Overview

- Modules
- Components
- Templates
- Metadata

Modules

Separate Code into Modules

Modules

We assemble our application from modules.

A module exports an asset such as a Service, Component, or a shared value

Angular 1 Modules

```
(function () {
  angular
    .module('app', [])
    .controller('StoryController', StoryController);

  function StoryController() {
    var vm = this;
    vm.story = { id: 100, name: 'The Force Awakens' };
  }
})();
```

Module definition

Angular 1 modules

Angular 1 had its own modules

Served as containers of controllers, services, and directives

We use ES6 style modules with Angular 2

vehicle.service.ts

```ts
export interface Vehicle {
  id: number;
  name: string;
}

export class VehicleService {
  //...
}
```

Exporting modules

Assets can be exported using the export keyword

vehicle.component.ts

```
import { Component } from 'angular2/core';

import { Vehicle, VehicleService } from '../vehicle.service';
```

Importing modules

Modules and their contents can be imported using the import keyword

We import the Vehicle and VehicleService using destructuring

Components

Angular 2 Components

A Component contains application logic that controls a region of the user interface that we call a view.

Anatomy of a Component

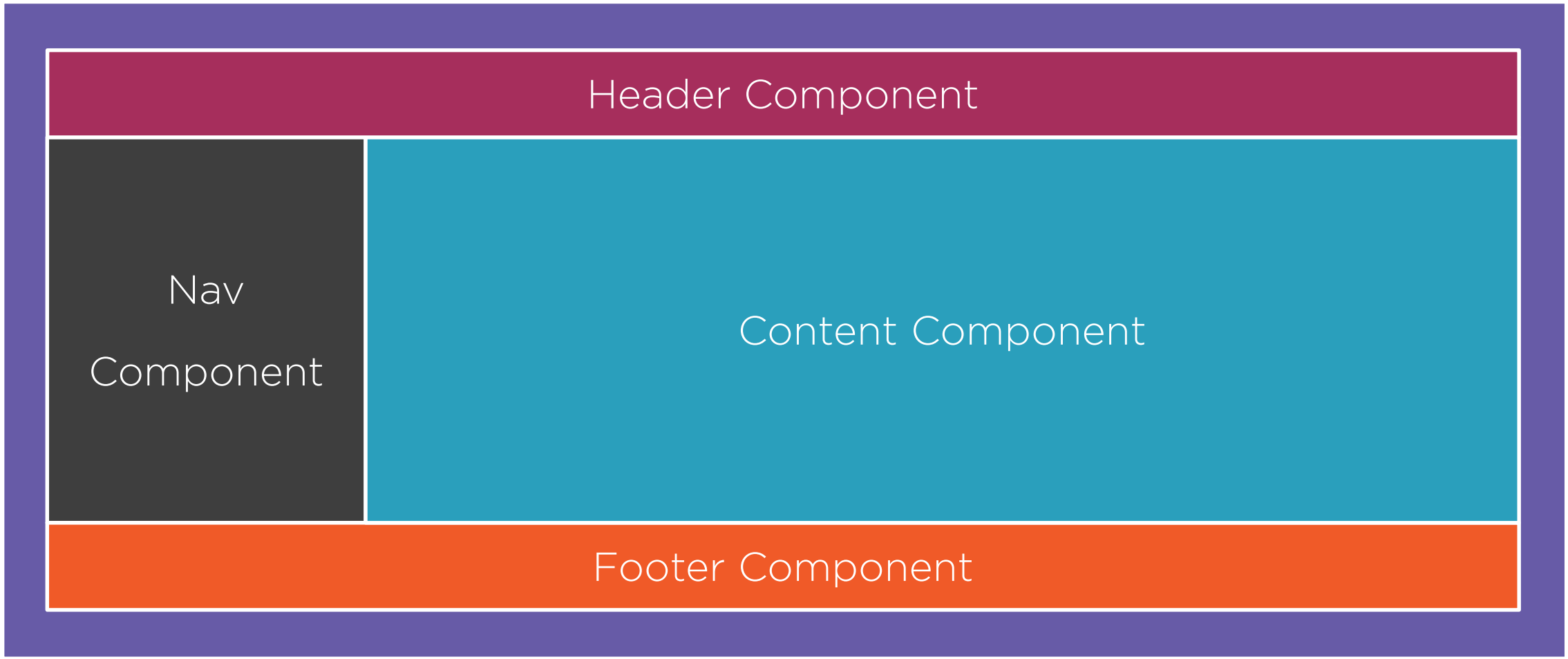
Imports (use other modules)

