

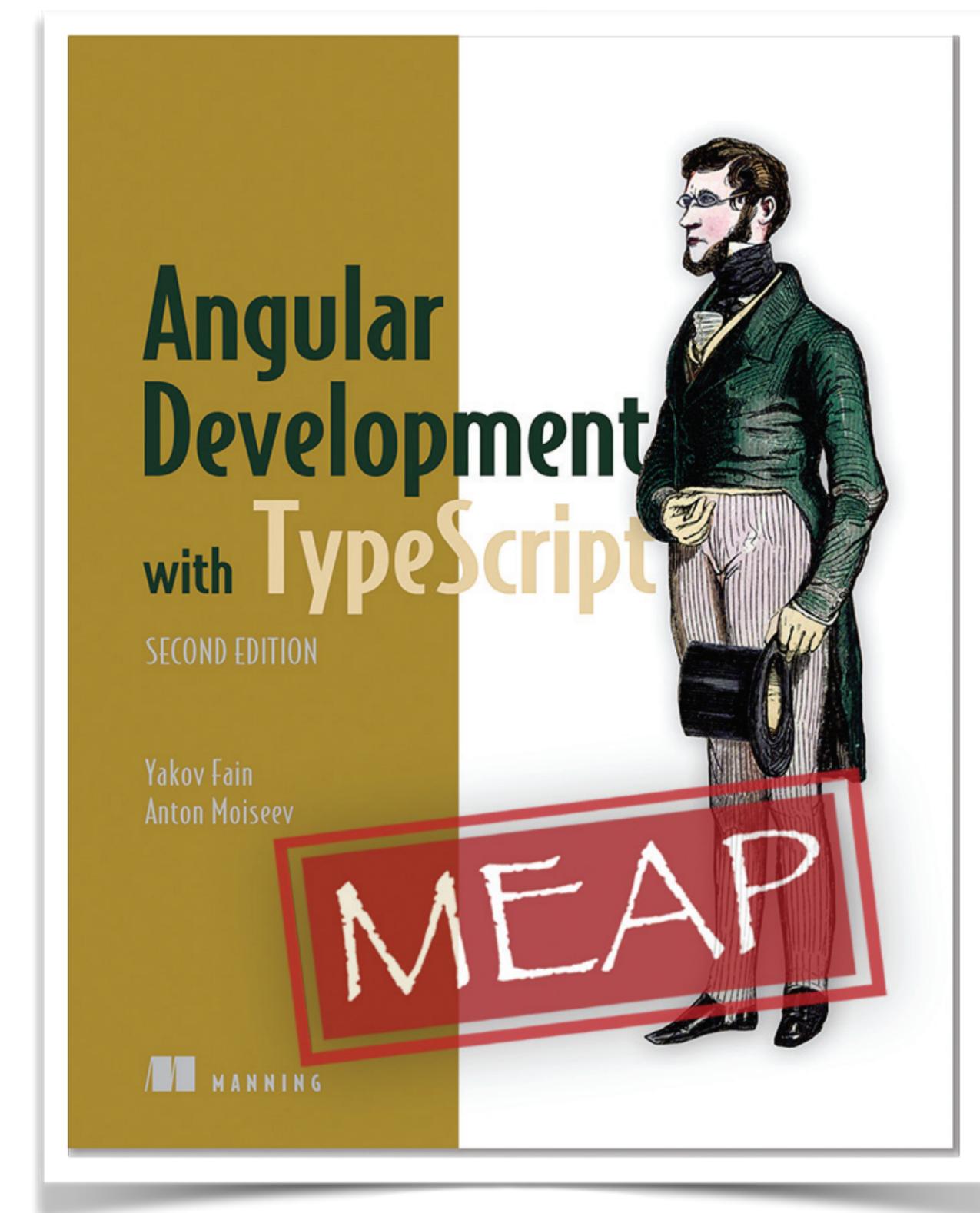
Angular Applied



Yakov Fain
Farata Systems

About myself

- Work for Farata Systems
Angular consulting
- Java Champion
- Working on the 2nd edition of:
“Angular Development with TypeScript”



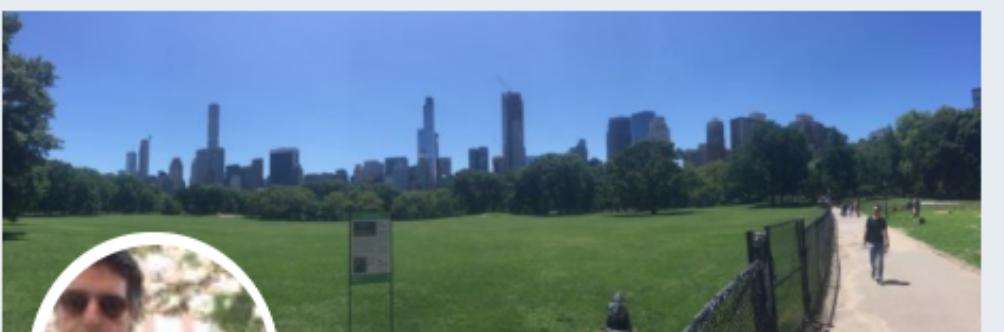
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The Agenda

- Jump-start a project with Angular CLI
- Major concepts:
Components, services, DI, binding, routing, inter-component communications
- Apply the concepts by creating a myStore app

Angular

- Component-based (not an MVC framework)
- Declarative templates
- Dependency Injection
- Router
- Integrated RxJS
- Can write apps in TypeScript or JavaScript



Yakov Fain
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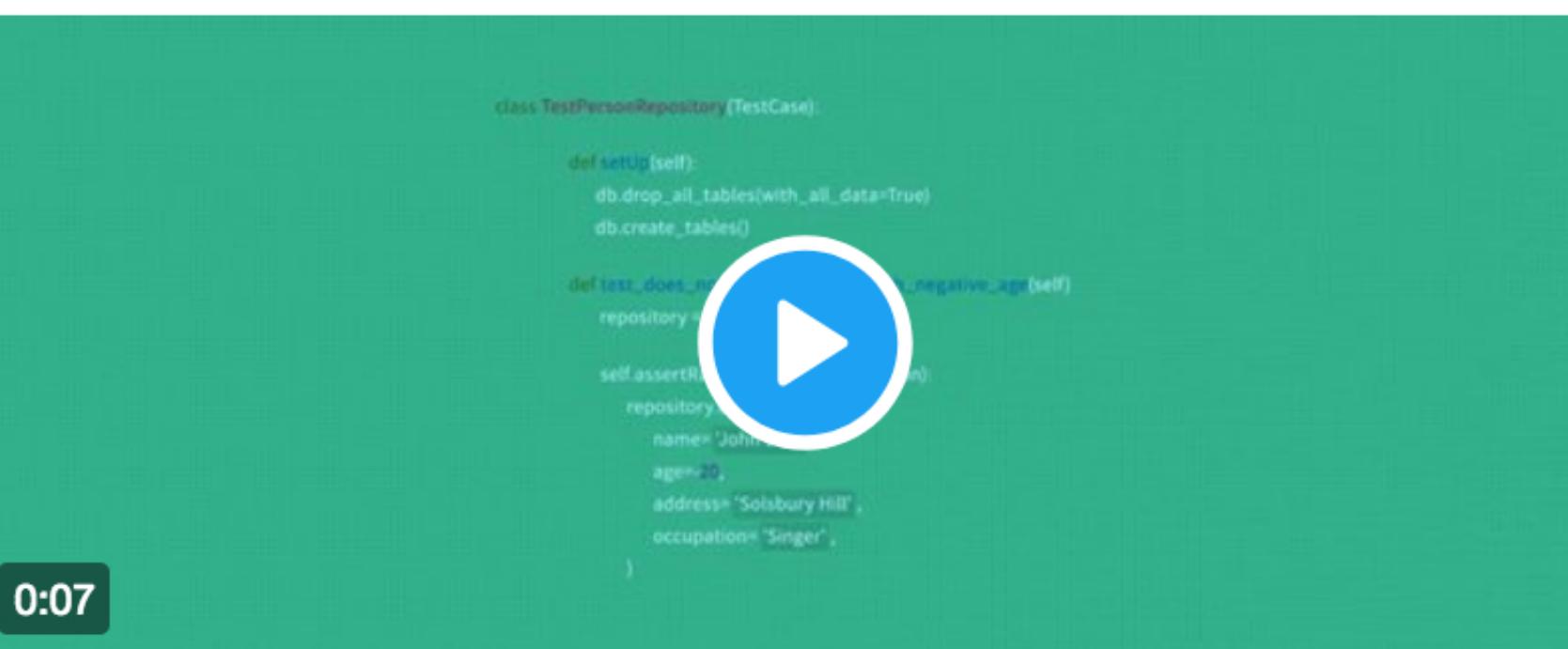
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21



