Angular 2
Module 3 - Services

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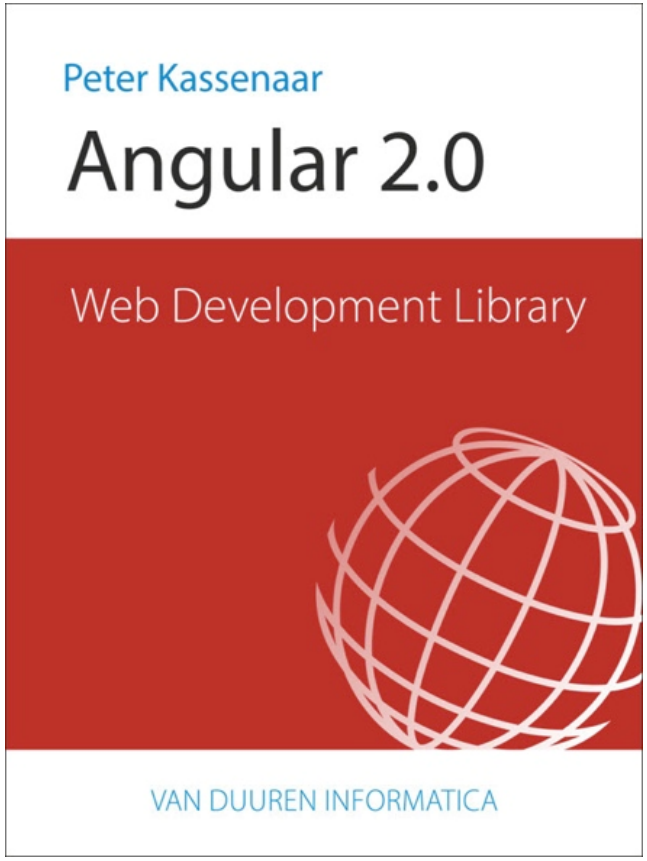
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Hoofdstuk 5

Services

Doel – datafunctionality herbruikbaar maken voor verschillende componenten

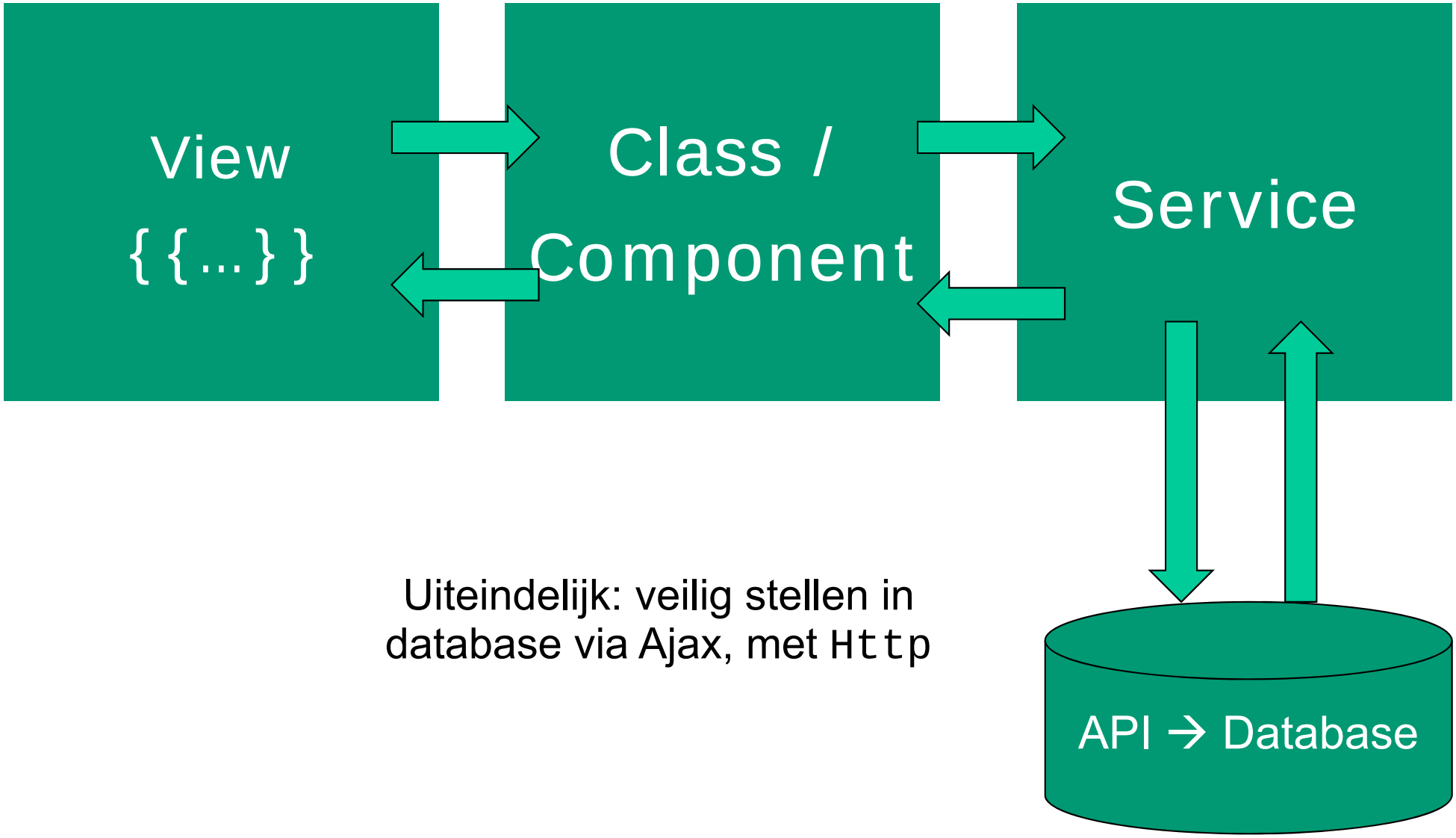
- Data retrieval
- Data caching
- Data Storage,
- …

- Angular 2 : één optie
  - `export class myDataService { … }`

Singleton?

