Angular 2

Modules

An Angular module, whether a root or feature, is a class with an `@NgModule` decorator.

```
// app/app.module.ts
import { NgModule }       from '@angular/core';
import { BrowserModule } from '@angular/platform-browser';
@NgModule({
  imports:      [ BrowserModule ],
  providers:    [ Logger ],
  declarations: [ AppComponent ],
  exports:      [ AppComponent ],  // AppComponent is just for show, no modules will ir
  bootstrap:    [ AppComponent ]   // They will import from AppComponent instead
})
export class AppModule { }
```

`NgModule` is a decorator function that takes a single metadata object whose properties describe the module. The most important are:

- **declarations** - the view classes that belong to this module. Angular has three kinds of view classes: *components*, *directives* and *pipes*.
- **exports** - subset of declarations that should be visible and usable in the component templates of other modules.
- **imports** - other modules whose exported classes are needed by component templates declared in this module.
- **providers** creators of services that this module contributes to the global collection of services; they become accessible in all parts of the app.
- **bootstrap** - identifies the main application view, called the root component, that hosts all other app views. Only the root module should set this bootstrap property.

Components

A **component** controls a patch of screen real estate that we could call a view.

```
 // app/hero-list.component.ts
@Component({
  selector:    'hero-list',
  templateUrl: 'app/hero-list.component.html',
  providers:   [ HeroService ]
 })

export class HeroListComponent implements OnInit {
  heroes: Hero[];
  selectedHero: Hero;

  constructor(private service: HeroService) { }

  ngOnInit() {
    this.heroes = this.service.getHeroes();
  }

  selectHero(hero: Hero) { this.selectedHero = hero; }
}
```

Templates

A **template** is a form of HTML that tells Angular how to render the component.

```
<!-- app/hero-list.component.html -->
<h2>Hero List</h2>
<p><i>Pick a hero from the list</i></p>
<ul>
  <li *ngFor="let hero of heroes" (click)="selectHero(hero)">
    {{hero.name}}
  </li>
</ul>
<hero-detail *ngIf="selectedHero" [hero]="selectedHero"></hero-detail>
```

Metadata

Metadata tells Angular how to process a class.

For below example, in fact, it really is just a class. It's not a component until we tell Angular about it.

```
@Component({
  selector:    'hero-list',
  templateUrl: 'app/hero-list.component.html',
  providers:   [ HeroService ]
})
export class HeroListComponent implements OnInit {
/* . . . */
}
```

Here are a few of the possible `@Component` configuration options:

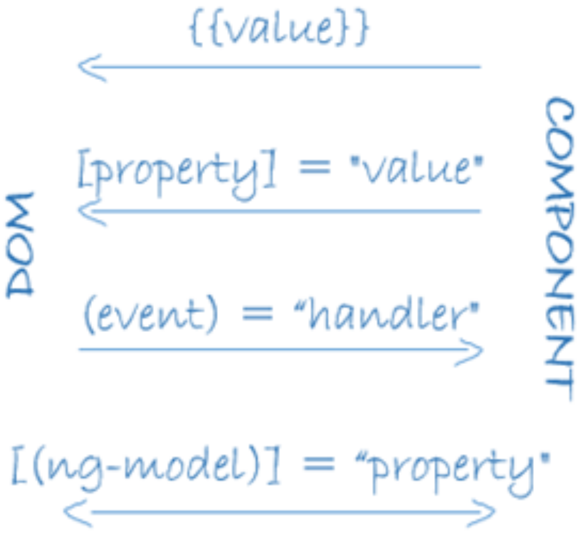
- **selector**: CSS selector that tells Angular to create and insert an instance of this component where it finds a `<hero-list>` tag in parent HTML. For example, if an app's HTML contains `<hero-list></hero-list>` , then Angular inserts an instance of the HeroListComponent view between those tags.

- **templateUrl**: address of this component's template, which we showed above.

- **directives**: array of the components or directives that this template requires. We saw in the last line of our template that we expect Angular to insert a HeroDetailComponent in the space indicated by `<hero-detail>` **tags. Angular will do so only if we mention the HeroDetailComponent in this directives array.

- **providers**: array of *dependency injection* providers for services that the component requires. This is one way to tell Angular that our component's constructor requires a HeroService so it can get the list of heroes to display. We'll get to dependency injection later.