Metadata (describe the component)

Class (define the component)

```
import { Component } from 'angular2/core';

import { Vehicle } from './vehicle.service';


@Component({
  selector: 'story-vehicles',
  templateUrl: './vehicles.component.html'
})


export class VehicleListComponent {
  vehicles: Vehicle[];
}
```

Assembling Our App from Components



main.ts

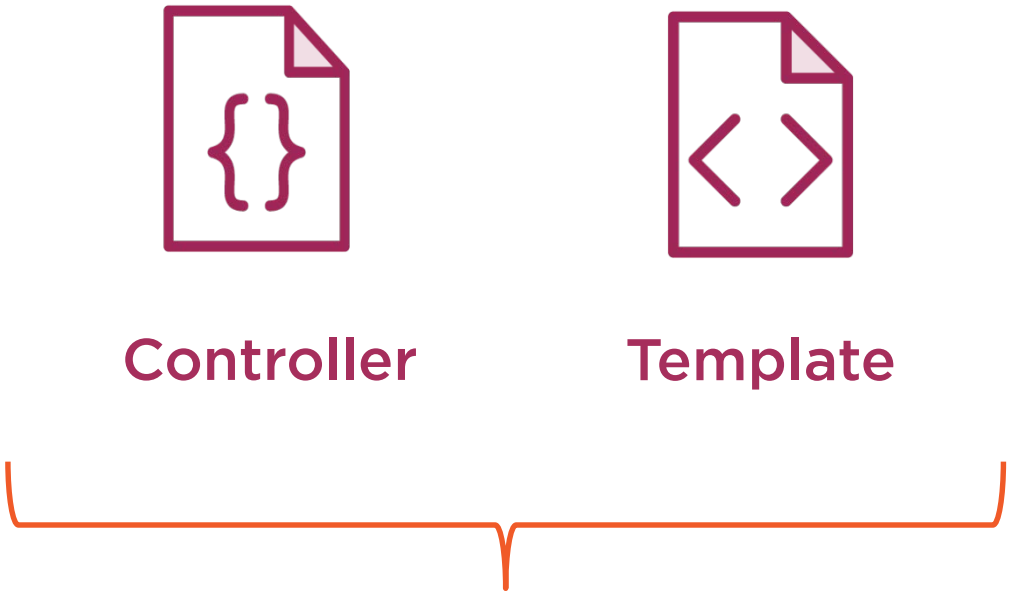
```
import { bootstrap } from 'angular2/platform/browser';
import { StoryComponent } from './story.component';

bootstrap(StoryComponent);
```

Bootstrapping a Component

Entry point for the app

This is where we start

Comparing Angular 1 to Angular 2



story.component.ts

Component has logic

```
@Component({
  selector: 'my-story',
  templateUrl: 'app/story.component.html'
})
export class StoryComponent {
  name = 'Han Solo';
}
```

story.component.html

What is rendered

```
<h3>My name is {{name}}</h3>
```

index.html

Where the component is placed

```
<my-story></my-story>
```

story.component.ts

Component has logic

```
@Component({
  selector: 'my-story',
  templateUrl: 'app/story.component.html'
})
export class StoryComponent {
  name = 'Han Solo';
}
```