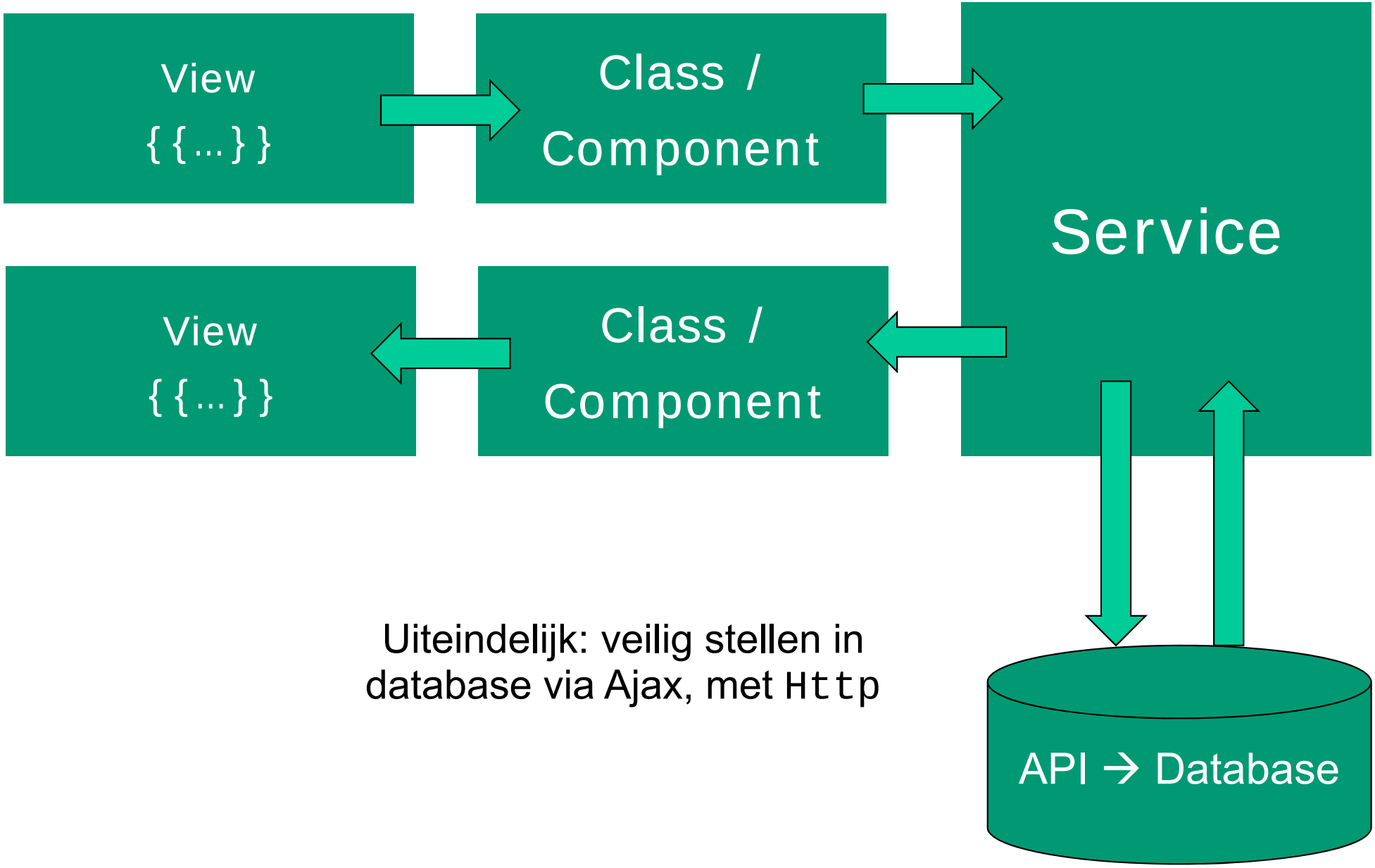
- Services zijn (in principe) singletons
  - Maar: afhankelijk van de plek waar ze geïnstantieerd worden!
  - Ze zijn een singleton voor de Module en alle child components.
  - Module/Site-wide gebruiken? Instantieer service in `app.module.ts`

Data flow



Uiteindelijk: veilig stellen in database via Ajax, met `Http`

Data flow



Uiteindelijk: veilig stellen in database via Ajax, met `Http`

Services in Angular 2

Data services in Angular 1:

```
angular.module('myApp')
  .service(…)
  .factory(…)
  .provider(…)
```

Data services in Angular 2:

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

@Injectable()
export class CityService{
   //....
}
```

De rol van @Injectable

Why? – Dependency Injection (DI) en metadata!

“TypeScript sees the @Injectable() decorator and emits metadata about our service, metadata that Angular may need to inject other dependencies into this service.”

https://angular.io/docs/ts/latest/tutorial/toh-pt4.html

“Our service doesn't have any dependencies at the moment. Add the decorator anyway.

It is a best practice to apply the `@Injectable()` decorator from the start both for consistency and for future-proofing”

Stap 1 – service maken (static data)

```
import { Injectable } from '@angular/core';
import { City } from './city.model'

@Injectable()
export class CityService {
   cities:City[] = [
      new City(1, 'Groningen', 'Groningen'),
      …
   ];

   // retourneer alle cities
   getCities() {
      return this.cities
   }

   // retourneer city op basis van ID
   getCity(id:number) {
       return this.cities.find(c => c.id === id);
   }
}
```

Stap 2 – Service consumeren/injecten

