Global Knowledge®

Angular Fundamentals

Services

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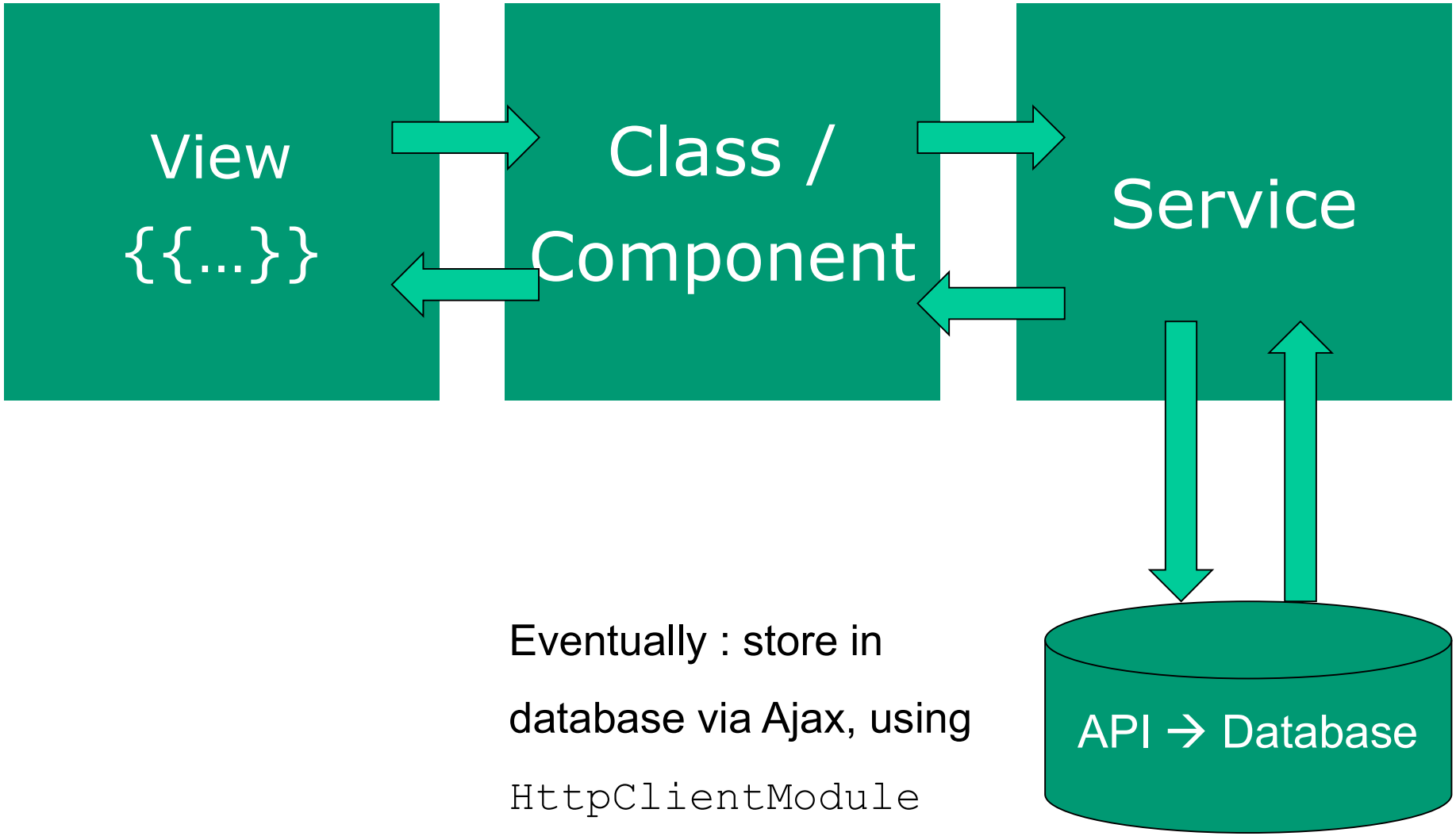
Services