story.component.html

What is rendered

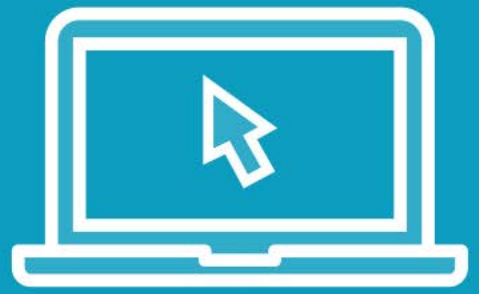
```
<h3>My name is {{name}}</h3>
```

index.html

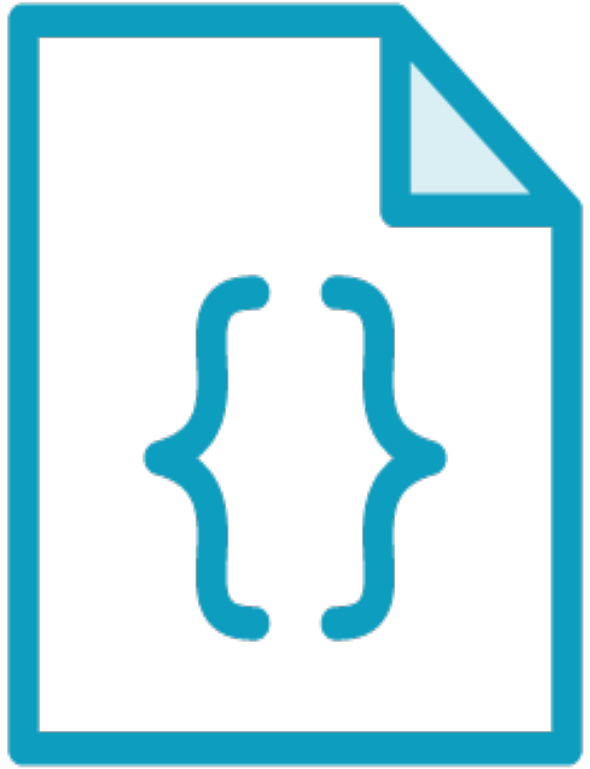
Where the component is placed

```
<my-story></my-story>
```

Components Demo



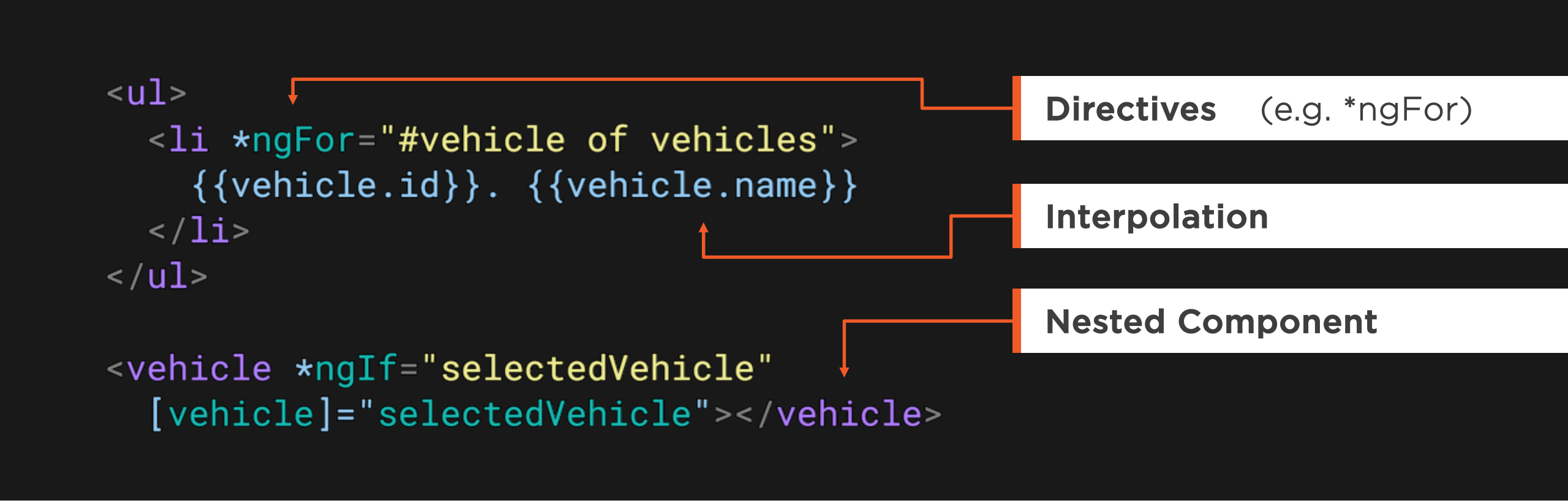
Components



Templates

Templates are the View

Templates are mostly HTML, with a little help from Angular. They tell Angular how to render the Component