Data binding



A simple template

```
<div>
  Hello my name is {{name}} and I like {{thing}} quite a lot.
</div>
```

`{}` : RENDERING

To render a value, we can use the standard double-curly syntax:

```
<p> My name is {{name}} </p>
```

`[]` : BINDING PROPERTIES

If we have `this.currentVolume` in our component, we will pass this through to our component and the values will stay in sync:

```
<video-control [volume]="currentVolume"></video-control>
```

`()` : HANDLING EVENTS

To listen for an event on a component, we use the `()` syntax

```
<my-component (click)="onClick($event)"></my-component>
```

`[()]` : TWO-WAY DATA BINDING

To keep a binding up to date given user input and other events, use the `[()]` syntax. Think of it as a combination of handling an event and binding a property:

```
<input [(ngModel)]="myName">
```

The `this.myName` value of your component will stay in sync with the input value.

`*` : THE ASTERISK

`*` indicates that this directive treats this component as a template and will not draw it as-is.

For example, `ngFor` takes our `<my-component>` and stamps it out for each item in items, but it never renders our initial `<my-component>` since it's a template:

```
<my-component *ngFor="#item of items">
</my-component>
```

Directives

Angular templates are dynamic. When Angular renders them, it transforms the DOM according to the instructions given by **directives**.

There are three kinds of directives in Angular:

1. Components

2. Structural directives
3. Attribute directives

Structural directives

Structural directives can change the DOM layout by adding and removing DOM elements. `NgFor` and `NgIf` are two familiar examples.

```
<!-- app/hero-list.component.html -->
<li *ngFor="let hero of heroes"></li>
<hero-detail *ngIf="selectedHero"></hero-detail>
```

- `*ngFor` tells Angular to stamp out one `<li>` per hero in the heroes list.
- `*ngIf` includes the HeroDetail component only if a selected hero exists.

Attribute directives

An **Attribute directive** can change the appearance or behavior of an element. The built-in `NgStyle` directive, for example, can change several element styles at the same time.

```
<div [ngStyle]="{'color': color, 'font-size': size, 'font-weight': 'bold'}">
  style using ngStyle
</div>

<input [(ngModel)]="color" />
<button (click)="size = size + 1">+</button>
<button (click)="size = size - 1">-</button>

<div [ngClass]="['bold-text', 'green']">array of classes</div>
<div [ngClass]="'italic-text blue'">string of classes</div>
<div [ngClass]="{'small-text': true, 'red': true}">object of classes</div>
```

Services

Service is a broad category encompassing any value, function, or feature that our application needs. There is **nothing** specifically *Angular* about *services*. Angular itself has no definition of a service.