57



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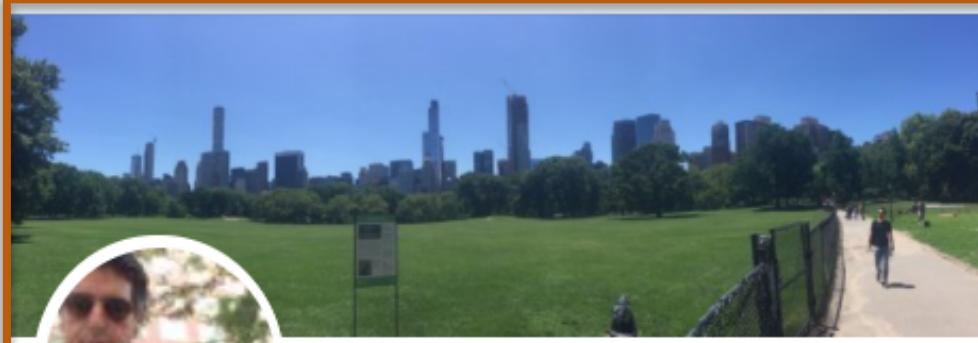
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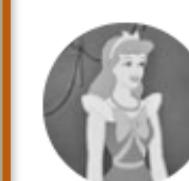
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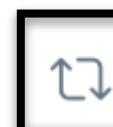
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When you see it.. 😊

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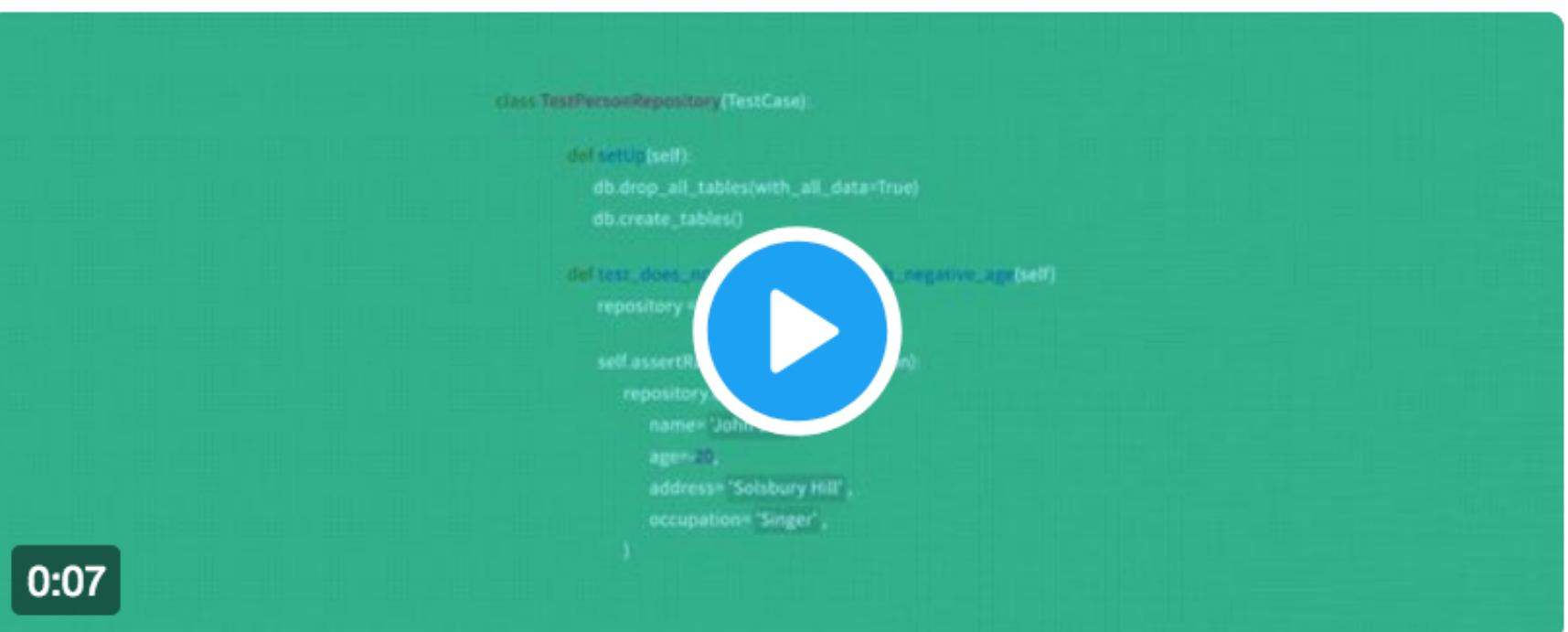
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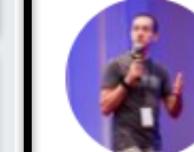
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Router Outlet

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The landing page of myStore

The screenshot shows a web application interface for "My Store". At the top, there is a blue header bar with the text "My Store" and "Home Products". Below the header, there is a form for adding a new product:

- Product title:** A text input field labeled "Title".
- Product price:** A text input field labeled "Price".
- Category:** A dropdown menu.

Below the form is a blue "Search" button.

The main content area displays six product cards, each consisting of a gray placeholder image (320 x 150) and a product summary:

- First Product \$24.99**
This is a short description of the First Product
- Second Product \$64.99**
This is a short description of the Second Product
- Third Product \$74.99**
This is a short description of the Third Product
- Fourth Product \$84.99**
This is a short description of the Fourth Product
- Fifth Product \$94.99**
This is a short description of the Fifth Product
- Sixth Product \$54.99**
This is a short description of the Sixth Product

At the bottom of the page, there is a copyright notice: "Copyright © My Store 2017".

Main Angular artifacts

- **Component** - a class that includes UI (a template)
- **Directive** - a class with the code to perform actions on components but has no UI of its own
- **Service** - a class where you write business logic
- **Pipe** - a transformer function that can be used in templates
- **Module** - a class that lists all of the above

Angular module

Other
modules
if needed

Root
component

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { FormsModule } from '@angular/forms';
import { HttpClientModule } from '@angular/common/http';
import { AppComponent } from './app.component';

@NgModule({
  declarations: [
    AppComponent
  ],
  imports: [
    BrowserModule,
    FormsModule,
    HttpClientModule
  ],
  bootstrap: [AppComponent]
})
export class AppModule {}
```

All module
components

Installing Angular and dependencies

npm: Node Package Manager

- Install NodeJS from <https://nodejs.org>
- npm comes with Node.js
- The npmjs.org repository has 400K+ packages
- All packages required by Angular apps are installed from npmjs.org

Semantic Versioning

<https://docs.npmjs.com/misc/semver>

5.0.1

Major
breaking
changes

Minor
new features,
not breaking

Patch
bug fixes,
not breaking

package.json

Required for dev and prod

```
"dependencies": {  
    "@angular/animations": "^5.0.0",  
    "@angular/common": "^5.0.0",  
    "@angular/compiler": "^5.0.0",  
    "@angular/core": "^5.0.0",  
    "@angular/forms": "^5.0.0",  
    "@angular/http": "^5.0.0",  
    "@angular/platform-browser": "^5.0.0",  
    "@angular/platform-browser-dynamic": "^5.0.0",  
    "@angular/router": "^5.0.0",  
    "core-js": "^2.4.1",  
    "rxjs": "^5.5.2",  
    "zone.js": "^0.8.14"  
},  
"devDependencies": {  
    "@angular/cli": "1.5.0",  
    "@angular/compiler-cli": "^5.0.0",  
    "@angular/language-service": "^5.0.0",  
    "@types/jasmine": "~2.5.53",  
    "@types/jasminewd2": "~2.0.2",  
    "@types/node": "~6.0.60",  
    "codemlyzer": "~3.2.0",  
    "jasmine-core": "~2.6.2",  
    "jasmine-spec-reporter": "~4.1.0",  
    "karma": "~1.7.0",  
    "karma-chrome-launcher": "~2.1.1",  
    "karma-cli": "~1.0.1",  
    "karma-coverage-istanbul-reporter": "^1.2.1",  
    "karma-jasmine": "~1.1.0",  
    "karma-jasmine-html-reporter": "^0.2.2",  
    "protractor": "~5.1.2",  
    "ts-node": "~3.2.0",  
    "tslint": "~5.7.0",  
    "typescript": "~2.4.2"  
}
```

Required for dev

Angular CLI features

- Scaffolding the project and creating a basic app
- Generating components, services, modules, etc.
- Dev web server
- Supports dev and prod builds
- Configuring test runners

Getting started with Angular CLI

- Install Angular CLI globally

