

Angular ~~Angular 2~~ Deep Dive

By Chris McKnight



About Me

- Graduated from LSU in Computer Science with a concentration in Mathematics
- Background in C++, PHP, and JavaScript

Currently, I am a software developer at Franklin American Mortgage. I started building PHP applications at 16 years old. I transitioned to writing JavaScript-heavy applications in 2009 using "Web 2.0" technologies, such as, AJAX.

Overview

Many pieces of the Angular ecosystem to cover!

- Angular Cli (@angular/cli on npm)
- Angular: Directives, Services, Modules, and Pipes
- RxJS
- The HTTP service

Angular

*Angular is a development platform
for building mobile and desktop web
applications.*

One framework.

Mobile & Desktop

Angular is a TypeScript-based open-source front-end web application platform led by the Angular Team at Google.

Decorators

A function that adds metadata to a class, its members (properties, methods) and function arguments.

*Decorators are an experimental (stage 2), JavaScript language **feature**. TypeScript adds support for decorators.*

Also known as an annotation

Angular uses decorators extensively to create directives, services, etc.

Decorator example

```
import { deprecate } from 'core-decorators';
import { compact } from 'lodash';

class Person {
  ...
  // deprecate the name method using a decorator
  @deprecate('Use the fullName method instead')
  get name() {
    return compact([this.first_name, this.last_name]).join(' ');
  }

  get fullName() {
    ...
  }
}
```

Three types of Directives

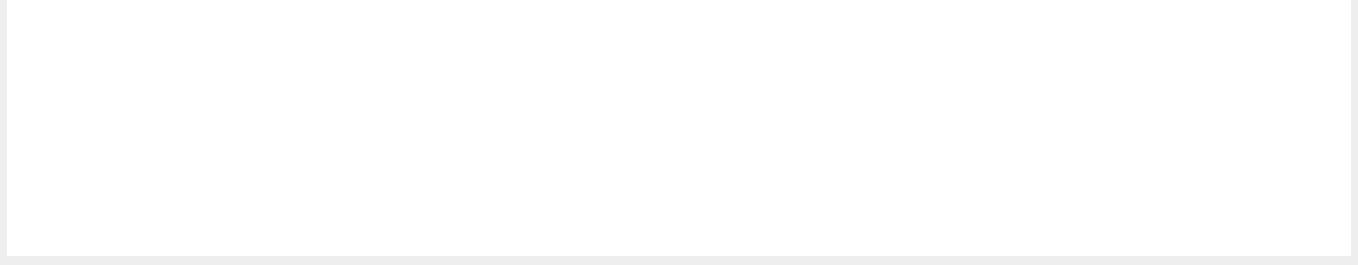
- Attribute directives
- Structural directives
- Components

We will explore all 3 categories of directives



Components

- Fundamental building block to Angular
- Handles exposing data to view and handling user interaction
- A directive containing a template



Components

```
import { Component } from '@angular/core';

@Component({
  selector: 'home',
  styles: [`
    h1 { color: rebeccapurple; }
  `],
  template: `
    <h1>{{title}}</h1>
  `
})
export default class HomeComponent {
  public title: string = 'Hello World';
}
```

The selector is the "tag" to use inside of another component's template. It is also how the component will appear in the browser.

Components can be split into 2 categories of components, containers (smart) and presentational (dumb).

Attribute Directives

A category of directive that can listen to and modify the behavior of other HTML elements, attributes, properties, and components. They are usually represented as HTML attributes, hence the name.

Common attribute directives:

- ngClass
- ngStyle

See <https://angular.io/docs/ts/latest/guide/attribute-directives.html> for more

Structural Directives

A category of directive that can shape or reshape HTML layout, typically by adding and removing elements in the DOM.

- ngIf
- ngFor
- ngSwitch

For more see <https://angular.io/docs/ts/latest/guide/structural-directives.html>

Container components

a.k.a. "smart" components

- Root level, routable components
- Access application state from ngrx, services, etc
- Handle events emitted from child components within the same view tree

Presentational Components

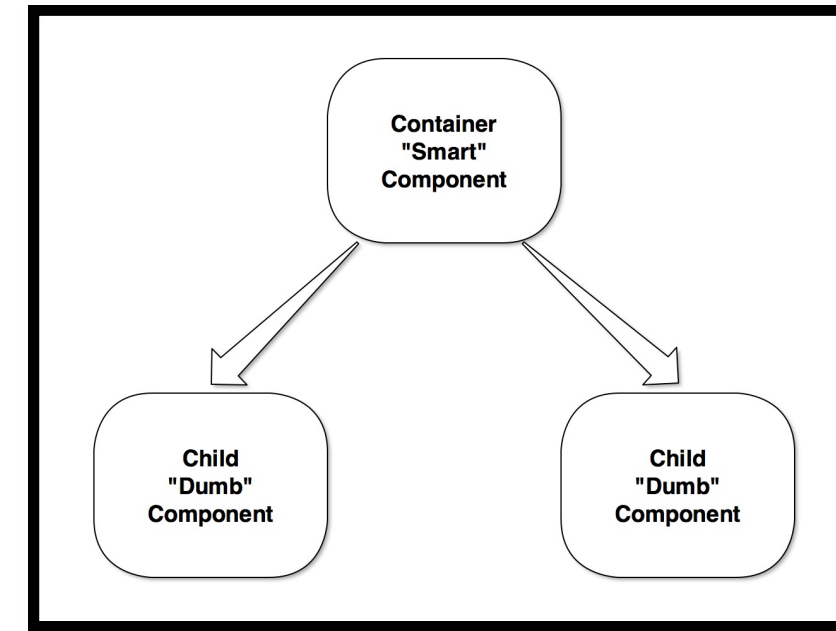
"State down, Events up" allow large applications to render more efficiently. Think flux architecture.

a.k.a. "dumb" components

- Small
- Focused
- Reusable
- State down, Events up

Overview of managing state with ngrx: <http://onehungrymind.com/build-better-angular-2-application-redux-ngrx/>

Container & presentational components



The image represents a component tree of a container component and its presentational components

See <https://gist.github.com/btroncone/a6e4347326749f938510#utilizing-container-components> for more information

Component lifecycle

Common lifecycle events

- `ngOnInit`
- `ngAfterContentInit`
- `ngAfterViewInit`
- `ngOnDestroy`

Lifecycle events can be used to prepare to present content, setup custom event listeners, etc.