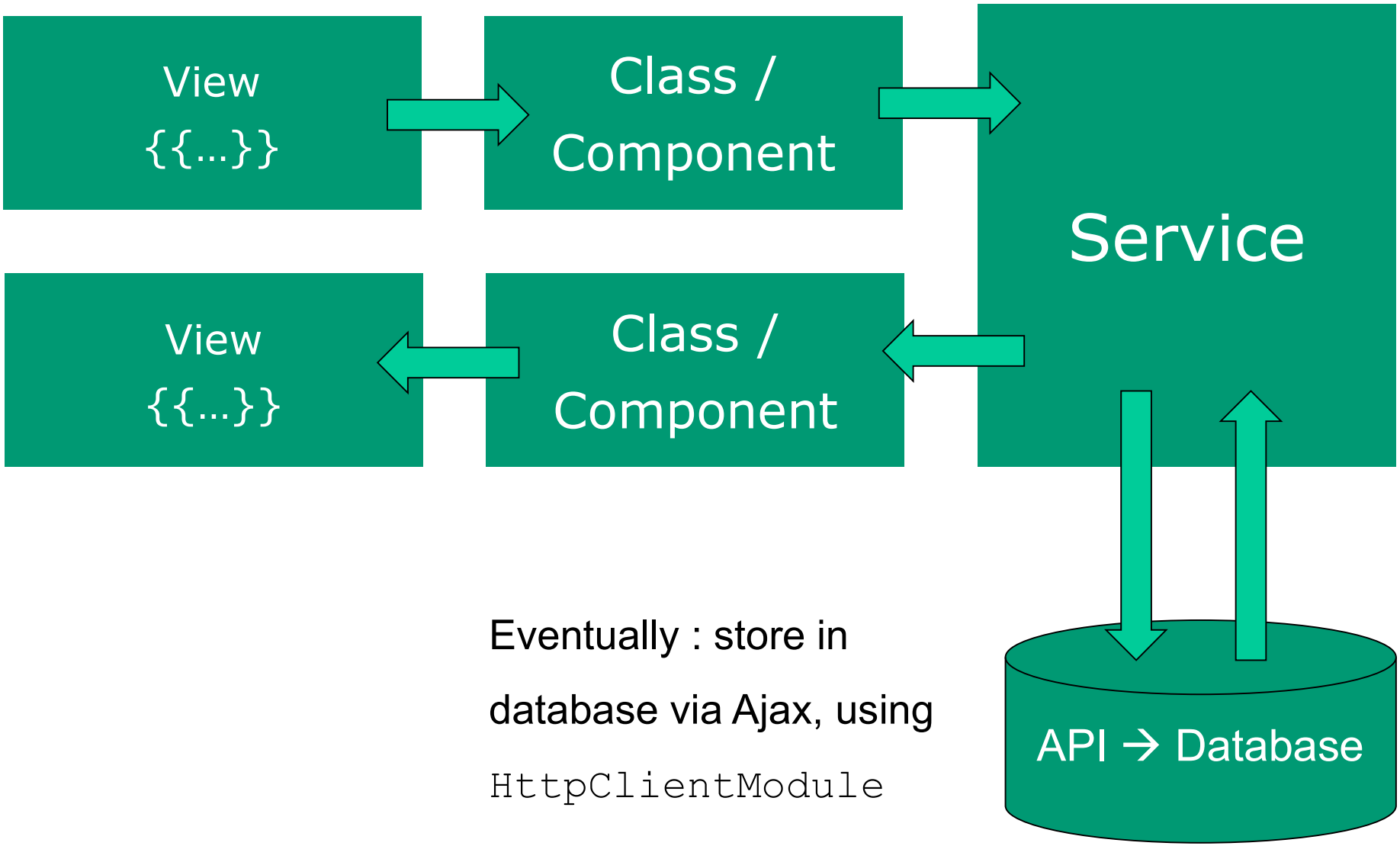
- Goal – *reuse* data functionality over different components
  - Data retrieval
  - Data caching
  - Data Storage,
  - …
- Angular: create a class without a UI (no template)
  - `export class myDataService { … }`