```
npm i @angular/cli -g
```

- Generate new project using the command **ng new**

Running a newly generated project

- Generate a new Angular project with `ng new`:

`ng new myStore`

- Change to your project dir:

`cd myStore`

- Build the app bundles in memory and open the app in the browser on port 4200:

`ng serve -o`

Generated app.component.ts: and app.component.html

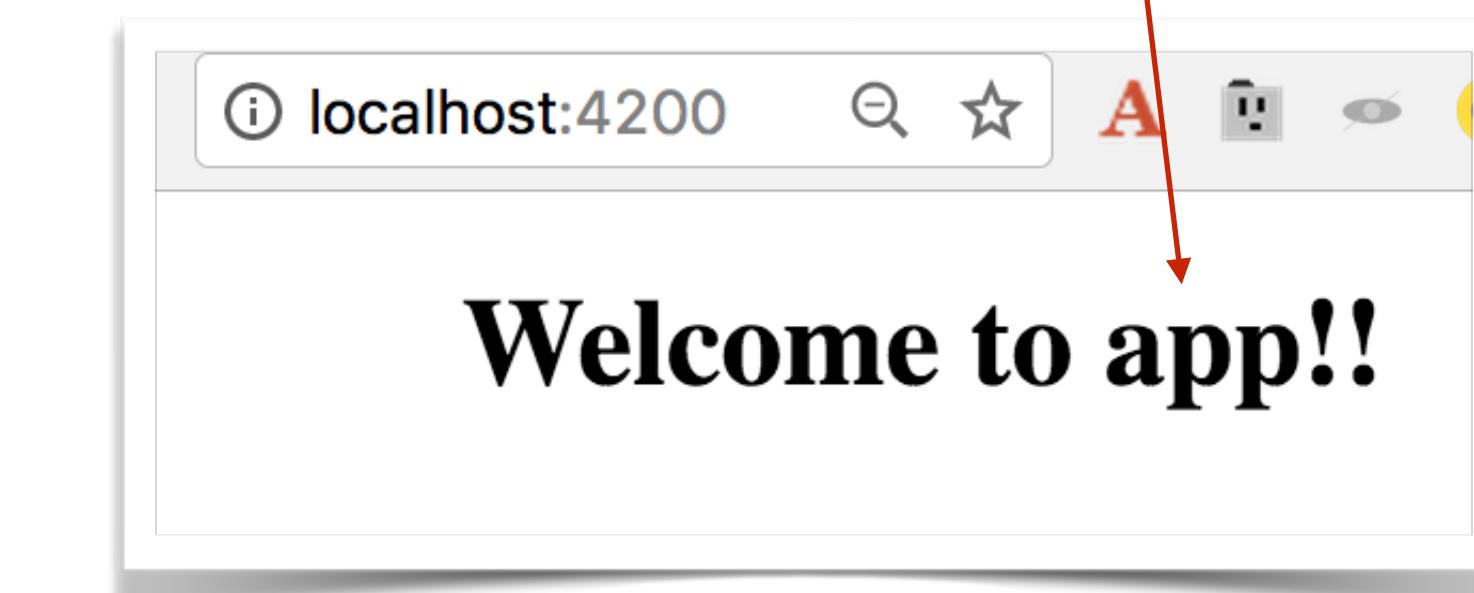
app.component.ts

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

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'app';
}
```

app.component.html

```
<div style="text-align:center">
  <h1>
    Welcome to {{title}}!!
  </h1>
</div>
...
...
```



ng generate (ng g)

- Component: `ng g c`
- Service: `ng g s`
- Module: `ng g m`
- Directive: `ng g d`
- Help: `ng help generate`

UI libraries and layout options

1. Bootstrap and ng-bootstrap
2. Angular Material
3. Angular Flex Layout
4. PrimeNG
5. ... and more

Hands-on

Generating myStore and its artifacts

(steps 1.1 - 1.3)

Instructions in myStore_3hours.html
at <https://github.com/yfain/mystore>

TypeScript in 10 min

Watch my video course “TypeScript Essentials”
on safaribooksonline.com <http://bit.ly/2fp5OF5>

What's TypeScript

- A superset of JavaScript
- Increases your productivity in writing JavaScript
- Supports types, classes, interfaces, generics, annotations
- Supports most of the ES6 - ES8 syntax

A Class With Constructor

TypeScript



JavaScript (ES5)

The screenshot shows a comparison between a TypeScript editor and a JavaScript editor. On the left, under the 'TypeScript' tab, is the following code:

```
1 class Person {  
2     constructor(public firstName: string,  
3                 public lastName: string, public age: number, private _ssn: string) {  
4     }  
5 }  
6  
7 var p = new Person("John", "Smith", 29, "123-90-4567");  
8 console.log("Last name: " + p.lastName + " SSN: " + p._ssn);
```

On the right, under the 'JavaScript' tab, is the generated ES5 code:

```
1 var Person = (function () {  
2     function Person(firstName, lastName, age, _ssn) {  
3         this.firstName = firstName;  
4         this.lastName = lastName;  
5         this.age = age;  
6         this._ssn = _ssn;  
7     }  
8     return Person;  
9 })();  
10 var p = new Person("John", "Smith", 29, "123-90-4567");  
11 console.log("Last name: " + p.lastName + " SSN: " + p._ssn);
```

Inheritance

Classical syntax

Prototypal

The diagram illustrates the transformation of inheritance from Classical syntax to Prototypal inheritance. On the left, under 'TypeScript', is the classical syntax code:

```
1 class Person {  
2     constructor(public firstName: string,  
3                 public lastName: string, public age: number,  
4                 private _ssn: string) {  
5     }  
6 }  
7  
8 class Employee extends Person{  
9 }  
10  
11 }
```

A red arrow points from the 'extends' keyword in line 10 to the corresponding code in the prototypal section on the right.

On the right, under 'JavaScript', is the prototypal code generated by the TypeScript compiler:

```
1 var __extends = this.__extends || function (d, b) {  
2     for (var p in b) if (b.hasOwnProperty(p)) d[p] = b[p];  
3     function __() { this.constructor = d; }  
4     __.prototype = b.prototype;  
5     d.prototype = new __();  
6 };  
7 var Person = (function () {  
8     function Person(firstName, lastName, age, _ssn) {  
9         this.firstName = firstName;  
10        this.lastName = lastName;  
11        this.age = age;  
12        this._ssn = _ssn;  
13    }  
14    return Person;  
15 })();  
16 var Employee = (function (_super) {  
17     __extends(Employee, _super);  
18     function Employee() {  
19         _super.apply(this, arguments);  
20     }  
21     return Employee;  
22 })(Person);
```

The 'Run' button is visible at the top right of the JavaScript editor.

Generics

TypeScript Share Run JavaScript

```
1 class Person {  
2     name: string;  
3 }  
4  
5 class Employee extends Person{  
6     department: number;  
7 }  
8  
9 class Animal {  
10    breed: string;  
11 }  
12  
13 var workers: Array<Person> = [];  
14  
15 workers[0] = new Person();  
16 workers[1] = new Employee();  
17 workers[2] = new Animal();  
18
```

Compile time error

```
1 var __extends = (this && this.__extends) || function (d, b) {  
2     for (var p in b) if (b.hasOwnProperty(p)) d[p] = b[p];  
3     function __() { this.constructor = d; }  
4     d.prototype = b === null ? Object.create(b) : (__.prototype =  
5 );  
6     var Person = (function () {  
7         function Person() {}  
8         return Person;  
10    })();  
11    var Employee = (function (_super) {  
12        __extends(Employee, _super);  
13        function Employee() {  
14            _super.apply(this, arguments);  
15        }  
16        return Employee;  
17    })(Person);  
18    var Animal = (function () {  
19        function Animal() {}  
20        return Animal;  
22    })();  
23    var workers = [];  
24    workers[0] = new Person();  
25    workers[1] = new Employee();  
26    workers[2] = new Animal();  
27
```

No Errors

Interfaces as Custom Types

TypeScript Select... Share Run JavaScript

```
1 interface IPerson { ←  
2  
3   firstName: string;  
4   lastName: string;  
5   age: number;  
6   ssn?: string;  
7 }  
8  
9 class Person {  
10  
11   constructor(public config: IPerson) {  
12 }  
13 }  
14  
15 var aPerson: IPerson = {  
16   firstName: "John",  
17   lastName: "Smith",  
18   age: 29  
19 }  
20  
21 var p = new Person(aPerson);  
22 console.log("Last name: " + p.config.lastName);
```

```
1 var Person = (function () {  
2   function Person(config) {  
3     this.config = config;  
4   }  
5   return Person;  
6 })();  
7 var aPerson = {  
8   firstName: "John",  
9   lastName: "Smith",  
10  age: 29  
11 };  
12 var p = new Person(aPerson);  
13 console.log("Last name: " + p.config.lastName);  
14
```

