

What Makes Angular Interesting

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ABSTRACT

Angular JS is Single Page Application which is also a JavaScript library. It is a Open Source application which is used by the thousands of developers in the world. Angular is more responsive to action taken by the users. It is also licensed in Apache license version 2.0. The new mobile and web-based application frameworks has been released and it is used by the both the software development industry and research While some of these new frameworks are more popular than others, some are specialised in certain types of applications, and others have specific advanced features or outstanding capabilities that set them above others. The increase in the usage of mobile application has increased the demand of mobile application and has also increase the need for cross-platform framework. In this paper, we discuss the different criteria which identifies the strengths and weaknesses of using Angular frame work in developing mobile and web-applications. Finally, we focus more deeply on the version of the Angular framework showing the eminent capabilities and over its own earlier versions. Overall, our comparative analysis results in a few interesting findings regarding different version of Angular framework, leaving us to believe that a new generation might soon emerge from the exponential path of MVC, MV*/MVW and MVVM.

Keywords : Apache License, Cross-Platformframe Work

I. INTRODUCTION

Both mobile and web-based application platforms evolve over time to better serve the needs and requirements of the growing business markets and their demands. Mobile and web- based applications consist of two main components:

- 1). Client- side, also known as front-end, which includes the browser and the mobile web app client.
- 2). Server-side that includes all back-end functionalities (database, validations, authorizations and authentications).

In this paper, we focus on the front- end that includes various dependencies affecting the service performance as well as the user satisfaction with the final software solution. Therefore, there is also a growing area of development in terms of new frameworks, platforms and IDE tools, availing different combinations of the basic and essential software development functionalities such as bundling, logging, compiling, packing, debugging and testing.

The challenge is choosing the best framework technology to that fits the desired solution and easily integrates with other systems resulting in the best user experience. Currently there are several cross-platform client-side frameworks. Most of which include an

array of libraries and responsive user interactions, often referred to as 'single-page applications' [1]. For instance, if we consider the simplicity and accessibility of jQuery as a web-development platform, it would be difficult to build and manage a medium to a large-sized solution. Although jQuery is manageable and straightforward to use, it is too low-level as far as application development is concerned. It even gets more complicated and inefficient as scale and complexity of the project increases.

AngularJS lets us use HTML as your template language. The data binding and dependency injection eliminate more of the code that has been currently written. And this all happens within the browser's, which makes an ideal partner with any of the server technology. Some of the features of the AngularJS are as follows:

1. It is an efficient framework that can create an a Rich Internet Application(RIA).
2. It also provide the developer an option at the client side using the TypeScript in a clean Model View Controller(MVC) way.
3. It is completely free as it is a open source application and it is used by thousands of developer across the world.
4. Application written in AngularJS are cross-browser compliant.
5. It handles TypeScript code which is suitable for every browser.

Overall, AngularJS is a framework to build large scale, high-performance, and easy to-maintain web applications.

AngularJS is a framework which provide user to build dynamic web application. The developer can make use of the HTML's syntax to express the application's components succinctly and clearly. HTML is a declarative language for the static document, but AngularJS is what HTML would be if it had been

designed for applications. There is huge difference between the Single Page Application and the Multiple Page Application. According to the rumor, according to Twitter after getting to the app from multiple page to single page application they have reduce over 50% of their internet traffic and around 60% time consumption is reduced.

And similiary there are much difference between the static and dynamic doucments and the difference between this is often solved with

- a library - a collection of functions which are useful to write the web apps. The code is in charge and it calls to the library when it sees fit. E.g., jQuery.
- frameworks - the implementation of a web application, where the code fills in the details. The framework is in charge and it calls the code when it needs something app specific.

AngularJS makes another approach towards minimize the impedance mismatch between the document centric HTML and what an app need by creating new HTML constructs. AngularJS helps the browser with new syntax through the construct called as directives. Examples include:

- Data binding, as in `{{}}`.
- Support for forms and form validation.
- New behaviour is added to the DOM elements, such as DOM event handling.

II. Literature Survey

AngularJS is an a open-source web application framework. It was first developed in 2009 by Misko Hevery and Adam Abrons. It is now maintained by Google. Its latest version is Angular 9(beta). Definition of AngularJS as put by its official documentation is:

AngularJS is a structural framework for dynamic web applications.

A. AngularJS

As part of a commercial product, AngularJS was first launched in 2009 under the name of 'GetAngular' and then later it was sponsored by Google due to its great benefits. With the help of AngularJS the work that takes 6 months for the development of 17000 lines, which can be completed within 3 weeks and would take around 1,000 lines only. And then Google re-introduced it as the currently known open-source AngularJS [4]. Similar to Knockout, AngularJS leaves HTML readable by supporting data binding into the DOM. AngularJS also supports integrated data validation and also introduced an array of controllers and services for building single-page applications. AngularJS combined the ideas of Backbone and Knockout and brought custom components via custom directives which made Angular much popular. It also brought a common pattern from OOP which is the 'Dependency Injection' container. Also the AngularJS introduced the concept of MV* or MVW (Model View Whatever) [5] due to which the AngularJS combined the 'Controller' and the 'View' into one single container which handles both functionalities.