Pipes

An Angular pipe is a function that transforms input values to output values for display in a view.

```
...  
  
@Component({  
  selector: 'my-component',  
  template: `  
    <!-- Today is Apr 21, 2017 -->  
    <span>Today is {{ currentDate | date }}</span>  
  `,  
})  
export class MyComponent {  
  public currentDate = new Date();  
}
```

- Pipes can be thought of as formatters
- Custom formatters can provide powerful functionality

The example represents formatting a date string or Date object as a string in the view

Services

```
import { Injectable } from '@angular/core';

@Injectable()
export default class DataService {
  public title: string = 'My Application';
}
```

Modules

Helps you organize an application into cohesive blocks of functionality.

An Angular module identifies the components, directives, and pipes that the application uses along with the list of external Angular modules that the application needs, such as FormsModule.

Every Angular application has an application root-module class. By convention, the class is called AppModule and resides in a file named app.module.ts.

Modules use NgModule decorator

A feature module delivers a cohesive set of functionality focused on an application business domain, user workflow, facility (forms, http, routing), or collection of related utilities.

Module Example

```
import { NgModule, CommonModule } from '@angular/core';
import { HomeComponent } from './home.component';
import { HomeService } from './home.service';
export default class HomeModule {
  declarations: [
    HomeComponent
  ],
  imports: [CommonModule],
  exports: [HomeComponent],
  providers: [HomeService]
}
```

Introduction to RxJS

RxJS is a library for reactive programming using Observables, to make it easier to compose asynchronous or callback-based code.

- Observable
- Subscription

In computing, reactive programming is an asynchronous programming paradigm oriented around data streams and the propagation of change.

What does that mean?!

An event happens somewhere and an object responds to that event.

2 players in reactive programming: producer and consumer

Producer "emits" events to the stream Consumer has a subscription to the stream and reacts to new data

Good talk on Observables <https://www.youtube.com/watch?v=DaCc8lckuw8>

Observables

The Observable object represents a push based collection.

Observables are used extensively in Angular (Http service)

Observables are used extensively in Angular. Methods on the Http service return `Observable<Response>`.

Subscription

A Subscription is an object that represents a disposable resource, usually the execution of an Observable.

Subscription objects have a single method!

RxJS Example

```
const source = Rx.Observable.timer(200, 100)
  .take(3);

const subscription = source.subscribe(
  function (x) {
    console.log('Next: ' + x);
  },
  function (err) {
    console.log('Error: ' + err);
  },
  function () {
    console.log('Completed');
  });
```

The example shows a timer that produces an initial value after 200ms. Subsequent events are produced every 100ms.

This example shows automatically unsubscribing

```
// => Next: 200
// => Next: 100
// => Next: 100
// => Completed
```

Common RxJS Operators

Support for common higher order functions from JavaScript

Map - transform the items emitted by an Observable by applying a function to each item
Filter - emit only those items from an Observable that pass a predicate test
Reduce - apply a function to each item emitted by an Observable, sequentially, and emit the final value

- map
- filter
- reduce

Common RxJS Operators

- merge
- take
- forkJoin

merge - Combine any number of observables into a single observable
take - Returns a specified number of contiguous elements from the start of an observable sequence
forkJoin - Runs all observable sequences in parallel and collect their last elements.



Additional Resources

Ben Lesh also has a post about avoiding creating subscriptions:
<https://medium.com/@benlesh/rxjs-dont-unsubscribe-6753ed4fda87>

- André Staltz RxJS Introduction
<https://gist.github.com/staltz/868e7e9bc2a7b8c1f754>
- Ben Lesh RxJS course
<https://egghead.io/instructors/ben-lesh>

Http is available as an injectable class, with methods to perform http requests

Angular Cli

The Angular CLI is a command line interface tool that can create a project, add files, and perform a variety of ongoing development tasks such as testing, bundling, and deployment.

Why would you want to use the Angular cli?

Rapid development, Angular build setup is tedious

Angular Cli Installation

```
npm i -g @angular/cli  
# yarn global add @angular/cli
```

Angular Cli allows developers to rapidly develop applications with minimal setup

Create a project

```
ng new --link-cli --routing --style scss my-project
```

```
├── e2e
├── package.json
├── protractor.conf.js
├── src
│   ├── app
│   │   ├── app-routing.module.ts
│   │   ├── app.component.ts
│   │   └── app.module.ts
│   ├── index.html
│   ├── main.ts
│   ├── polyfills.ts
│   └── styles.scss
├── tsconfig.json
└── yarn.lock
```

Global defaults can be set using `ng set --global` or by manually editing `~/.angular-cli.json`

Example: `ng set --global defaults.styleExt=scss`

Angular Cli common commands

- new
- serve (server)
- build
- generate
- test
- e2e
- lint

Some commands are aliases

serve => s build => b generate => g test => t e2e => e lint => l

Demo

- Show parts of an Angular application
- Show examples of component types
- Show custom directives



Questions?