```
…
import {CityService} from "./city.service";

@Component({
   selector    : 'hello-world',
   templateUrl: 'app/app.html',
})

export class AppComponent implements OnInit {
   // Properties voor de component/class
   currentCity: City;
   cities: City[];
   cityPhoto: string;

   constructor(private cityService: CityService) {

   }

   ngOnInit() {
      this.cities = this.cityService.getCities();
   }

   getCity(city: City) {
      this.currentCity = this.cityService.getCity(city.id);
      this.cityPhoto   = `img/${this.currentCity.name}.jpg`;
      console.log('City opgehaald:', this.currentCity);
   }
}
```

Constructor: shorthand voor nieuwe private variable + instantiering!

local variables

Detailgegevens voor city bij (click) event

Ho, ho, dat gaat snel!

- Let op: geen new( ) instantie van de Service!
  - Services zijn Singletons
  - Worden opgehaald uit de Module en/*of* geïnstantieerd in een constructor( )

```
constructor(private cityService:CityService) { … }
```

"The constructor itself does nothing.

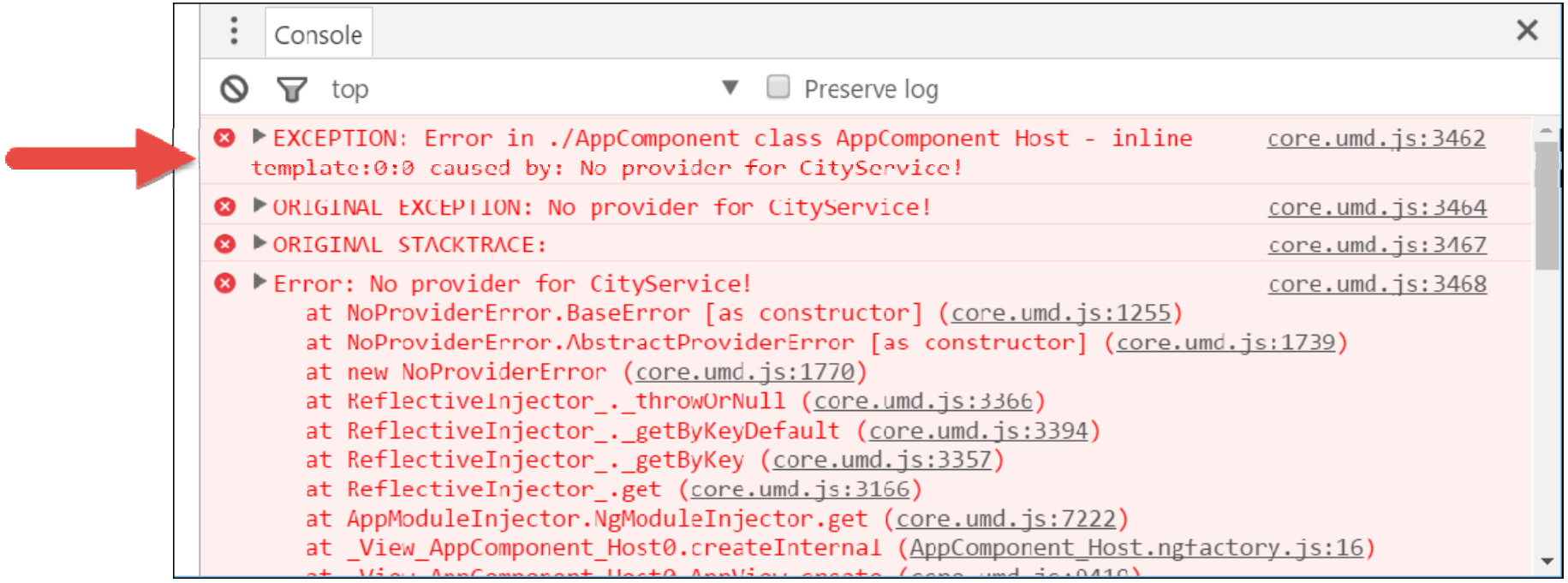
The parameter simultaneously defines a

private cityService property and identifies it

as a CityService injection service."

“No provider for CityService”

- Solution: inject in `app.module.ts`



Service injecteren in Module

- Alleen de *referentie* naar CityService is niet voldoende.
- Angular moet de service *injecteren* in de module
- Gebruik de annotatie `providers: [ … ]`

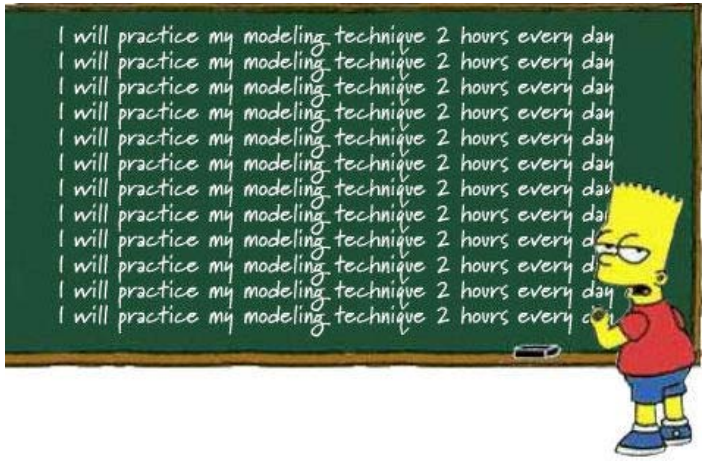
```
// Module declaration
@NgModule({
   imports      : [BrowserModule],
   declarations: [AppComponent],
   bootstrap    : [AppComponent],
   providers    : [CityService] // DI voor service