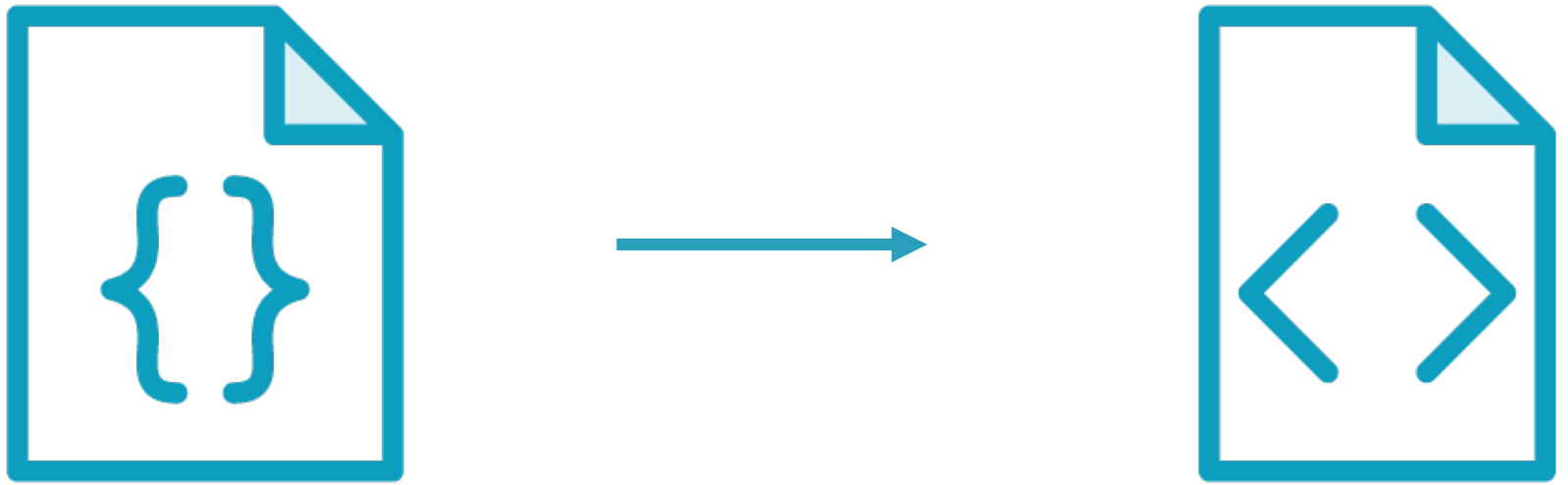
Templates

HTML

Directives, as needed

Template Binding Syntax

Connecting the Component to its Template



Component

Template

```
@Component({
  selector: 'story-vehicles',
  template: `
    <ul>
      <li *ngFor="#vehicle of vehicles">
        {{vehicle.name}}
      </li>
    </ul>
  `
})
export class VehicleListComponent { }
```

Template String

Inline Templates

template defines an embedded template string

Use back-ticks for multi-line strings

```
@Component({
  selector: 'story-vehicles',
  templateUrl: './vehicles.component.html'
})
export class VehicleListComponent { }
```