Data flow



Eventually : store in database via Ajax, using `HttpClientModule`

…and with multiple components



Services in Angular

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{
   //....
}
```

Make sure to use @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

But...

"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"*

Creating a service

Creating a service in 3 steps

Creating a service – 3 steps

1. Create/generate your service
2. Consume/inject service into component
3. Make service available in the module
    - NOT necessary when using modern notation (see further)

Creating a service

```
ng generate service [name]
```

Step 1 – create service (static data)

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

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

   // return all cities
   getCities() {
      return this.cities
   }

   // return city based on id
   getCity(id:number) {
       return this.cities.find(c => c.id === id);
   }
}
```

Step 2 – Inject/consume service – using constructor injection

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

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

export class AppComponent implements OnInit {
   // Properties for 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);
     ……
 }
}
```

local variables

Dependency Injection

Constructor: shorthand to instantiate private variable

Call service method in ngOnInit()

Instantiation?

- 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."

Instantiation?

- Pay attention: no manual `new()` instance of Service!
  - Services are -often- Singletons
  - Are fetched from the Module and/or instantiated in

    `constructor()`

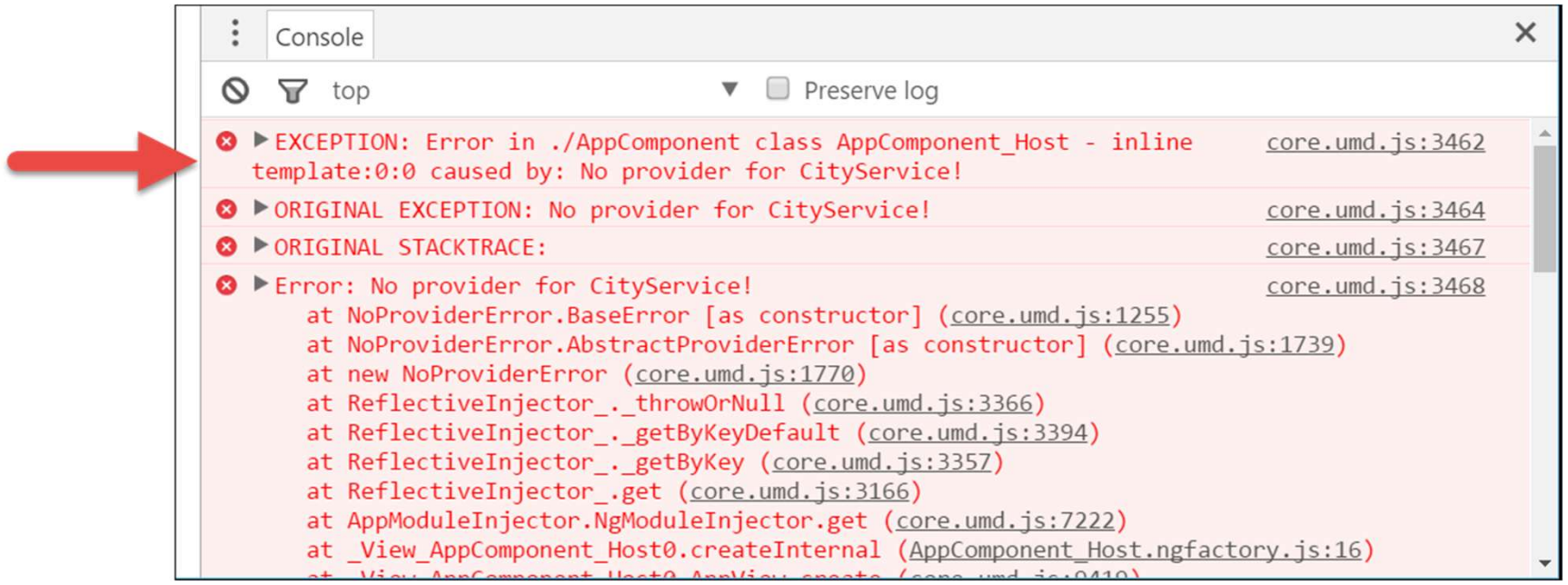
```
constructor(private cityService:CityService) { … }
```

"The constructor itself does nothing.

The parameter simultaneously defines a private `cityService` property and identifies it as a `CityService` injection service."

Error might occur: "No provider for CityService"

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



Step 3, option 1 – Inject service in Module

Only an import/reference to `CityService` is not sufficient.

Angular has to *inject* the service in the module

Use the annotation `providers: [ … ]`

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

Array with Service-dependencies

Step 3, option 2, modern: use `providedIn`

- "Tree shakeable providers"
- Don't tell the Module which services to use, the other way around:
- tell the service in which module it is used