No interfaces here

Interfaces and implements

```
1 interface IPayable{  
2  
3     increasePay(percent: number): void  
4 }  
5  
6 class Employee implements IPayable{  
7  
8     increasePay(percent: number): void {  
9         // increase salary  
10    }  
11 }  
12  
13 class Contractor implements IPayable{  
14  
15     increasePay(percent: number): void {  
16         // increase hourly rate  
17    }  
18 }  
19  
20 var workers: Array<IPayable> = [];  
21 workers[0] = new Employee();  
22 workers[1] = new Contractor();  
23  
24 workers.forEach(worker => worker.increasePay(30));
```



```
1 var Employee = (function () {  
2     function Employee() {  
3     }  
4     Employee.prototype.increasePay = function (percent) {  
5         // increase salary  
6     };  
7     return Employee;  
8 })();  
9 var Contractor = (function () {  
10    function Contractor() {  
11    }  
12    Contractor.prototype.increasePay = function (percent) {  
13        // increase hourly rate  
14    };  
15    return Contractor;  
16 })();  
17 var workers = [];  
18 workers[0] = new Employee();  
19 workers[1] = new Contractor();  
20 workers.forEach(function (worker) { return worker.increasePay(30);  
21 })
```

No interfaces
in JavaScript

TypeScript Compiler: tsc

- Install the typescript compiler `tsc` globally:

```
npm install typescript -g
```

- Compile `main.ts` into `main.js` specifying ES5 as target syntax:

```
tsc --t ES5 main.ts
```

Sample tsconfig.json

```
{  
  "compilerOptions": {  
    "outDir": "./dist",  
    "moduleResolution": "node",  
    "emitDecoratorMetadata": true,  
    "experimentalDecorators": true,  
    "target": "es5",  
  }  
}
```

Run `tsc` from dir where `tsconfig.json` is located

Data Binding

- Keeping the view and data in sync
- UI elements can be bound to component properties
- Events can be bound to functions or expressions

Unidirectional Binding

From code to template:

```
<h1>Hello {{ name }}!</h1>  
  
<span [hidden]=“isZipcodeValid”>Zip code is not valid</span>
```

Text interpolation
↑
Property binding ↑
A class variable

Unidirectional Binding

From template to code:

```
<button (click)="placeBid()">Place Bid</button>
```

DOM
event



```
<input (input)="onInputEvent()" />
```

Custom
event



```
<price-quoter (lastPrice)="priceQuoteHandler($event)">  
</price-quoter>
```

Dependency Injection

Dependency Injection

- Angular injects values into components via constructors
- Each component has **its own injector**
- You specify **a provider** so Angular knows **what** to inject
- If a provider specified in `@NgModule`, you'll get a singleton object

How to declare providers

Providers allows you to map a token to a concrete implementation.

- Defining a provider on the app level

```
@NgModule ({  
  ...  
  providers: [ {provide: ProductService, useClass: ProductService} ]  
})
```



- Or when the token and implementation names are the same:

```
@NgModule ({  
  ...  
  providers: [ ProductService]  
})
```

How to declare providers

Providers allows you to map a token to a concrete implementation.

- Defining a provider on the app level

```
@NgModule ({  
  ...  
  providers: [ {provide: ProductService, useClass:MockProductService} ]  
})
```

The diagram illustrates the mapping of a provider token to its implementation. A red-bordered box labeled "Token" has a red arrow pointing down to the "provide" field in the code. Another red-bordered box labeled "Implementation" has a red arrow pointing down to the "useClass" field, which is highlighted in bold black text.

- Or when the token and implementation names are the same:

```
@NgModule ({  
  ...  
  providers: [ ProductService ]  
})
```

Injection and Providers

- When the token and a type have the same name, use the shorter notation:

```
@Component ({  
  ...  
  providers: [ProductService]  
})
```

- Angular injects values via the component's constructor:

```
constructor(productService: ProductService) {  
  productService.doSomething();  
}
```

- If a component doesn't declare a provider for an injectable value, Angular checks component's parent, then grandparent, etc.

Demo: generate a service with Angular CLI

- In the Terminal window run this:

```
ng g s product -m app.module
```

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

@Injectable()
export class ProductService {

  constructor() { }

}
```

```
...
import { ProductService } from './product.service';

@NgModule({
  declarations: [
    AppComponent,
    ProductComponent
  ],
  imports: [
    BrowserModule,
    FormsModule,
    HttpModule
  ],
  providers: [ProductService],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

A sample injectable service

```
export class ProductService {  
    getProducts(): Product {  
        // An HTTP request can go here  
        return new Product( 0, "iPhone 7", 249.99, "The latest iPhone, 7-inch screen");  
    }  
}
```

Value Object



```
export interface Product {  
  
    public id: number;  
    public title: string;  
    public price: number;  
    public description: string;  
  
}
```

Injecting ProductService

```
import {Component} from '@angular/core';
import {ProductService, Product} from "./product.service";

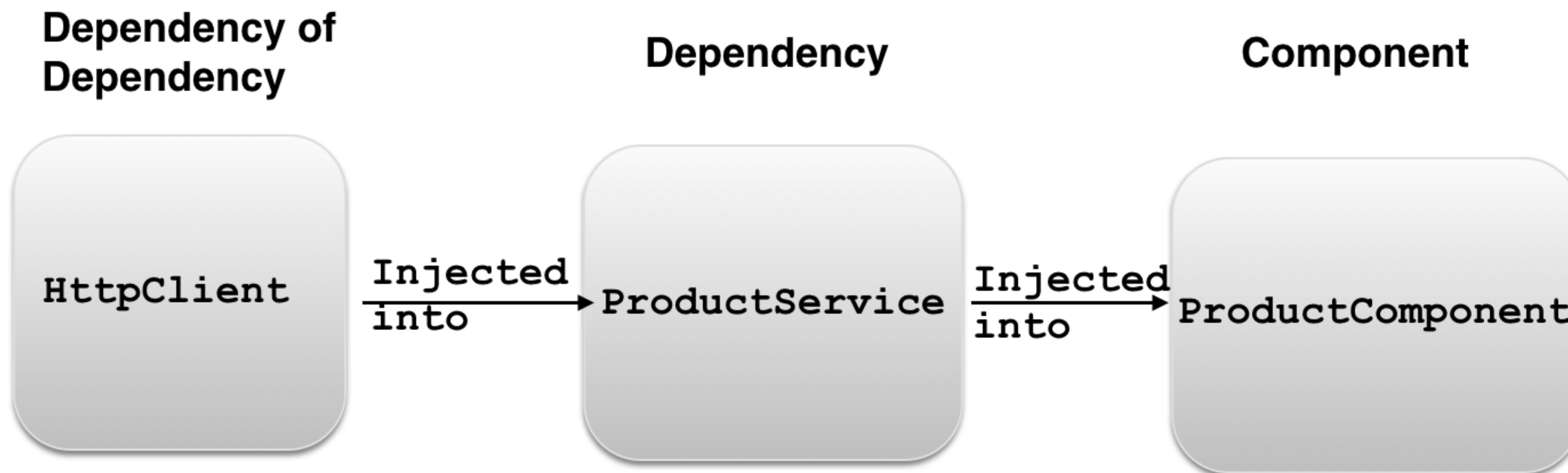
@Component({
  selector: 'di-product-page',
  template: `<div>
    <h1>Product Details</h1>
    <h2>Title: {{product.title}}</h2>
    <h2>Description: {{product.description}}</h2>
    <h2>Price: \${{product.price}}</h2>
  </div>`,
  providers: [ProductService]
})

export class ProductComponent {
  product: Product;

  constructor( productService: ProductService) {
    this.product = productService.getProduct();
  }
}
```

Injection

Dependencies of dependencies



Dependencies of dependencies

Http providers



```
import {HttpClientModule} from '@angular/common/http';
...
@NgModule({
  imports:      [ BrowserModule, HttpClientModule ],
  declarations: [ AppComponent,
                  ProductComponent ],
  bootstrap:    [ AppComponent ]
})
class AppModule { }
```

```
export default class ProductComponent {
  product: Product;
  constructor( productService: ProductService) {
  }
}
```

DI



```
import {HttpClient} from '@angular/common/http';
@Injectable()
export class ProductService {
  constructor(private http:HttpClient){
    let products = this.http.get('products.json');
  }
  // other app code goes here
}
```