})
export class AppModule {
}
```

Array met Service-dependencies

Checkpoint

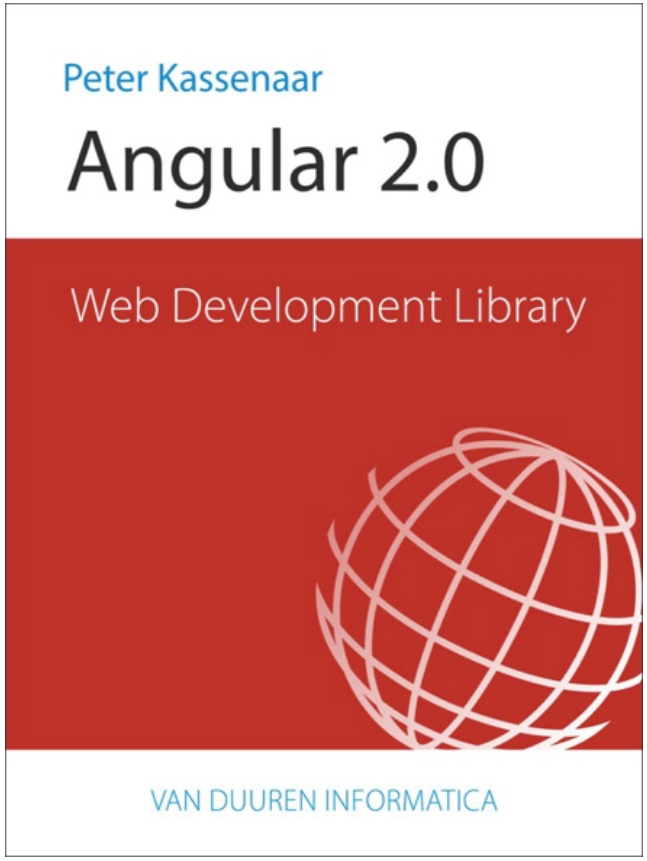
- Elke service in Angular 2 is een `class`
- Class importeren in de component die hem gebruikt
- Instantiëren in `constructor()`
- Service invoegen in de Module
- Oefening 5a) + 5b)

Oefening….



Async services

Werken met Live Data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Hoofdstuk 6

Async Services

- Statische data ophalen: *synchrone* actie
- Werken via `Http`: *asynchrone* actie
- Angular 1: `Promises`
- Angular 2: `Observables`

Bovendien in Angular 2: ReactiveX library RxJS

ReactiveX Introduction Docs Languages Resources Community

ReactiveX

An API for asynchronou
with observable stream

Choose your platform

ReactiveX Introduction Docs Languages Resources Community

Languages

- Java: RxJava
- JavaScript: RxJS
- C#: Rx.NET
- C#(Unity): UniRx
- Scala: RxScala
- Clojure: RxClojure
- C++: RxCpp
- Ruby: Rx.rb
- Python: RxPY
- Groovy: RxGroovy
- JRuby: RxJRuby
- Kotlin: RxKotlin
- Swift: RxSwift

ReactiveX for platforms and frameworks

- RxNetty
- RxAndroid
- RxCocoa

DOCUMENTATION

Observable
Operators
Single

LANGUAGES

RxJava
RxJS
Rx.NET

RESOURCES

Tutorials

COMMUNITY

GitHub
Twitter
Others

http://reactivex.io/

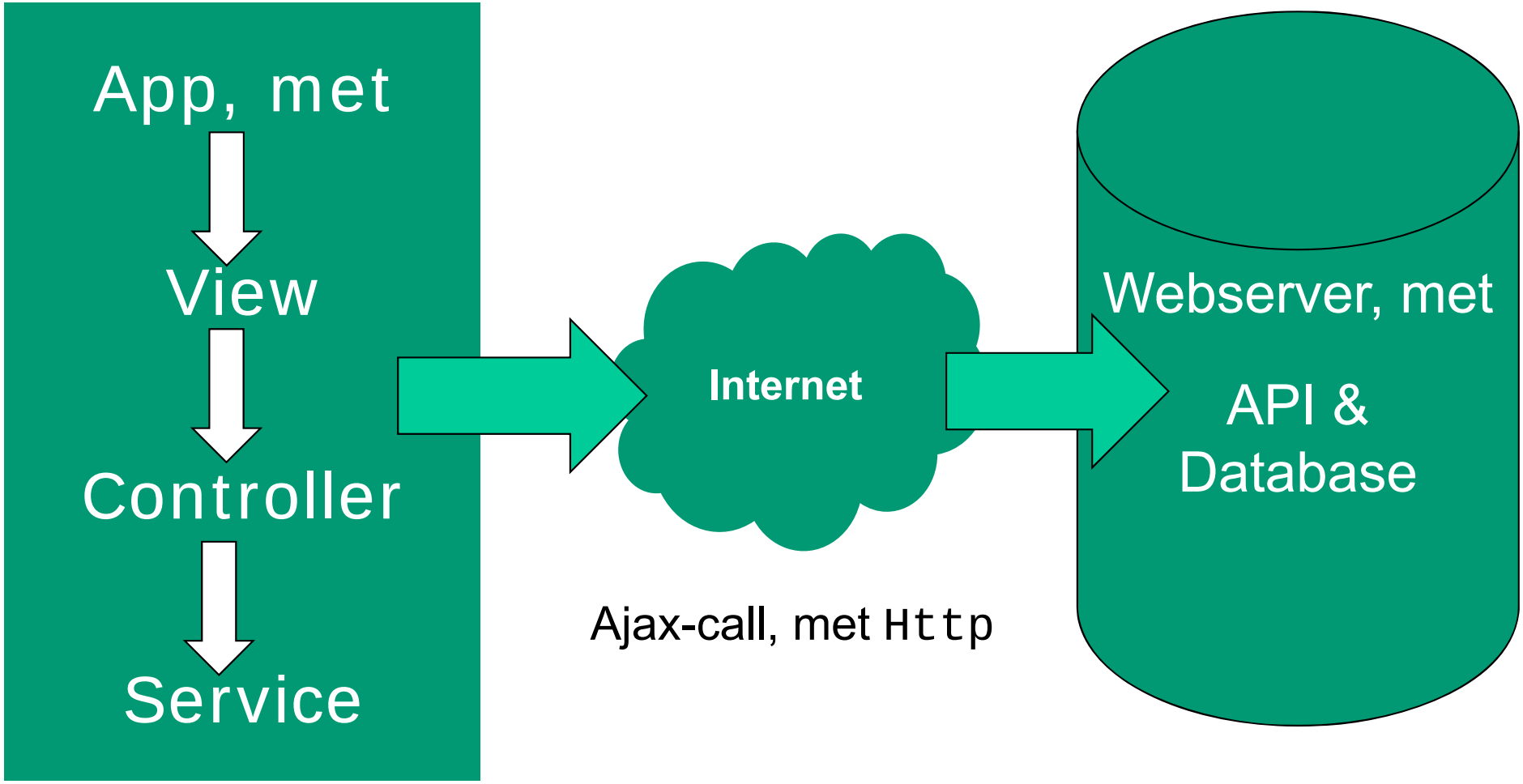
Waarom Observables?

We can do much more with observables than with promises.

With observables, we have a whole bunch of operators to pull from, which let us customize our streams in nearly any way we want.

https://auth0.com/blog/2015/10/15/angular-2-series-part-3-using-http/

Async services



Voorbeeld Http / cities.json

Maak een data-bestand; hier: `cities.json`