```
@Injectable({
   providedIn: 'root'
})
export class CityService {
      …
}
```

```
@NgModule({
   imports      : [BrowserModule],
   declarations: [AppComponent],
   bootstrap    : [AppComponent],
   // providers    : [CityService]
})
```

https://blog.angular.io/version-6-of-angular-now-available-cc56b0efa7a4

Traditional – constructor based DI

- Not Wrong! This is still valid in Angular 17+

```
export class InjectComponent {

  // using classic constructor based Dependency Injection:
  constructor(public userService: UserService) {
  }

  //…
}
```

Modern Angular (17+) the `inject()` function

- Technically available since Angular 14
  - but now a lot more useful!
  - Ditching *Constructor based Dependency Injection*
- Technical benefits
  - Readability benefits – a lot
  - It's a lot more clearer what dependencies a component needs – even if you don't fully understand DI.
  - Inheritance becomes much simpler. No need to use `super(service1, service2)` … on `extends BaseComponent`

```
export class InjectComponent {
  // using inject() based Dependency Injection
  userService = inject(UserService);
}
```

Warning! `Inject` only during constructor-time

- Note: the `inject()` function only works when constructing the component
- So you CAN NOT use `inject()` in other methods

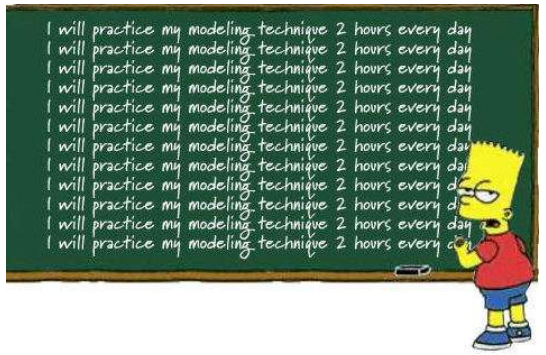
```
export class InjectComponent {

  // works - executed in construction phase of component
  userService = inject(UserService);

  ngOnInit(){
    // won't work, this function is executed later
    inject(SomeService).someValue
  }
  someMethod(){
    // won't work, this function is executed later
    inject(SomeService).someValue
  }
}
```

Singleton?

- Services are (usually) singletons
  - But: it depends where the service is provided/instantiated!
  - Services are singleton for Component/Module and all child components.
  - Using Module/Site-wide? (recommended)
    - Instantiate service in `app.module.ts`
    - `Or use { providedIn: 'root'}`

Workshop

- While working, you have developed some components, displaying data. Move this data from the component class to a service.
- Create a new file (for example `city.service.ts`) and import the correct annotations. Use `@Injectable()` to decorate the service.
  - 3 options: use `providers:[]`, constructor DI, or `inject()`.
- Write a `getCities()` method and methods to add or delete
  - or the data you are working with, of course.
- Example: `\200-services-static`



Checkpoint

- Every service in Angular is a `class`
- Use the `@Injectable()` decorator on service classes
- Dependency Inject in `constructor()` of the component that consumes/needs access to the service methods
- Add service to `providers: []` or use `providedIn`
- Modern Angular: use the `inject()` function in the component