React vs Angular For Application

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Abstract:

We believe that technology decisions should be driven by the job at hand. When a client asks “Which is better, React or Angular?”, we answer with questions to fully understand their outcomes. Choosing the right framework for an application has the potential to accelerate the development schedule, increase productivity and satisfaction within the development team, enhance stability, and ultimately lead to a better product.

What is React?

React is a library for building user interfaces. React applications are small and flexible, and can integrate with nearly any other technology to create a complete application.

Composable components

Composability is the main feature of React. Each individual component can be made small, single purpose, and reusable in many different contexts. This allows for rapid and maintainable development. React’s composability makes teams much more collaborative, with fewer bugs and errors. Individual developers can contribute entire components that will work well together. The ability to create higher order components (HOCs) allows ‘wrapping’ existing components to add new functionality.

Small API

React has a very small API, which makes for a library that is easy to learn, maintain, and use in combination with other tools. It is possible (and common) to use multiple view layer libraries and frameworks alongside React. Upgrading an existing application from Angular or Backbone to React can be done incrementally.

Although React has a smaller overhead than Angular, React apps may need to rely on imported dependencies to access equivalent functionality. Over time, the end result is that the overhead of a React app can grow large.

What is Angular?

Think of Angular as a component-based MVC JavaScript framework for building cross-platform apps. All of the building blocks for developing complete web applications, as well as progressive web, native and desktop apps are included in the framework, from the data layer to the view layer. Angular is built for quick, robust development and requires very little support from external dependencies because of its comprehensive API. It mandates the use of TypeScript for consistent typing and is highly modularized. Similarly to React, Angular affords the use of small reusable components.

Ease of Development

Because Angular is a ‘framework’ – as opposed to a ‘library’ – it includes many tools that make it easy to:

- Generate new projects and new pieces of the codebase from scratch using templates.
- Use or customize predefined development and deploy configurations immediately upon project creation.
- Automatically generate tests with each new piece of the codebase.
- Automatically configure and customize code style rules to maintain a consistent codebase.

Architecture

Angular's architecture consists of eight main building blocks:

● **Module** - A cohesive block of code dedicated to an application domain, workflow, or closely related set of capabilities. While all Angular applications must have at least one root module, they can contain as many as necessary.

● **Metadata** - Angular makes use of JavaScript decorators. Decorators are functions that modify a JavaScript class. In Angular's case, these decorators specify that the code they decorate is in fact Angular code, and include metadata about what the code means and how it should behave at runtime.

● **Component** - An Angular component controls a patch of screen and is intertwined with a Template (see below). Components contain logic to set properties, manipulate data, and manage state. They have access to a host of lifecycle methods to help facilitate this management.

● **Template** - Templates make use of the logic and properties set in the component and define what is actually displayed. This is done through HTML extended to include Angular directives.

● **Data bindin**g - Data binding connects Angular components and templates. This allows for data, properties, and events set in a component can be passed down to child components through templates.

● **Directive** - A directive is a function that allows or assists with manipulating the Virtual DOM. It is possible to write custom directives.

● **Service** - Reusable purpose-driven code that can be shared throughout the application.

● **Dependency Injection** - Allows injection of dependencies that are already running without having to create new instances of them.

Benefits of React JavaScript Library

Better User Experience

Unlike other JavaScript frameworks, React uses the Virtual DOM – the abstract form of Real DOM. This makes it easier for the React app developers to update changes performed by the users in the application without affecting the other parts of the interface. This results in building a highly dynamic UI with the exquisite user experience.

Time-Saving

In the case of React, the app development companies can reuse the code components at distinct levels at any point of time. Besides, the components are isolated to each other and changes in one does not affect the other, which makes it easier to manage the updates.
This makes the React app development easier, time-saving, and efficient for developers.

Quick Development

React allows the developers to reuse the existing code and apply hot reloading into the process. This approach not only improves the app performance, but also accelerates the development speed.

Faster Testing

React extensively uses Redux which cut down the hassle of storing and managing component states in large-sized and complex applications with enormous dynamic elements. It helps the developers to add application state in a single object and empower every component of the app to access the application state without involving child components or using callback. This makes it easier to test the application and log data changes, along with the use of hot reloading and other such tools.

Code Stability with One-directional data binding

ReactJS let the developers work directly with the components and employ downward data binding to ensure that the parent entities do not get affected by the changes of child entities. This approach makes the code stable and supports the idea of development in the future.

Benefits of Angular Front-End Development Framework

Cleaner Code

Angular uses TypeScript programming language, which is a superset of JavaScript. It compiles JavaScript, but also ease the process of finding and eliminating the common issues while typing the code. This approach helps the developers in writing cleaner and error-free codes and ensure high code quality, something that is really helpful when investing in Enterprise app development.