DI



Hands-on

Implementing myStore landing page

(steps 1.4 - 1.7)

Inter-component communication

Input and Output Properties

- Think of a component as a black box with entry and exit doors
- Properties marked as `@Input()` are used for getting data from the parent component
- The parent component can pass data to its child using bindings to input properties
- Properties marked as `@Output()` are used for sending events (and data) from a component

Parent binds to input props

```
@Component({
  selector: 'app',
  template: `
    <input type="text" placeholder="Enter stock (e.g. AAPL)"
           (change)="onInputEvent($event)">
    <br/>

    <order-processor [stockSymbol]="stock" [quantity]="100">
    </order-processor>
  `
})
class AppComponent {
  stock:string;

  onInputEvent({target}):void{
    this.stock=target.value;
  }
}
```

Input Properties in Child

```
@Component({
  selector: 'order-processor',
  template: `
    Buying {{quantity}} shares of {{stockSymbol}}
  `)
class OrderComponent {

  → @Input() quantity: number;

  private _stockSymbol: string;

  → @Input()
    set stockSymbol(value: string) {

      if (value != undefined) {
        this._stockSymbol = value;
        console.log(`Sending a Buy order to NASDAQ: ${this.stockSymbol} ${this.quantity}`);
      }
    }

    get stockSymbol(): string {
      return this._stockSymbol;
    }
}
```

Output properties in a child

```
@Component({
  selector: 'price-quoter',
  template: `<strong>Inside PriceQuoterComponent:
    {{stockSymbol}} {{price | currency:'USD':true}}</strong>`,

  styles: [`:host {background: pink;}`]
})
class PriceQuoterComponent {

  → @Output() lastPrice: EventEmitter<IPriceQuote> = new EventEmitter();

  stockSymbol: string = "IBM";
  price: number;

  constructor() {
    setInterval(() => {
      let priceQuote: IPriceQuote = {
        stockSymbol: this.stockSymbol,
        latestPrice: 100*Math.random()
      };

      this.price = priceQuote.latestPrice;

      this.lastPrice.emit(priceQuote);
    }, 1000);
  }
}
```

↑
pipe

```
interface IPriceQuote {
  stockSymbol: string;
  latestPrice: number;
}
```

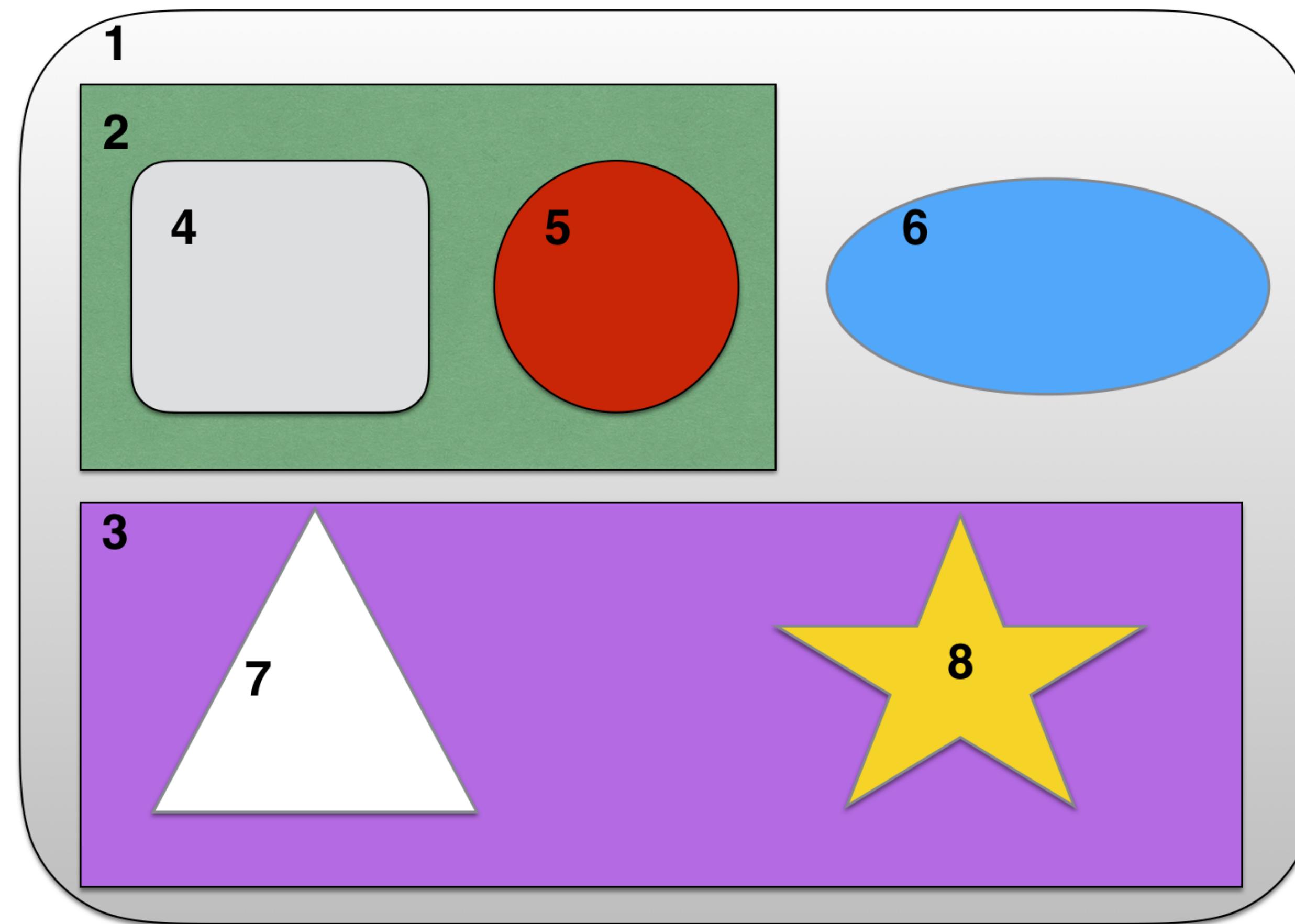
The parent listens to the lastPrice event

```
@Component({
  selector: 'app',
  template: `
    <price-quoter (lastPrice)="priceQuoteHandler($event)"></price-quoter><br>
      AppComponent received: {{stockSymbol}} {{price | currency:'USD':true}}
  `
})
class AppComponent {

  stockSymbol: string;
  price:number;

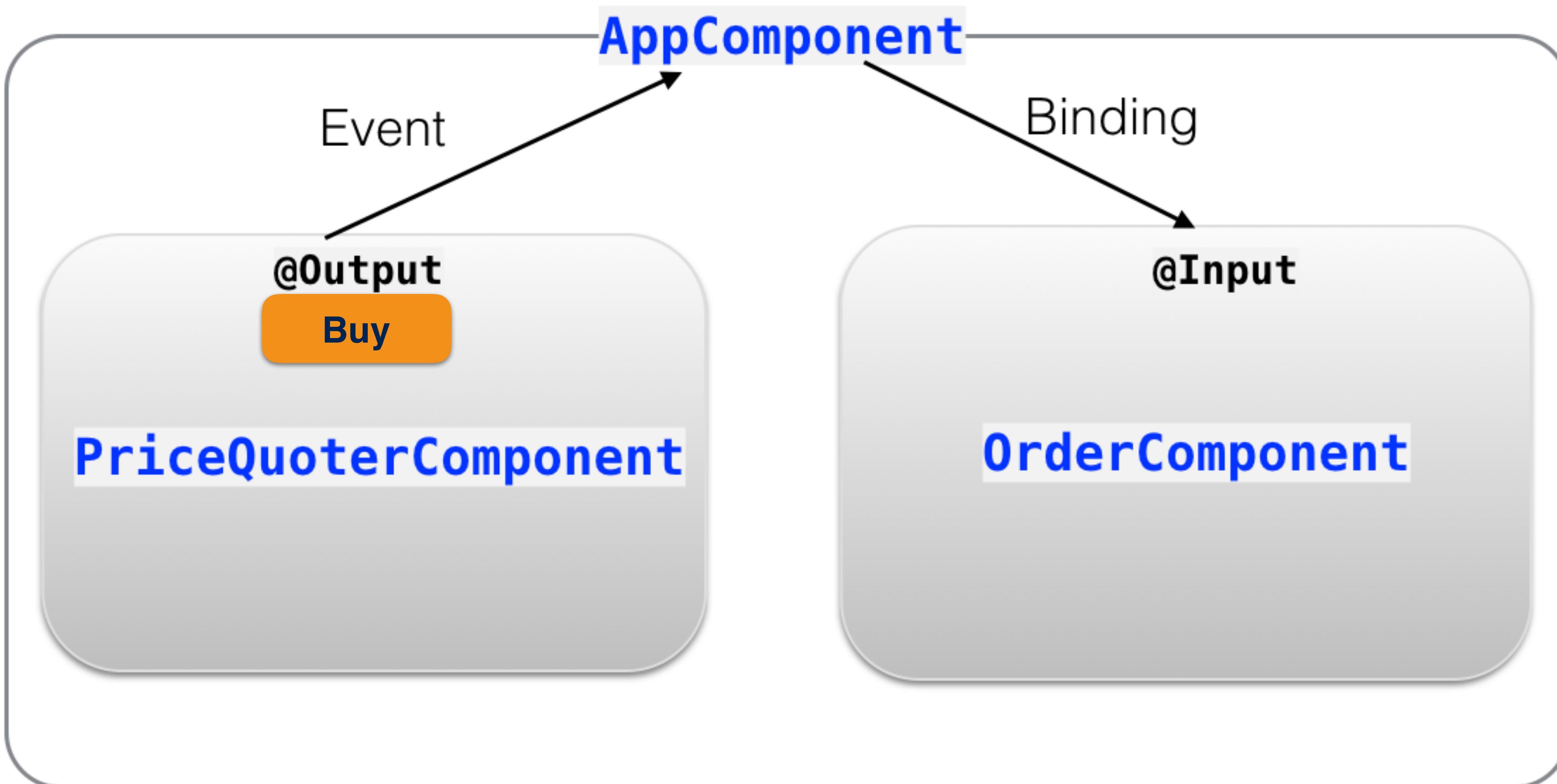
  priceQuoteHandler(event:IPriceQuote) {
    this.stockSymbol = event.stockSymbol;
    this.price = event.latestPrice;
  }
}
```