However, over time and due to many refactoring and API improvements, it is now closer to MVVM (Model View ViewModel) paradigm [6] where the \$scope object could be considered as the ViewModel that is being decorated by a function known as a 'Controller'. Angular's modular structure, strict development guidelines and ability to simply bind directly to plain objects, all enhance the efficiency of the coding by preventing many issues, and providing a strong architectural foundation for the application. Therefore, we believe that these reasons have enforced the position of AngularJS as one of the most recent readable and maintainable web developing frameworks. Moreover, AngularJS provides an unprecedented strong and large community that support

to respond to the users' enquiries, bug detection and problem-solving which offers vast opportunities for bug fixing in the next releases.

B. Angular 2

- The previous team of AngularJS was used to build Angular 2.
- Angular 2 was entirely written in TypeScript.
- It was built for development for responsive and mobile applications.
- It was launched in September 2016.
- We can make use of the language from ES5, ES6. And also provide choice for the language.
- Angular 2 code had to be written using the help of TypeScript or Dart.

C. Angular 3

Angular 3 was skipped.

D. Angular 4

- Angular 4 was launched in March 2017.
- There are no much changes compared to Angular 4 from Angular 2.
- ✓ Angular team has tried to make the angular apps more faster and compact.
- ✓ New changes reduced the size of the code for your components by around 60% that was generated in the previous most cases.
- ✓ Angular 4 has come up with the fast compilation and bug fixing Alert.
- ✓ Some Changes from Angular 2
 - Animations were removed
 - from @angular/core so to reduce the extra code that is getting imported into our production bundle. Although we can easily add the animation by importing the
 - {BrowserAnimationsModule} from @angular/platform-browser/animations into NgModule.

- Renderer 2 in place of Renderer from same '@angular/core'.
- *ngIf/else : Now you can use else clause as well
- Pattern for email validation need not be written in Angular 4.
- In the previous version typescript 1.8 was supported but in Angular 4 we can make use of TypeScript 2.1.

E. Angular 5

- ✓ Angular 5 was launched in November 2017.
- ✓ Angular team comes up with a bigger change in the version 5
- ✓ Some of the important features in Angular 5 are :
 - New Router Lifecycle Events : GuardsCheckStart and End, ChildActivationStart and End, ActivationStart and End, ResolveStart and End.
 - Build Optimizer: By default build optimizer will be applied after production builds are created with the help of Angular.
 - Angular Universal State Transfer API and DOM Support.
 - Improvement in the Compiler.

F. Angular 6

Angular 6. was launched on May 2018. Two important feature released with the Angular 6 was Angular CLI 6 and Angular Material 6

Two new angular cli commands added : ng update and ng add

- ✓ Angular Elements
- ✓ Component Dev Kit (CDK)
- ✓ Material for Angular Starter Components
- ✓ Schematics
- ✓ Library Support
- ✓ Improvement in Animation Performance.

G. Angular 7

It's going to show you some of the requirement as shown below:

Angular 7.0.0 was launched on Oct 2018, and also launched Ang? Would you like to add Angular routing? Yes CLI 7 and Angular Material 7.

It is launched with improvement in the performance and s interesting features like CLI Prompts, Virtual Scrolling, and and Drops.

Which stylesheet format you like to use? CSS

Some of the Important Features Released in Angular 7, Angular CLI 7 and Angular Material 7 are

- Bundle budgets in CLI.
- Angular Material & CDK
- Virtual Scrolling

It few minutes to complete and then you can get into the project folder by typing:

- Drag and Drop
- Dependency updates :
- TypeScript 3.1
- Added support for Node 10

H. Angular8:

> cd first-app

Open up this project in your Visual Studio Code, and you can launch it automatically by typing code . in the current folder

B. COMPONENT

Angular 8 is the latest release, It is launched in May 2019. And released with Angular CLI 8 and Angular Material 8.

Some of the Important Features Released in Angular 8, Angular CLI 8 and Angular Material 8 are

- ✓ Differential Loading by Default: Where the browser chooses between the modern or legacy JavaScript on its own capabilities.
- ✓ Route Configurations.
- ✓ Builder APIs in CLI: In this we can customize angular CLI commands like ng build, ng test, and ng run.
- ✓ Workspace APIs in the CLI
- ✓ Web Worker Support
- ✓ Angular CLI comes with ng deploy.

III. Methodology

A. Installation

To work with the Angular we need carry some of the steps. First we need to install NodeJS and then we can install Angular. The following command need to be done in the command prompt. Before this we need to have any of the editor, so for the best we can install Visual Studio Code. We can have VSC by going to their official website and install as per the requirement that may be windows, mac or linux.