Higher Performance

Angular has a hierarchical dependency injection, much better than that of AngularJS, in which classes are not dependent on each other. They rather turn towards the external sources, which delivers higher performance to the Angular mobile applications.

Material Design-like Interface

Angular offers pre-built material design components across navigation elements, form controls, pop ups, layouts, and data tables. This helps the mobile app developers to overcome the Google Material Design's impact on Mobile app design and design a digital product that users need in the long run.

Better Error Handling

The latest version of Angular, i.e. Angular 7 also offers features like an upgraded error handling process for @Output in the scenarios where a property is not initialized.

Seamless Updates using Angular CLI

Angular CLI (Command Line Interface) is easy to install and use, newcomer-friendly, offers innovative testing tools and simpler commands and is supported by various engineers and platforms, which make it possible to update even those components having a third-party dependency.

Factors to consider for choosing the right platform.

1. Popularity

As per Google Trends, React has more searches than Angular. While, people shows more interest in Angular due to availability of ample of ready-made solutions. Besides, both the technologies are developing which means both are popular in the market.

2. Architecture

Both Angular and React have component-based architecture, which means they have cohesive, reusable and modular components. But, the difference comes at the point of tech stack. React uses JavaScript while Angular goes with Typescript for web development which is more compact and error-free.

3. Learning Curve

Angular has a steep learning curve when compared to React. The Google Angular IO framework offers multiple ways to solve a particular problem, has a complex component management system, as well as demand familiarity with different concepts and languages like templates, pipes, dependency injection, RxJS, TypeScript, etc.

Besides, the framework is developing constantly – making it necessary for the developers to look into what's new in the Angular ecosystem and upgrade their skills accordingly.

Whereas, the same is not true for React JS framework. Reactjs allows you to easily learn and make an app in React ecosystem if you are good with JavaScript. ReactJS provides multiple useful resources for newcomers to understand the framework and look forward to developing an application, even after frequent updates are rolled out.

4. Development Speed and Productivity

Angular offers enhanced development experience – thanks to its CLI that empowers creating a workspace and design functioning applications swiftly and producing components and services with one-line commands, built-in process to solve comprehensive problems and clean coding feature of TypeScript.

But, when it comes to React, the development speed and productivity gets affected due to the involvement of third-parties libraries. The React js app developers have to determine the right architecture along with the tools. Besides, the toolkit for React mobile apps varies from project to project, implying more time and efforts is invested if the project is handed over to new developers for an app update.

This indicates that Angular outshines React in terms of development speed and productivity.

5. Flexibility and Freedom

Another factor that contributes to React vs Angular choice is flexibility. React framework provides you with the freedom to choose the tools, libraries, and architecture for developing an app. It let you build a highly-customized app using only the features and tech stack you require, provided you have hired a skilled ReactJS development team.

Angular, on the other side, offers a limited amount of freedom and flexibility. For example, the latest version of Angular IO, i.e, Angular 7 lets you only use Angular components inside other frameworks and embed codes in an HTML-based application.

This indicates that React offers better flexibility and freedom in comparison to Angular.

6. DOM (Document Object Model)

Angular uses real DOM where the whole tree data structure is updated even if a single section of it is changed or altered. Whereas, Virtual DOM is employed in Reactjs app development, which enables the app development companies to track and update the changes without affecting the other parts of the tree.

Since Virtual DOM is considered faster than real DOM, React wins over Angular in this context.

7. Data Binding

Another factor that influences the decision to choose the right framework among React and Angular is Data Binding.

React uses one-way data binding in which the UI elements can be changed only after changing the model state. The developers cannot alter the UI elements without updating the corresponding model state.

Whereas, in the case of an Angular mobile app, the two-way binding approach is considered. This approach ensures that model state changes automatically when any change in UI element is made, and vice-versa.

While Angular's approach seems easier and effective, React's way offers a better and streamlined data overview in the case of larger app project. Thus, React wins over Angular.

8. App Performance and User Experience

It is true that React uses Virtual DOM and Fiber for building applications that make it lead to AngularJS. But, the newer versions, like Angular 7 has come up with features and elements like ShadowAPI that has made the competition between the two frameworks even more intense, with none falling down in terms of app size or performance.

9. Mobile Solutions

Angular offers Ionic framework for mobile app development, which comes with a Cordova container and an engaging UI component library. So, the developed application, when viewed on any device, appears like a web inside a native web app container.

However, this is not in the case of React javascript library. It offers a truly native UI experience that enables you to make your own components and bind them to native code written in Java, Kotlin, Objective-C, and Kotlin.

So, React wins this battle here.

10. Testing

The Angular IO testing and debugging for a complete project is possible with a single tools like Jasmine, Protractor and Karma. But, this is not possible in the case of React js app development. A set of tools are required for performing different sets of testing.