Parent components as mediators

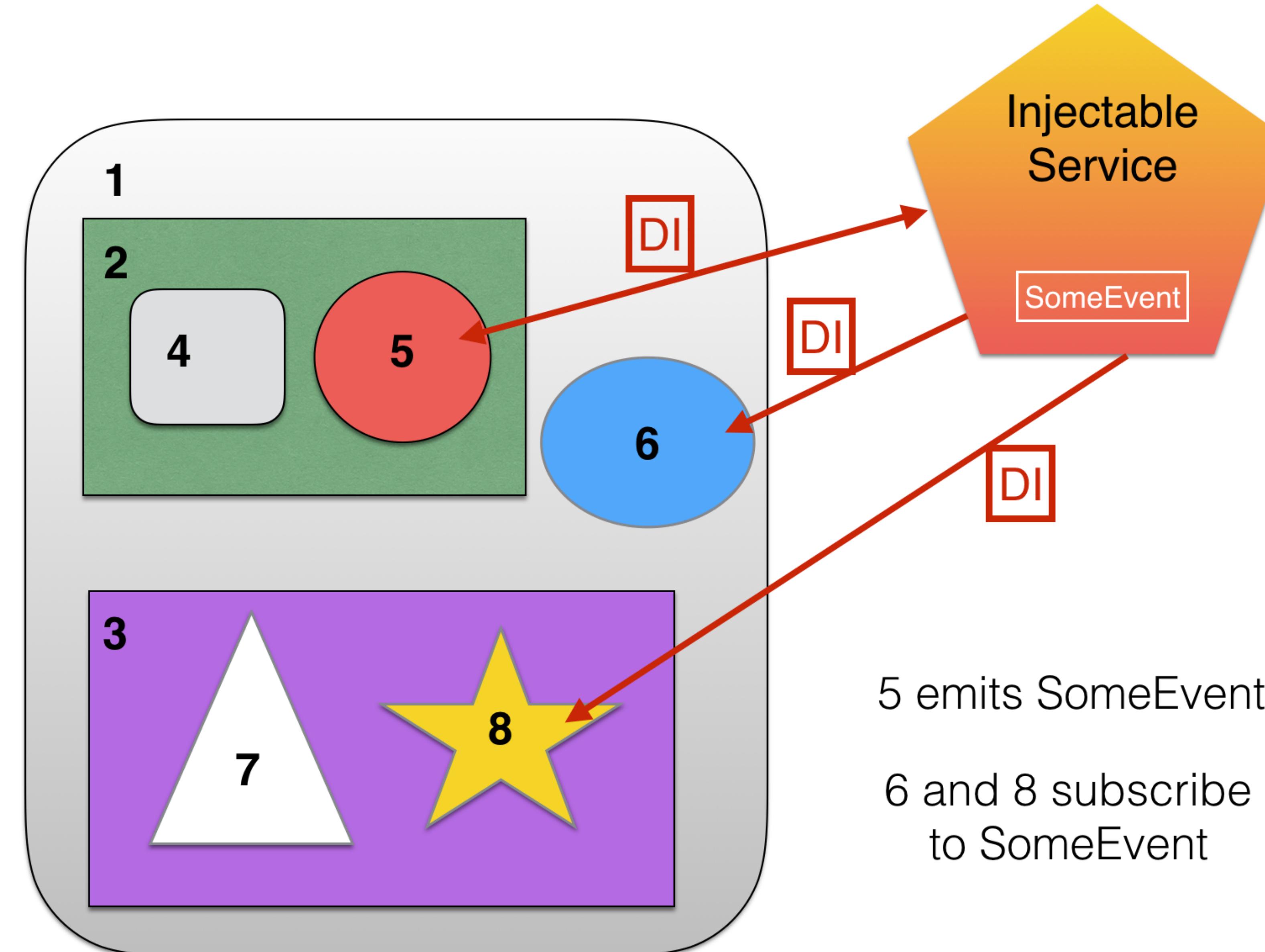


QUIZ: How the number 7 can send the data to number 6?