```
[
  {
   "id"         : 1,
   "name"       : "Groningen",
   "province"   : "Groningen",
   "highlights": "Martinitoren"
  },
  …
]
```

Stap 1 - Http injecteren in Service

```
…
import {Http} from ‘@angular/http';

@Injectable()
export class CityService {

   constructor(private http:Http) {

   }

   // retourneer alle cities
   getCities(): Observable<Response> {
      return this.http.get('app/cities.json')
   }

   …

}
```

Maak lokale variabele http

Retourneer observable naar de Component

Stap 2 – Component aanpassen

```
export class AppComponent implements OnInit {
   // Properties voor de component/class
   currentCity: City;
   cities: City[];
   cityPhoto: string;

   constructor(private cityService: CityService) {

   }

   ngOnInit() {
      this.cityService.getCities()
         .subscribe(cityData => {
               this.cities = cityData.json()
            },
            err => console.log('FOUT: ', err),
            () => console.log('Getting cities complete'))
   }
}
```

Data async ophalen en .subscribe() gebruiken

Stap 3 – Module aanpassen

```
// Angular Modules
…
import {HttpModule} from '@angular/http';


…
// Module declaration
@NgModule({
   imports      : [BrowserModule, HttpModule],
   declarations: [AppComponent],
   bootstrap    : [AppComponent],
   providers    : [CityService] // DI voor service
})
export class AppModule {
}
```

HttpModule importeren en toevoegen

Meer over Observables

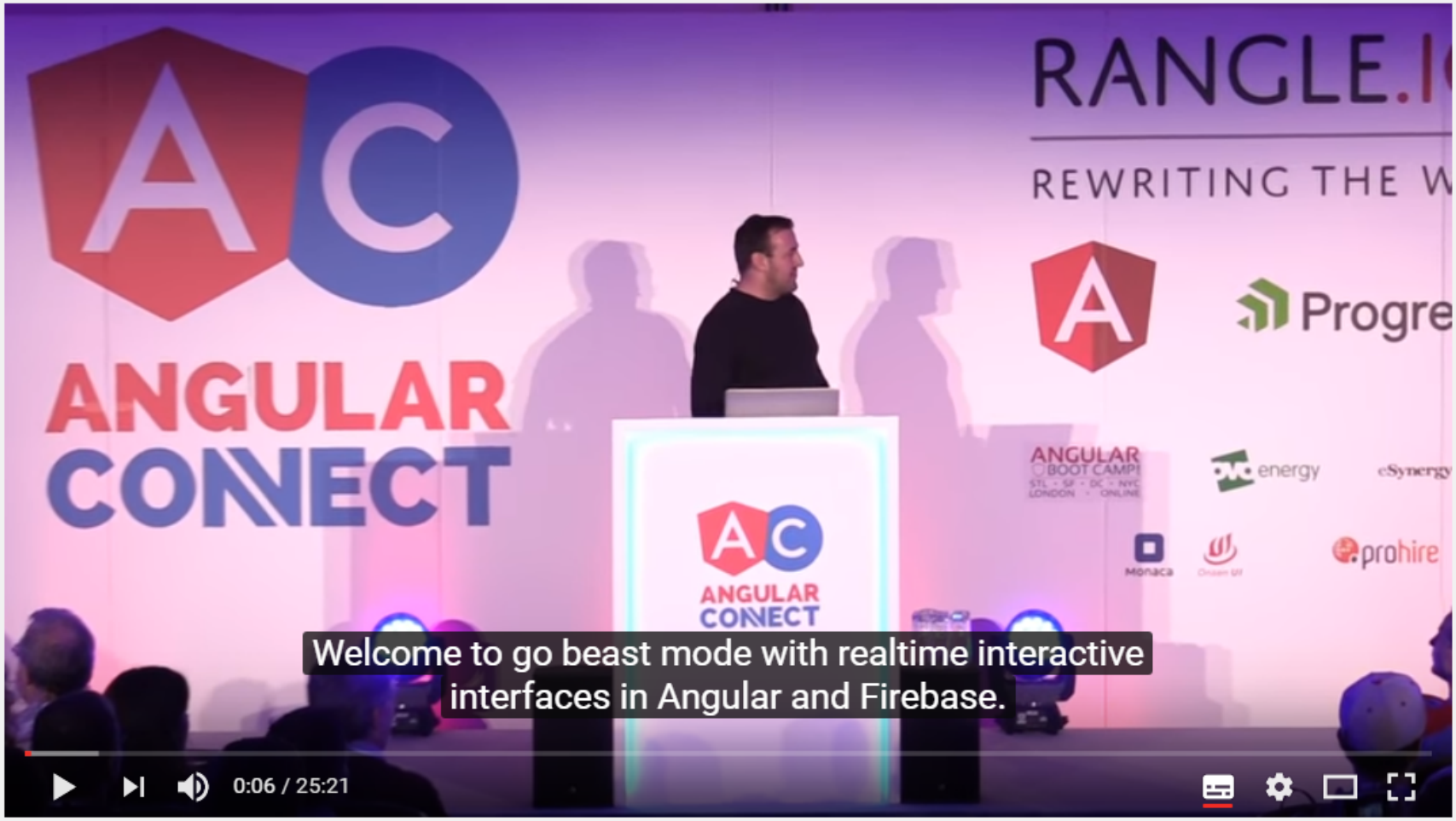
- Onderdeel van RxJs
- Drie parameters:
  - success
  - error
  - complete