For example, you will require Jest for JavaScript code testing, Enzyme and Unexpected-React for component testing, Skin-deep for Render testing utils, React-unit for unit testing, and so on. This increases the efforts and time required in the testing process.

So, the winner of this Angular vs React war is Angular.

11. Ease of Update

Angular has an improved CLI that contains commands like a ng_update which makes it possible to easily upgrade the app to the latest Angular version. This makes Angular app development less painful, provided most of the updating process is automated.

Similarly, React also offers the facility to make seamless transitions between two versions. But, the front-end development library relies heavily on the external libraries which make it possible to update and migrate the third-party components. Besides, the developers have to check all the time if the used third-party libraries are compatible with the recent versions of the JavaScript framework or not, which increases the efforts of the developers.

This implies that though both the frameworks are working towards making transitions from version to version seamless, React lags behind Angular.

12. Documentation

The documentation in the Angular framework is slower due to the ongoing development process. Besides, most of the documentation and tutorials are till AngularJS, which are outdated and useless for the developers now.

But this is not the case with Reactjs development. The React framework is also undergoing regular updates, but the insights from the earlier versions is still valuable.

13. Community Support

React has a wider community support than Angular on GitHub. But, when it comes to 2018 StackOverflow Developer Survey, the number of developers working with Angular are somewhat higher than those working with React.

So, both the front-end development frameworks have somewhat the same community support.

When to Use React for Developing an App?

React is the right fit for your app project when:-

1. Your team has expertise in HTML, CSS and JavaScript.
2. You need a highly customized specific app solution.
3. A myriad of components with different and often variable states – active/inactive navigation items, dynamic inputs, user login and access permissions, buttons enabled/disabled, etc. is involved in the development process.
4. Components are expected to be shared across multiple applications as the app project expands.
5. You wish to spend time on pre-development preparation.

When to Consider Angular for App Development?

Going with the Angular framework in a good choice when:-

1. Your team has experience with Java, C# and previous versions of Angular.
2. App complexity lies from Low to Medium level.
3. You embrace ready-to-use solutions and need higher productivity.
4. You wish to embrace Bundle Budgets in CLI option, which informs the developers when the app bundle size exceeds by the pre-decided value. In other words, selecting Angular is the right decision when you want to regulate app size.
5. You need a large-scale feature-rich application.

Common difference between Angular and React:

Technology	Angular	React
Technology type	Component-Based Framework using Typescript	User Interface Library with a component-based architecture using Javascript
Data binding	2-way data binding	1-way data binding
Size	Quite large and since it needs to be shipped to the client side, it increases the initial load time	Quite small in size, especially when compared with Angular
Learning Curve	Quite steep, given the number of features and options you have in Angular	It’s easy to pick up and learn
Performance	Comparable to React, Angular 2 and 4 are some	Faster than Angular thanks to the Virtual DOM
Simplicity	Quite complex	Fairly simple but takes some time to set up a project and configure everything
Scalability	Easy to scale thanks to the power CLI and generation tools, It’s also used by many large companies	Fairly easy to scale and is quite testable which facilitates the scaling procedure

Conclusion:

Reasons to choose React JS

With over 100,000 websites currently using React, according to BuiltWith.com, there should be a good reason for it. So, what made this young technology so popular? Having successfully implemented a number of React projects here at Eastern Peak, we can clearly see the benefits of this tool. Thus, the major advantages of React for web development include the following:

Development efficiency – Less development time and higher quality

React allows you to write modular and clean code, breaking the project into separate components. This also allows for code reuse, which can really boost developer productivity.

Flexible and easy to maintain

Unlike large monolithic projects, React code is easy to maintain and update due to its modular structure. React products are extremely flexible and can be scaled easily. This can significantly save time and money in the long run.

High performance of your app

Designed with performance in mind, the library’s core features, such as virtual DOM and server-side rendering, allow you to create large-scale apps which are really fast.

SEO friendly – more visibility for your site

Thanks to backend rendering, React projects are better optimized for search engines. Moreover, high speed and performance, which we have listed above, contribute to a better SEO, and also provide an overall better user experience.

Open, rich toolset

Being an open source technology, React is free and open for all. Moreover, it has a rich ecosystem, including such must-have tools as Flux or Redux as well as Node.js on the backend or a large number of task-specific open source libraries, listed on npm.

Strong community

Being built initially at Facebook, the library is still supported and maintained by the company as well as by more than 1,000 independent contributors worldwide. Thanks to the vibrant community and solid corporate support, React is a reliable and up-to-date technology.

Easy transition to React Native

React Native is a mobile development framework, based on React. Thus, it is easy for React JS developers to switch to React Native and create mobile apps with a native look and feel. Moreover, some parts of your React web app can be reused in a React Native mobile app (mostly business logic), which improves the development speed.