Parent as a mediator

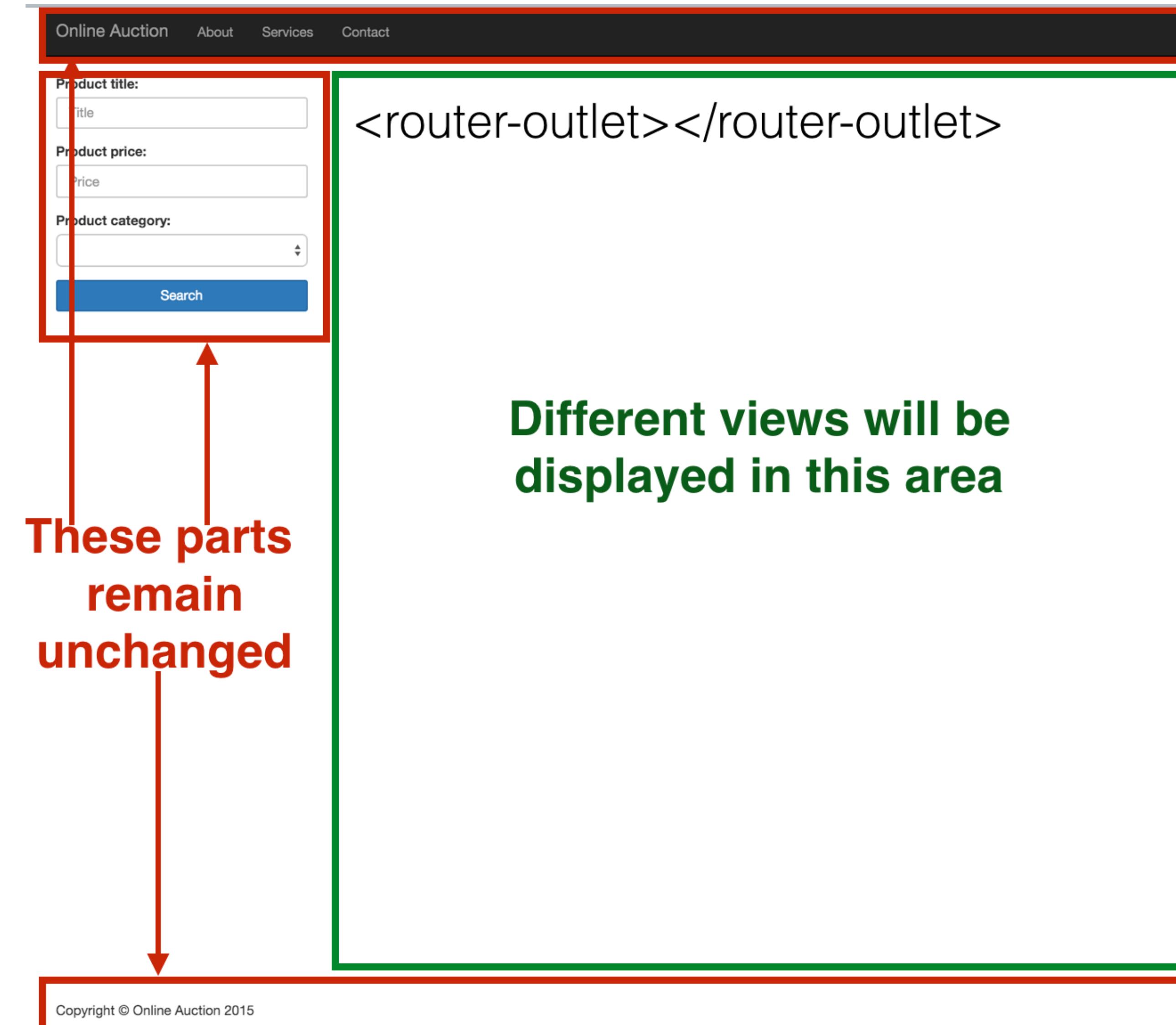


Injectable service as a mediator



Navigation with Router

Router Outlet



Sample routes configuration

app.routing.ts:

```
import { Routes, RouterModule } from '@angular/router';
import { HomeComponent } from './home';
import { ProductDetailComponent } from './product';

const routes: Routes = [
  {path: '', component: HomeComponent},
  {path: 'product', component: ProductDetailComponent}
];

export const routing = RouterModule.forRoot(routes); // config for the root module
```

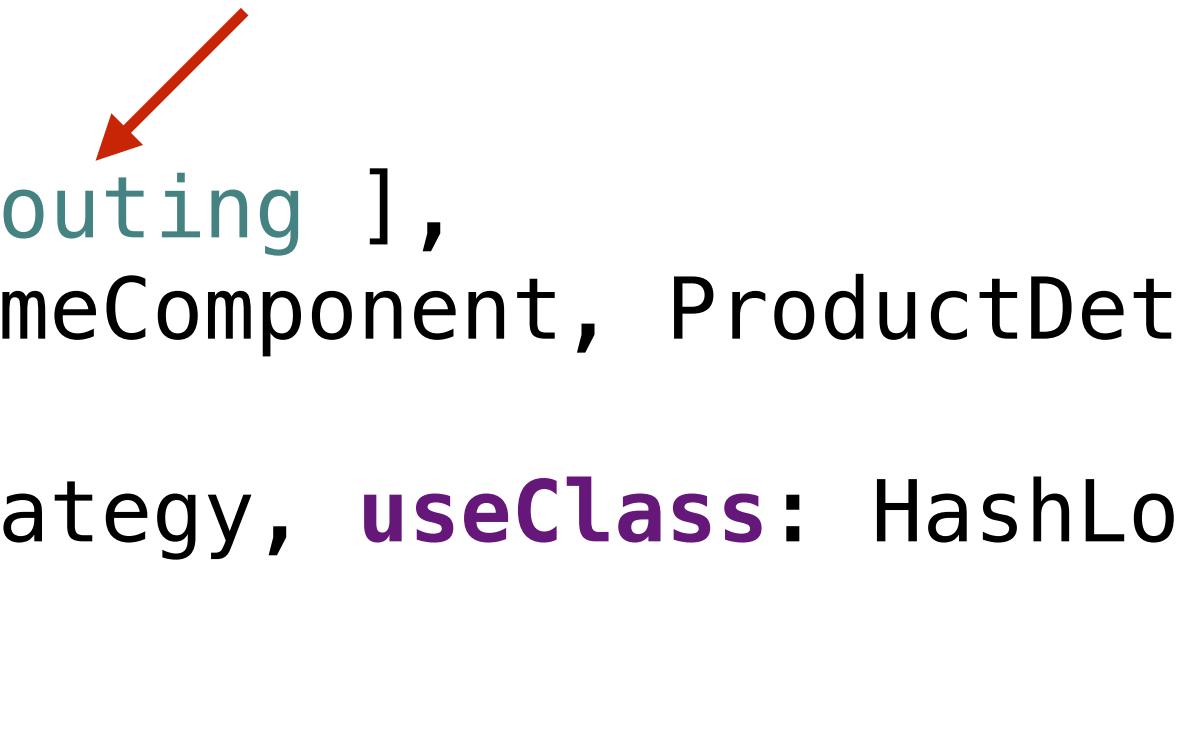


The root module

```
import { NgModule }      from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';
import { AppComponent }  from './components/app.component';
import { HomeComponent} from "./components/home";
import {ProductDetailComponent} from "./components/product";
import {LocationStrategy, HashLocationStrategy} from '@angular/common';

import {routing} from './components/app.routing';

@NgModule({
  imports:      [ BrowserModule, routing ],
  declarations: [ AppComponent, HomeComponent, ProductDetailComponent ],
  providers: [{provide: LocationStrategy, useClass: HashLocationStrategy}],
  bootstrap:   [ AppComponent ]
})
class AppModule { }
```



Navigation using template links

```
import {Component} from '@angular/core';
@Component({
  selector: 'app',
  template: `
    <a [routerLink]="/>Home</a>
    <a [routerLink]="/product">Product Details</a>

    <router-outlet></router-outlet>
  `
})
export class AppComponent {}
```

The screenshot shows a browser window with two tabs: "Home Product Details" and "Home Component". The "Home Component" tab is active, displaying the text "Home Component" in a red header bar. Below the header, there is a red box containing the text "[routerLink] replaced with href". To the right of the browser window is the developer tools' Elements tab, which shows the rendered HTML structure of the page. Red arrows point from the text "[routerLink] replaced with href" to the two elements in the rendered HTML, highlighting the substitution of the template link directive for standard href attributes.

```
<!DOCTYPE html>
<html>
  <head>...</head>
  <body> == $0
    <app>
      <a ng-reflect-router-link="/" ng-reflect-href="#/" href="#/">Home</a>
      <a ng-reflect-router-link="/product" ng-reflect-href="#/product" href="#/product">Product Details</a>
      <router-outlet></router-outlet>
    </app>
    <!-- Code injected by live-server -->
    <script type="text/javascript">...</script>
  </body>
</html>
```

Passing parameters to a route

```
const routes: Routes = [
  {path: '', component: HomeComponent},
  {path: 'product/:id', component: ProductDetailComponent}
];

@Component({
  selector: 'app',
  template: `
    <a [routerLink]="/>Home</a>
    <a [routerLink]="/product", 1234>Product Details</a>
    <router-outlet></router-outlet>
  `
})
class AppComponent {}
```

Receiving params: ActivatedRoute

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

@Component({
  selector: 'product',
  template: `<h1 class="product">Details for product {{productID}}</h1>`,
  styles: ['.product {background: cyan}']
})
export class ProductDetailComponent {
  productID: string;

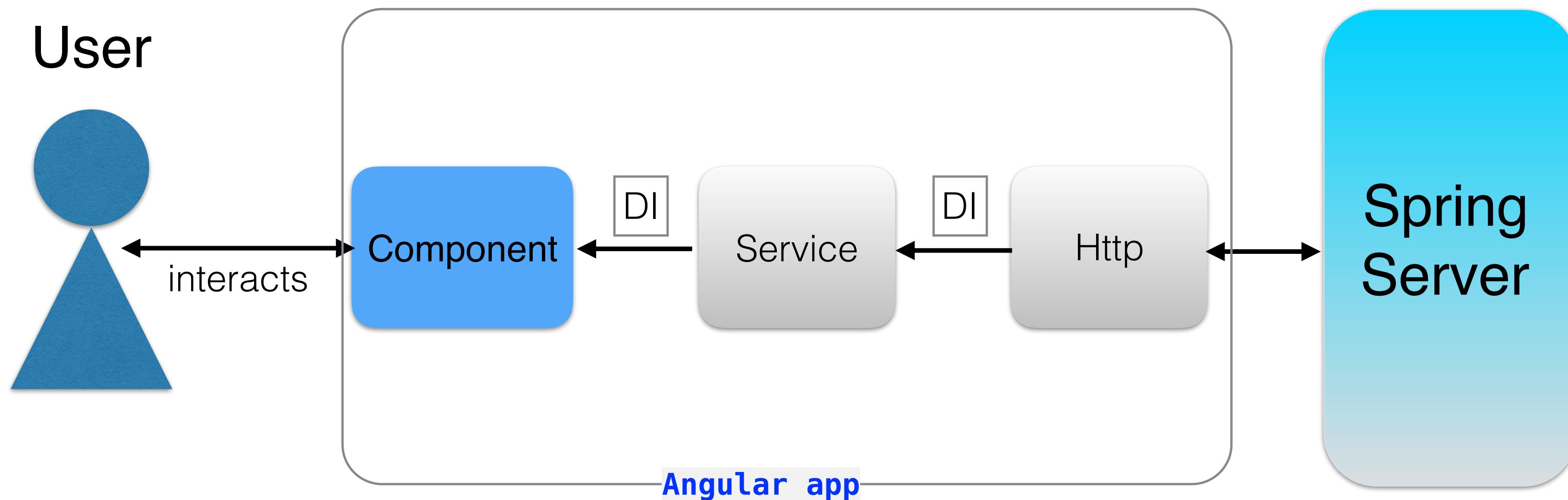
  constructor(route: ActivatedRoute) {
    this.productID = route.snapshot.paramMap.get('id');
  }
}
```

Hands-on

Implementing navigation to the product detail view (steps 1.8 - 1.10)

Communication with Web server and deployment

Typical workflow



Spring can be replaced with Java EE, NodeJS, .Net, or other technology.

Angular HttpClient

Declare HttpClientModule in @NgModule and inject an HttpClient object into the constructor of a service (or component)