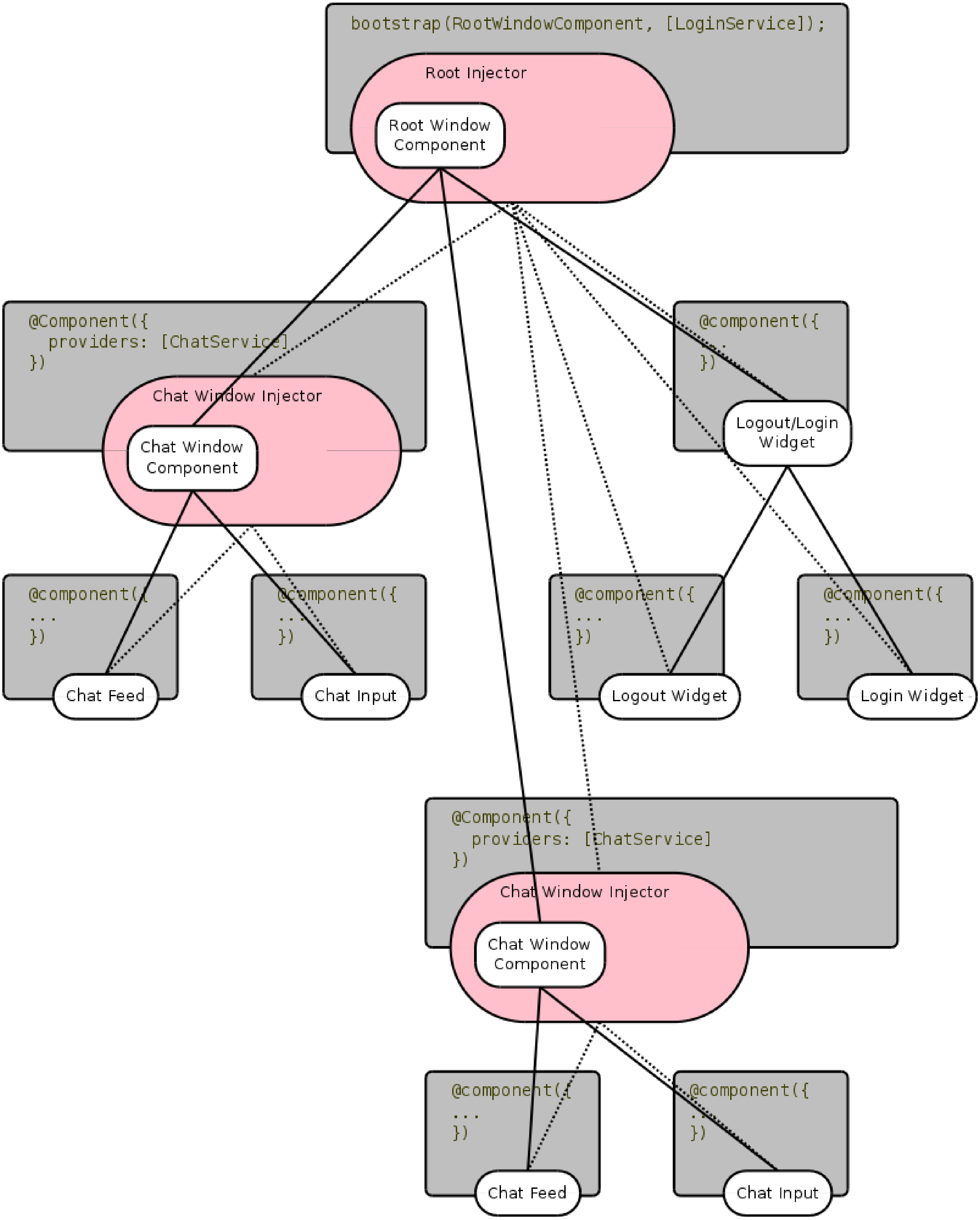
```
// app/logger.service.ts
export class Logger {
  log(msg: any)   { console.log(msg); }
  error(msg: any) { console.error(msg); }
  warn(msg: any)  { console.warn(msg); }
}
```

```
// app/hero.service.ts
export class HeroService {
  private heroes: Hero[] = [];

  constructor(
    private backend: BackendService,
    private logger: Logger) { }

  getHeroes() {
    this.backend.getAll(Hero).then( (heroes: Hero[]) => {
      this.logger.log(`Fetched ${heroes.length} heroes.`);
      this.heroes.push(...heroes); // fill cache
    });
    return this.heroes;
  }
}
```

Dependency injection



```
bootstrap(RootWindowComponent, [LoginService]);
```

```
@Component({
  providers: [ChatService]
})
```

```
@component({
...
})
```

`@Injectable()`

- is a decorator which tells the `typescript` that decorated class has `dependencies` and does not mean that this class can be injected in some other.
- And then TypeScript understands that it needs to Inject the required metadata into decorated class when constructing, by using the `imported` dependencies.

`bootstrap(app, [service])`

- bootstrap() takes care of creating a root injector for our application when it’s bootstrapped. It takes a list of providers as second argument which will be passed straight to the injector when it is created.
- You bootstrap your application with the services that are gonna be used in many places like `Http` , which also means you'll not need to write `providers: [Http]` in your class configuration.

`providers: [service]`

- providers also does the work of passing all the services' arguments to `Injector` .
- You put services in providers if it's not `bootstrap()ped` with. And is needed only in a few places.

`@Inject()`

- is a function that does the work of actually injecting those services like this. `constructor(@Inject(NameService) NameService)`
- but if you use TS all you need to do is this `constructor(NameService: NameService)` and typescript will handle the rest.

Aliased class providers

The Provider class and provide object literal

We wrote the `providers` array like this:

```
providers: [Logger]
```

This is actually a short-hand expression for a provider registration using a provider object literal with two properties:

```
[{ provide: Logger, useClass: Logger }]
```

Sometimes we want to create alias.

```
[ NewLogger,
  // Not aliased! Creates two instances of `NewLogger`
  { provide: OldLogger, useClass: NewLogger}]
```

The solution: alias with the useExisting option.

```
[ NewLogger,
  // Alias OldLogger w/ reference to NewLogger
  { provide: OldLogger, useExisting: NewLogger}]
```