantage of immutable objects to make their algorithm faster. In detail, if a component depends only on its input properties, and it is immutable, then this component can change if and only if one of its input properties changes. Therefore, Angular can skip the component's subtree in the change detection tree until such an event occurs. When it happens, Angular can check the subtree once, and then disable it until the next change.

Both React and Angular JS 2 have achieved the good result of rendering in the benchmark test from Auth0. However, React wins at most of the time. In detail, React is two times faster than Angular JS 2 about re-layout, Angular JS 2 takes 200ms to finish it; for the speed of JavaScript code execution, React is 2 times faster than Angular JS 2, and they are both faster than Angular JS 1. So far, React still has the efficiency advantage and will be your best choice if you decide to develop an application which needs very good efficiency.

In community and job demanding part, Angular JS 2 has taken the advantage. The result given by Indeed shows that companies have a huge demand for Angular JS developer since they have posted more than 8000 job posts. React begins to lose, there are only 6000 jobs showed on Indeed. Besides, on GitHub, React is also losing its advantage, the number of forks of Angular has been two times to React, which means more and more developer begin to contribute to Angular JS instead of React.

For the new beginner, the difficulty of learning often helps them decide which technique they should learn. However, it has been recognized in StackOverflow that Angular JS has a steep learning curve since Angular is a framework. You should not only familiar with APIs but also need to be familiar with how does Angular take over your application and how to use TypeScript. Instead, React is only a library and all you need to familiar with is the APIs. Though Angular JS 2 is harder to learn, using framework can give you many benefits. First, it's time-saving, a similar reason that you use a library, you already used the functions that other people provide to you, then why don't you just use the system other people developed? Second, it has good robustness and security, the framework usually has been tested by many developers

and it's far more likely better than something you come up with alone. This could also explain why many technique companies prefer Angular JS to React.

On the other hand, both React and Angular JS support native application development, this advantage will attract more and more developers to use them since the hybrid application helps developers design cross-platform application more efficiently. Developers can write their Android application using 90% React or Angular JS code and 10% Java code, then they can build their iOS application by reusing their 90% React or Angular JS code and 10% Swift code.

In the last, we need to understand one thing, React and Angular are not totally opposite, there is no reason to choose one than another. In fact, there shouldn't be a fight because they can work together, some people have already combined React and Angular into one framework to gain both of their advantages. So stop struggling and learn both of them will help you to be more competitive in the war of job hunting.

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