```
import {HttpClientModule}  
       from '@angular/common/http';  
...  
@NgModule({  
  imports:      [ BrowserModule,  
                 HttpClientModule ],  
  declarations: [ AppComponent ],  
  bootstrap:    [ AppComponent ]  
})  
class AppModule { }
```

```
import {HttpClient} from '@angular/http';  
  
class ProductService {  
  
  constructor(private httpClient: HttpClient){}  
  
  getProducts(){  
    this.httpClient.get('products').subscribe(...);  
  }  
}
```

Server
endpoint

Subscribing to HttpClient

```
@Component({
  selector: 'app-root',
  template: `<h1>All Products</h1>
  <ul>
    <li *ngFor="let product of products"> ←3
      {{product.title}} {{product.price}}
    </li>
  </ul>
  {{error}}
`})
export class AppComponent implements OnInit, OnDestroy{

  products: any[] = [];
  theDataSource: Observable<any[]>;
  productSubscription: Subscription;
  error:string;

  constructor(private httpClient: HttpClient) {
    this.theDataSource = this.httpClient.get<any[]>('/api/products'); ←1
  }

  ngOnInit(){
    this.productSubscription = this.theDataSource
      .subscribe(
        data => {
          this.products=data; ←2
        },
        err =>
          this.error = `Can't get products. Got ${err.status} from ${err.url}`
      );
  }

  ngOnDestroy(){
    this.productSubscription.unsubscribe(); ←4
  }
}
```

Building apps for prod deployment

JiT vs AoT compilation

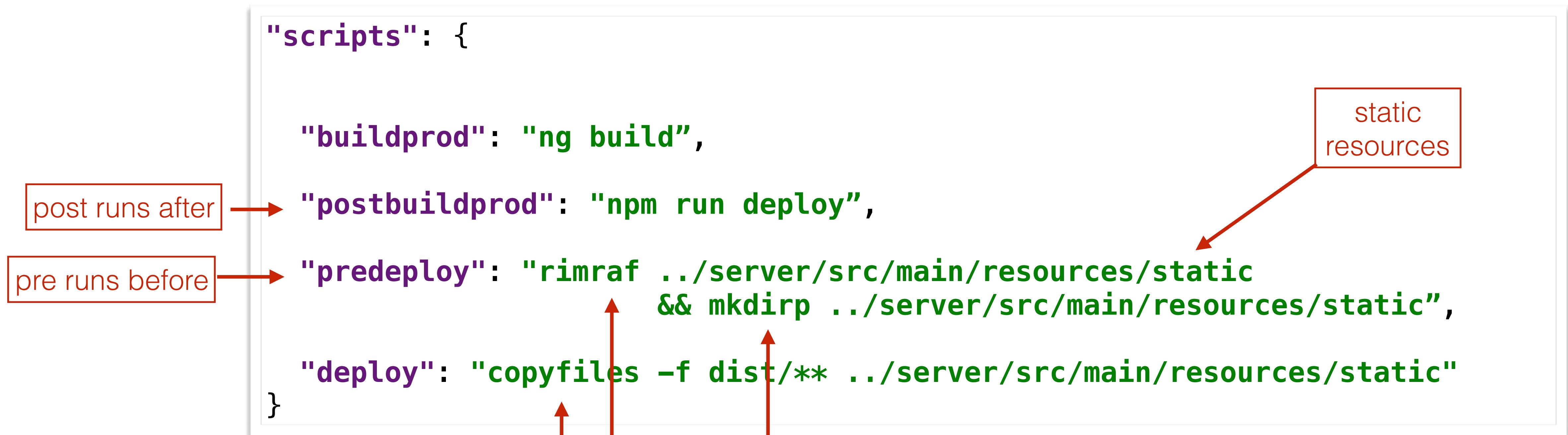
- **Just-in-Time:** your app includes Angular's compiler and is dynamically compiled in the browser.
- **Ahead-of-Time:** Angular components and templates are precompiled into JS with the `ngc` compiler.
- The AoT-compiled apps don't include the Angular compiler

ng build

the output goes into the **dist** dir

- `ng build` ← non-optimized build, produces files
- `ng build -prod` ← optimized build, produces files
- `ng serve -prod` ← optimized build, in-memory bundles

Sample npm scripts for deployment on Spring Boot server



Install these dependencies: `npm i rimraf copyfiles mkdirp --save-dev`

Demo myStore and Spring Boot server

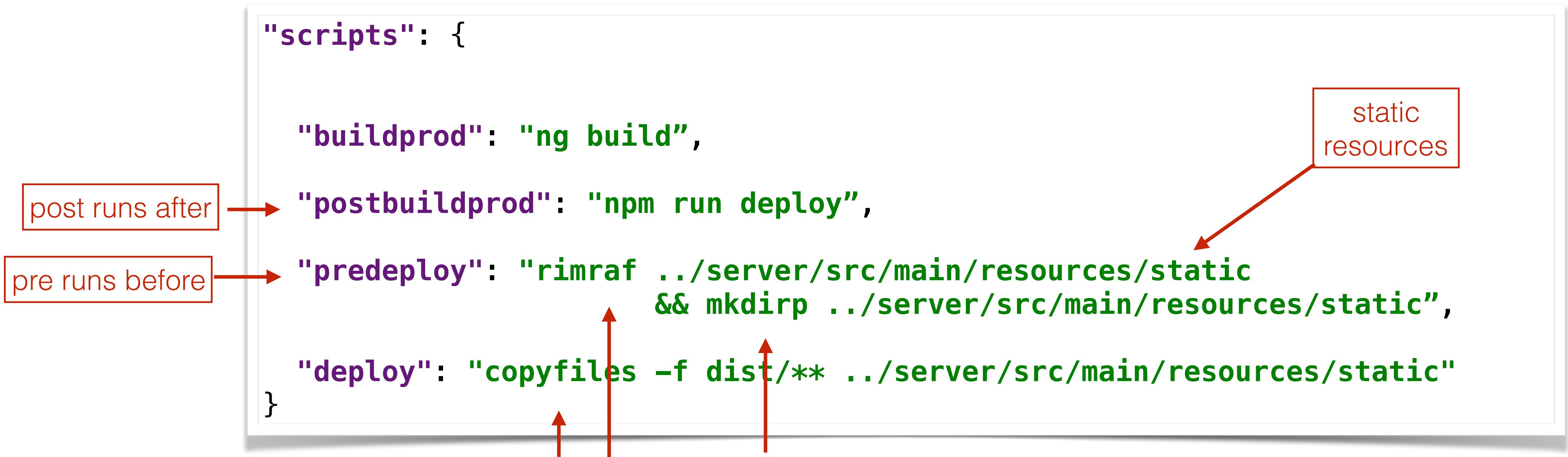
Sample npm scripts for deployment on Spring Boot server

```
"scripts": {  
  
  "buildprod": "ng build",  
  
  "postbuildprod": "npm run deploy",  
  
  "predeploy": "rimraf ../server/src/main/resources/static  
    && mkdirp ../server/src/main/resources/static",  
  
  "deploy": "copyfiles -f dist/** ../server/src/main/resources/static"  
}
```



Sample npm scripts for deployment on Spring Boot server

```
"scripts": {  
  
  "buildprod": "ng build",  
  
  "postbuildprod": "npm run deploy",  
  
  "predeploy": "rimraf ../server/src/main/resources/static  
    && mkdirp ../server/src/main/resources/static",  
  
  "deploy": "copyfiles -f dist/** ../server/src/main/resources/static"  
}
```



1. Install these dependencies: `npm i rimraf copyfiles mkdirp --save-dev`
2. `npm run buildprod`

Thank you!

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