Design and Implementation of Single Page Application Based on AngularJS

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Abstract

Now a days there are many MVC based frameworks are coming in market. AngularJS is a popular JavaScript MVC-based framework to construct single-page web applications at client side. In this paper, Healthy information includes large amount of continuity data, which will cause code redundancy, long development cycle etc. Problems if developer still using traditional method to develop user interface for healthy information system. The developer designed and built a front-end modular system, based on AngularJS framework. To achieve MVC framework, and separate view, data model, and user behavior, developer using controller as a core to maintain user behavior, directive system to make views reuse, and ui-route service to achieve routing control. The results show that this approach has enhanced the reusability of modules, simplifies the development process, reduce the maintenance cost, also improved the maintainability.

Introduction

JavaScript is a fundamental client side Web application. The language is used nowadays to construct a variety of systems, including Web applications with stylish user interfaces. As a result, we are observing the birth of new technologies and tools to solve common problems faced in such applications like AJAX,AngularJA,Node.JS etc. Now a days most frameworks are based on Model-View-Controller (MVC) architecture . Among them, AngularJS , which is built and maintained by Google, is the most popular framework. AngularJS, the open source JavaScript framework that uses Model–view–controller (MVC) architecture, data binding, client-side templates, and dependency injection to create a much-needed structure for building web apps[1][2]

AngularJS is a JavaScript framework. It is a library written in JavaScript. AngularJS is distributed as a JavaScript file, and can be added to a web page with a script tag: [3]

```
<script
src="https://ajax.googleapis.com/ajax/libs/ang
ularjs/1.6.4/angular.min.js">
```

AngularJS extends HTML with ng-directives.

- The ng-app directive defines that this is an AngularJS application.
- The ng-model directive binds the value of HTML controls (input, select, textarea) to application data.
- The ng-bind directive binds application data to the HTML view.

An AngularJS module defines an application.The module is a container for the different parts of an application. The module is a container for the application controllers. Controllers always belong to a module

MODULE AND CONTROLLER IN ANGULARJS

A module is created by using the AngularJS function angular.module[4]

```
<div ng-app="myApp">...</div>

<script>

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

The "myApp" parameter refers to an HTML element in which the application will run.Now you can add controllers, directives, filters, and more, to your AngularJS application.

AngularJS controllers control the data of AngularJS applications. AngularJS controllers are regular JavaScript Objects. AngularJS applications are controlled by controllers. The **ng-controller** directive defines the application controller. A controller is a JavaScript Object**,** created by a standard JavaScript object constructor**.**

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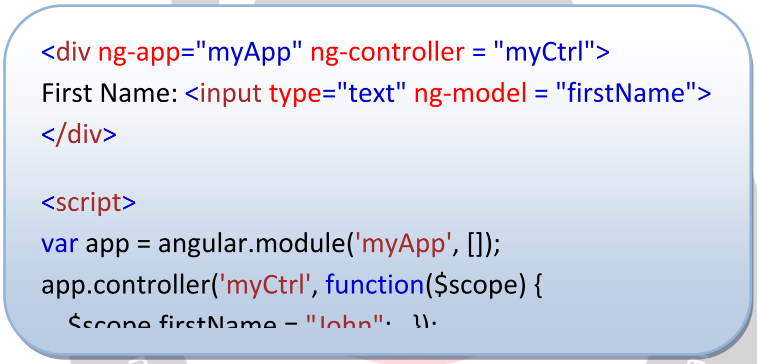

```
<div ng-app="myApp" ng-controller = "myCtrl">
First Name: <input type="text" ng-model = "firstName">
</div>