```
this.cityService.getCities()

   .subscribe(cityData => {
         this.cities = cityData.json();
      },
      err => console.log(err),
      ()=> console.log('Getting cities complete...')
   )
```

Observables en RxJs

- “Reactive Programming”
  - *“Reactive programming is programming with asynchronous data streams.”*
  - https://gist.github.com/staltz/868e7e9bc2a7b8c1f754
- Observables hebben extra mogelijkheden ten opzichte van Promises
  - Mapping
  - Filtering
  - Combining
  - Cancel
  - Retry
  - …
- Gevolg: géén `.success()`, `.error()` en `.then()` chaining meer!



Go beast mode with realtime reactive interfaces in Angular 2 & Firebase | Lukas Ruebbelke

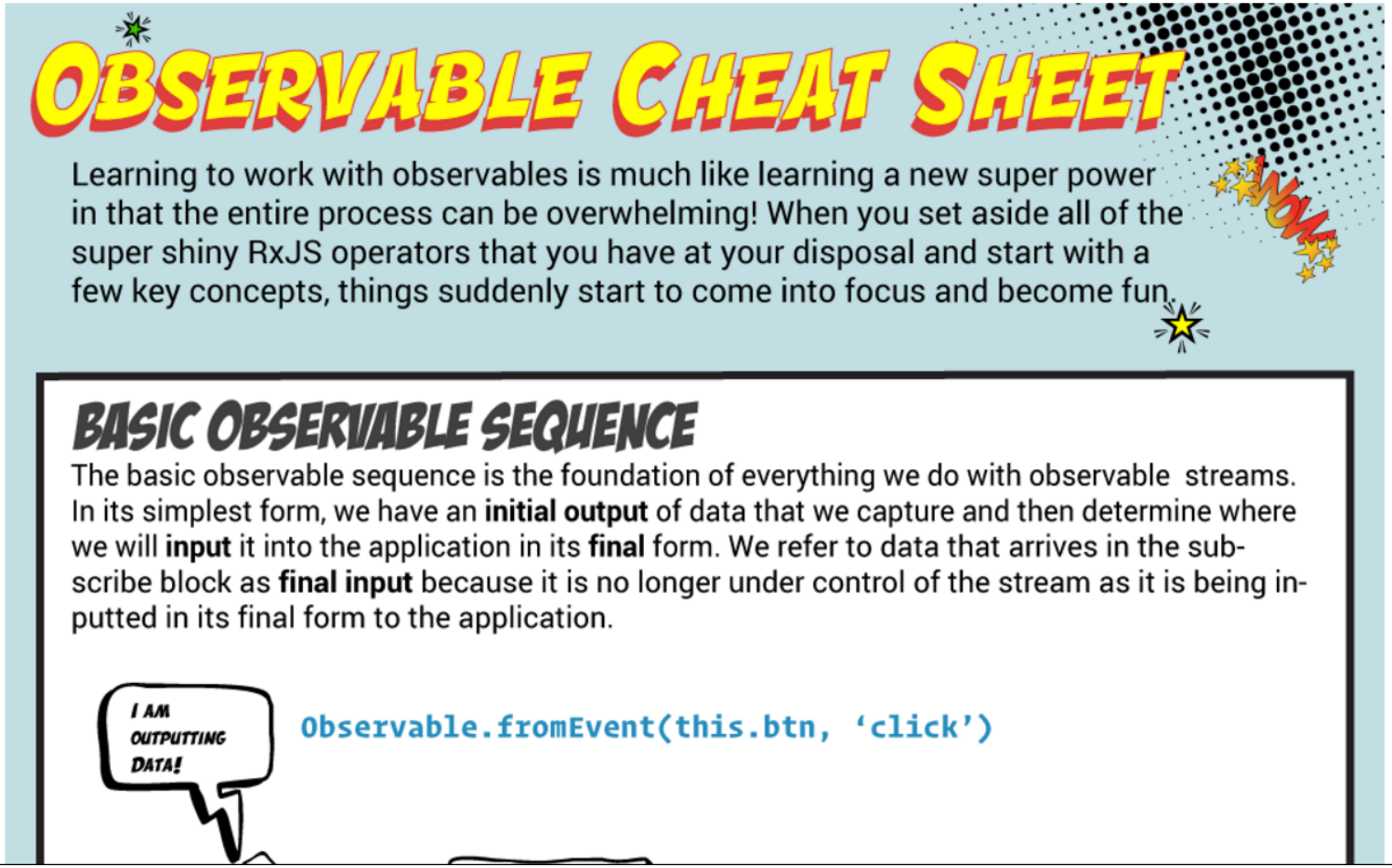
https://www.youtube.com/watch?v=5CTL7aqSvJU

Observable Cheat Sheet

genius to understand.

You can download the full-sized infographic at http://bit.ly/observable-cheat-sheet.

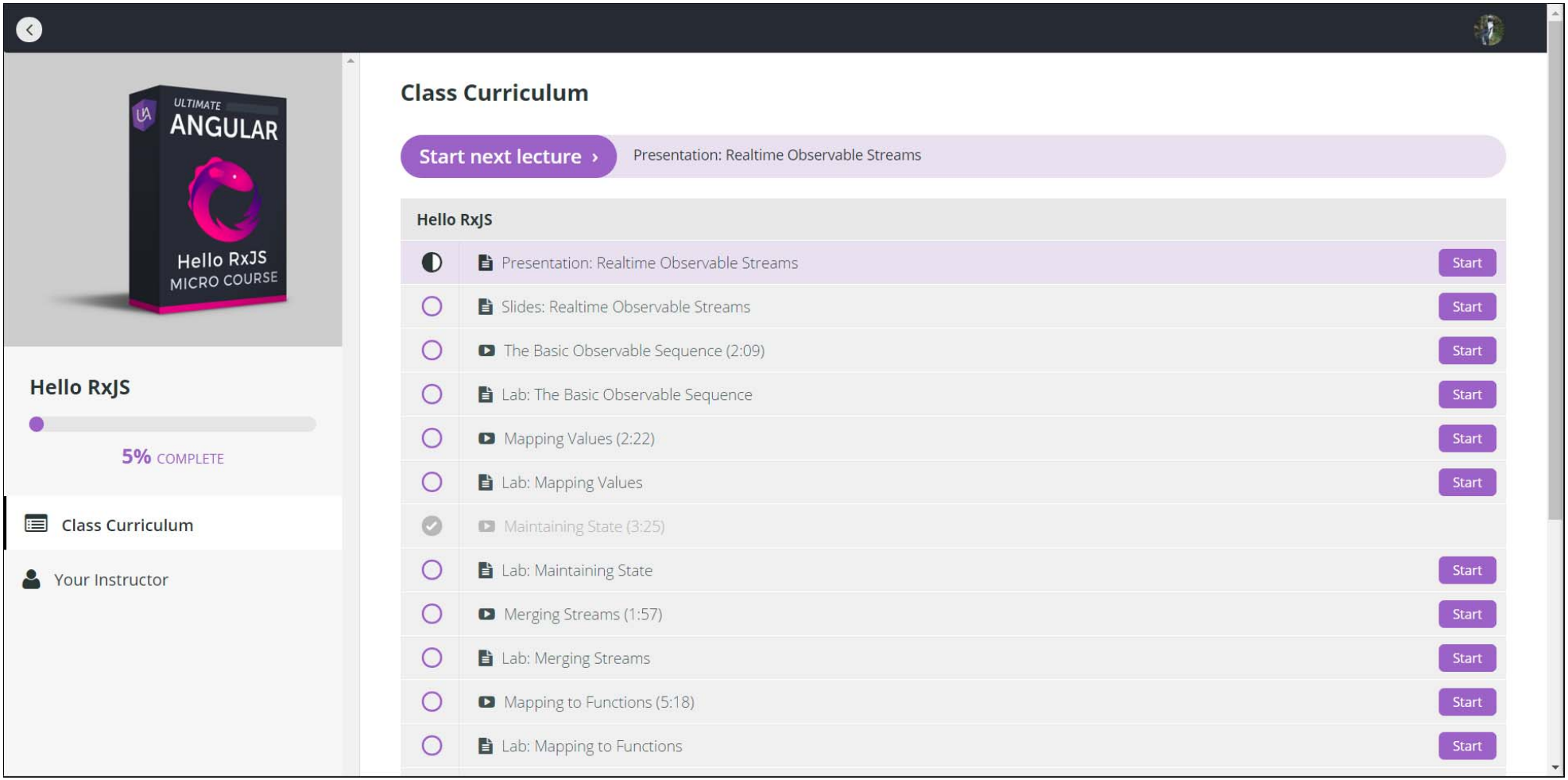
I really hope that you find the infographic helpful. Be sure to drop me a line below if you have any questions or comments. #highFive



http://onehungrymind.com/observable-cheat-sheet/

Hello RxJS

Gratis online training



http://courses.ultimateangular.com/

Observables in een Angular 2-applicatie

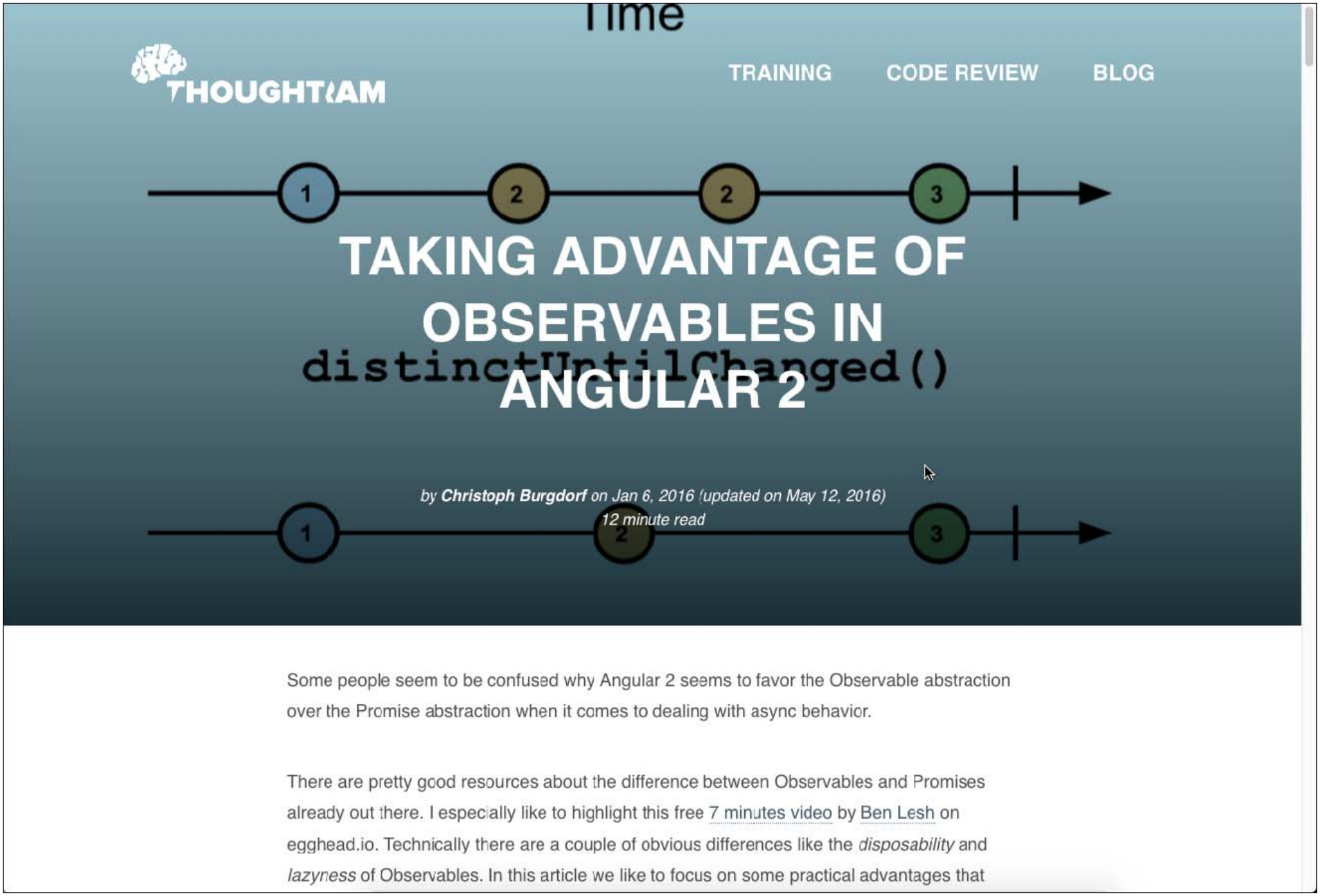
- Importeer Rx in de applicatie
  - Geheel, of alleen de benodigde onderdelen