After the installation of VSC the following command need to executed in command prompt.

```
>npm install -g @angular/cli
```

Once complete, you can now access by simply starting any commands with ng.

With the required folder need to be accessed, and run the following command to install a new Angular 7 project:

```
> ng new first-app
```

It's going to show you some of the requirement as shown below:

? Would you like to add Angular routing? Yes

? Which stylesheet format you like to use? CSS

It few minutes to complete and then you can get into the project folder by typing:

```
> cd first-app
```

B. COMPONENT

Components are the UI block of an Angular app. An Angular app contains a main number of tree of Angular components.

The main tasks of a component are:

- ✓ It displays a specific section or the page and its data is supported by Interpolation, Directives and Pipes.
- ✓ Binding is used between the view and the model.

A component contains mainly 3 parts:

- ✓ Template File(HTML View)
- ✓ TypeScript File(Model)
- ✓ Style File(CSS)

The folder is our Component Folder, which contains HTML, CSS and TS files. Spec.ts is for testing, we can ignore module.ts for now.

Every component consist of its own HTML structure, CSS for style and functionality(TS).

i. How does a component work?

We first need to generate the component by using the command:

```
> ng g c Header
```

```
> g-generate and c-component
```

We have TypeScript class. But to make use it as component:

- ✓ • We need to create a Angular Component.
- ✓ • The decorator marks the TS class as a Component and allows us to add the following metadata

```
> ng new first-app
```

o The selector is used to call the component inside other html files of the project as HTML tag:

```
<app-root></app-root>
```

o templateUrl is where the HTML View of the component is.

o style URLs :can contain more 1 css component is.

o Finally, we can export the class(component) so that we can call it inside the project.

C. Data Binding

There are different types of data-binding elements in a form. Suppose the component has a property called person, which is a class with the properties “name” and other. We can data-bind using:

i. Interpolation: In this type of binding the model property (or function) value, written in double curly brackets: {{ name }}. This is a Interpolation data-binding from the model to the view.

```
import { Component, OnInit } from '@angular/core';
@Component({
  selector: 'app-greet', template: `
<h1>Greetings {{name}}! </h1>
<h2>Have a good {{time}}!</h2>
styleUrls:
['./greet.component.css']
})
export class GreetComponent implements OnInit {
```

```
  name: string = "John"; time: string = "morning";
}
```

ii. Property binding: In this type of binding an element property to a model property (or function) value. Use square brackets for this: <input type="text" [value]="name">. This is a Property binding from the model to the view.

```
import {component} from "@angular/core";
@Component({
```

```
  Selector: 'app-example', Template: '<div>
```

```
<input [value]='name'>
```

```
</div>
```

```
})
```

```
export class AppComponent { name: string ="John";
```

```
}
```

iii. Event binding: In this type of binding a model function or an expression to an event. Use parenthesis for this: <input type="text" (change)="name = \$event.target.value">. This is a Event-binding from the view to the model.

```
<div ng-app="myApp" ng-controller="myCtrl"> Name:
```

```
<input ng-model="firstname">
```

```
<h1>{{firstname}}</h1>
```

```
</div>
```

```
<script>
```

```
var app = angular.module('myApp', []);
```

```
app.controller('myCtrl', function($scope) {
```

```
  $scope.firstname = "John";
```

```
  $scope.lastname = "Doe";
```

```
});
```

```
</script>
```

iv. Routing

- Routing is main concept of Single Page Application. Routing enables navigation from one page or view to another as users perform application tasks.
- It also interprets a browser URL as an instruction to navigate to a client generated view .
- We can pass optional parameter to the supporting view component to help it to decide which specific content need to be displayed.
- It logs the activity of the browser's history journal so the back and forward buttons work
- The routing application add a <base> element in the index.html as it is first child of the <head>.

```
<base href="/">
```

To navigate from a route to another, we can make use routerLinks. routerLinkActive associates a CSS class "active".

```
<!-- Routed views go here --> template: `
```

```
<h1>Angular Router</h1>
```

```
<nav>
```

```
<a routerLink="/crisis-center" routerLinkActive="active">Crisis Center</a>
```

```
<a routerLink="/heroes" routerLinkActive="active">Heroes</a>
```

```
</nav>
```

IV. CONCLUSION

Angular is popular application because of its large community and also it is part of the Google Developed Application. In this paper we came across with the different version of the Angular, Installation of the Angular and the concept which need to be understood before we get into creating the Angular App. In future the new update will be released by the Google as per now the latest is the Angular 8 and the Angular 9 is under beta test so with the update we need to make use of the new tools which will be added in the latest version. And there are still more concepts which need to be given importance similar to this above concept are considered to get a proper, completed website as per the user requirement..

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