<script>
var app = angular.module('myApp', []);
app.controller('myCtrl', function($scope) {
   $scope.firstName = "John";   });
```

The AngularJS application is defined by ng-app="myApp". The application runs inside the <div>.The ng-controller="myCtrl" attribute is an AngularJS directive. It defines a controller. The myCtrl function is a JavaScript function. AngularJS will invoke the controller with a $scope object. In AngularJS, $scope is the application object . The controller creates one property (variable) in the scope (firstName). The ng-model directives bind the input fields to the controller properties (firstName)[6].

CREATING REUSABLE COMPONENTS WITH DIRECTIVES

Once the content of the HTML document is received, the browser starts the analysis and the parse process in order to build the DOM tree. When the tree building is done, the AngularJS compiler comes in and starts to go through it, looking into the elements for special kinds of attributes known as directives[5][6]. The following diagram describes the bootstrapping process of the framework that is performed during the compilation process:

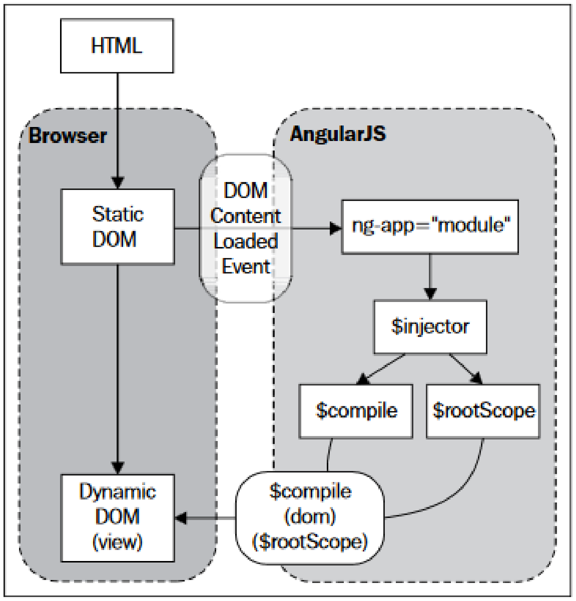

Figure 1: Source: Official documentation (www.angularjs.org)

In AngulaJS, there are number of directives defines such as

- ng-app
- ng-model
- ng-bind
- ng-repeat
- ng-submit
- ng-click

FEATURES OF ANGULARJS

FEATURE 1: TWO WAY DATA BINDING[7]

Think of your model as the single source of truth for your application. Your model is where you go to read or update anything in your application. Data binding is probably the coolest and most useful feature in AngularJS.It will save you from writing a considerable amount of boilerplate code. A typical web application may contain up to 80% of its code base, dedicated to traversing, manipulating, and listening to the DOM. Data-binding makes this code disappear, so you can focus on your application. There must be a better way! AngularJS' two way data binding handles the synchronization between the DOM and the model, and vice versa.

Here is a simple example, which demonstrates how to bind an input value to an<p>element.

```
<!doctype html>

<html ng-app>

<head>

<script src="

http://code.angularjs.org/angular-
1.0.0rc10.min.js"> </script>

</head>
```

FEATURE 2: DEPENDENCY INJECTION [7]

Dependency Injection is a software design pattern in which components are given their dependencies instead of hard coding them within the component. This relieves a component from locating the dependency and makes dependencies configurable. This helps in making components reusable, maintainable and testable.

AngularJS provides a supreme Dependency Injection mechanism. It provides following core components which can be injected into each other as dependencies.

- Value
- Factory
- Service
- Provider
- Constant

Value is simple javascript object and it is used to pass values to controller during config phase. Factory and Service are used to build your own services.Services, directives, filters, and animations are defined by an injectable factory method or constructor function, and can be injected with "services", "values", and "constants" as dependencies.

Example of DI using Value:

```
var mainApp = angular.module("mainApp", []);

mainApp.value("dInput", 5);

mainApp.controller('CalcController', function($scope, Calc,
dInput) {

  $scope.num = dInput;
```

COMPARISONS IN COMMUNITY:

Community is one of the most important factors to consider when choosing a framework. A large community means more questions answered, more third-party modules, more YouTube tutorials...you get the point. I have put together a table with the numbers. Angular is definitely the winner here, being the 6th most-starred project on GitHub and having more questions on StackOverflow than Ember and Backbone combined, as you can see below

Table 1: Comparison chart of AngularJS,Backbone.js and Ember.js [7]

Metric	**AngularJS**	**Backbone.js**	**Ember.js**
Stars on Github	27.2k	18.8k	11k
Third-Party Modules	800 ngmodules	236 backplugs	21 emberaddons
StackOverflow Questions	49.5k	15.9k	11.2k
YouTube Results	~75k	~16k	~6k
GitHub Contributors	928	230	393
Chrome Extension Users	150k	7k	38.3k

All those metrics, however, merely show the current state of each framework.

CONCLUSION

Angular's innovative and fast approach for extending HTML will make a lot of sense for people who are web developers in soul. As it is best option for single page application. With a large community and Google behind it, it is here to stay and grow, and it works well both for quick prototyping projects and large-scale production applications.

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