```
import 'rxjs/Rx';
import {Observable} from "rxjs";
```

- Gebruik observable functies als `.map()`, `.filter()` etc.
- Piping. Resultaat van de een functie dient als invoer voor de volgende functie.

```
_getCities() {
   if (!this.cities) {
      this._cityService.getCities()
         .map(res => res.json())
         .delay(3000)
         .subscribe(cityData => {
               this.cities = cityData;
            },
            err => console.log(err),
            ()=> console.log('Getting cities complete...')
         )
   }
}
```

RxJs-functies



http://blog.thoughtram.io/angular/2016/01/06/taking-advantage-of-observables-in-angular2.html

RxJs-functies

For example, you can ask the server to retry your call several times:

```
...
  return this.http.get('/api/v1/tasks.json')
    .retry(5)
    .map( res => res.json());
    ...
```

In addition you can poll for results - by using `Observable.interval`:

```
...
    pollTasks() {
     return Observable.interval(10000)
      .flatMapLatest(() => http.get('/api/v1/tasks.json'))
      .map(res => res.json())
    }
    // caller can do subscription and store it as a handle:
    let tasksSubscription =
      pollTasks()
        .subscribe( data => this.payload = data);
    // turn it off at a later time
    tasksSubscription.unsubscribe();
```

RxJs-functies

What the what? Ok, so the `pollTasks()` method emits a call every 10 seconds, which triggers the call inside of `flatMapLatest` - we're basically ignoring the result of that event, and using it to trigger the `http.get` method to fetch our data. We'll map it into JSON each time.

Meer over observables http://chariotsolutions.com/blog/post/angular2-observables-http-separating-services-components/

RxJS-operators in de service

```
import {Injectable} from '@angular/core';
import {Http, Response} from "@angular/http";
import {Observable} from "rxjs";
import 'rxjs/add/operator/map';

@Injectable()
export class CityService {

   constructor(private http: Http) {

   }

   // retourneer alle cities
   getCities(): Observable<Response> {
      return this.http.get('app/cities.json')
         .map(cities => cities.json());
   }

}
```

Import operator

Transform stream in de service

Werken met Live API's

- MovieApp
- `Oefeningen\09-services-live`

Voorbeeld API's

- https://pokeapi.co/ - Pokemon API
- http://openweathermap.org/API (weerbericht)
- http://filltext.com/ (random NAW-gegevens)
- http://ergast.com/mrd/ - Ergast Motor (F1) API
- http://www.omdbapi.com/ - Open Movie Database
- http://swapi.co/ - Star Wars API
- Zie ook `JavaScript APIs.txt` met meer voorbeelden

Checkpoint

- Elke service in Angular 2 is een `class`
- Class injecteren in de component die hem gebruikt
- Instantiëren in constructor()
- Aanbevolen: leren werken met `RxJs`
- Werken met statische data en werken met live data

Oefening….