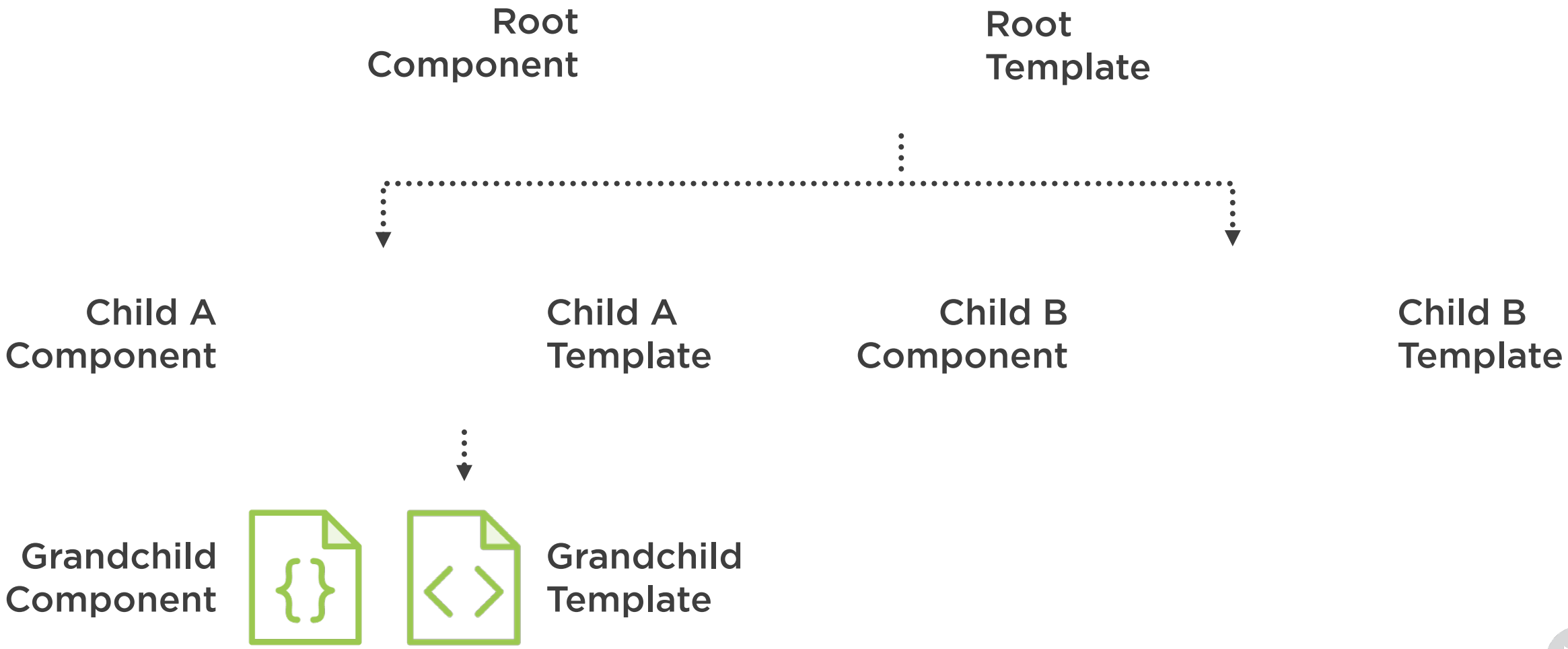
Template Url

Linked Templates

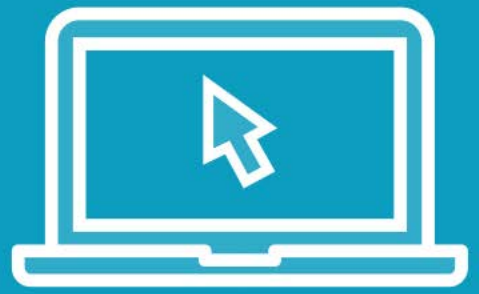
templateUrl links the Component to its Template

Components have templates,
which may contain other components

Templates Contain Other Components



Demo



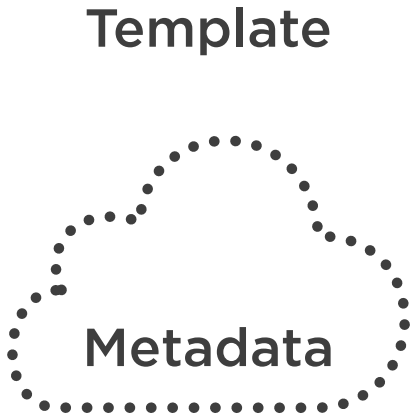
Templates

Metadata

Metadata

We use Metadata to tell Angular about the objects we build.

Metadata Links the Template to the Component



```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterDetailComponent],
  providers: [HTTP_PROVIDERS, CharacterService]
})
```

Declare all directives

Nesting Components

Built-in directives like *ngFor and ngClass are already available

Angular needs to know what <character-detail> is in the Template

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterDetailComponent],
  providers: [HTTP_PROVIDERS, CharacterService]
})
```

Decorators

metadata for the Component

@Component Decorator

Selector is the name of the element in the Template

templateUrl and **styleUrls** point to the template and styles

directives declare custom directives it uses

providers declare services the Component needs

Examining a Component and its Metadata

Decorators

The @ is a decorator that provides metadata describing the Component

Component

Component definition class. Controls a patch of screen real estate that we call a View

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Template and Styles

Tells the Component where to find them.

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Directives

Tell the Component which directives we will be using in the Template

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Providers

These services will be registered with Angular's injector. Only do this once.

Injectors

Inject a Service into another object.

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Output

Component can communicate to anyone hosting it

Emit Events

Component emits events via output

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Input

Pass values into the Component

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Properties

Component exposes properties that can be bound to its Template

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Actions

Functions can be exposed, bound and called by the Template to handle events

```
@Component({
  selector: 'story-characters',
  templateUrl: './app/characters.component.html',
  styleUrls: ['./app/characters.component.css'],
  directives: [CharacterComponent],
  providers: [CharacterService]
})
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  constructor(private _characterService: CharacterService) { }

  ngOnInit() {
    this._characterService.getCharacters(this.storyId)
      .subscribe(characters => this.characters = characters);
  }

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
}
```

Input and Output

Components allow input properties to flow in, while output events allow a child Component to communicate with a parent Component.

Output

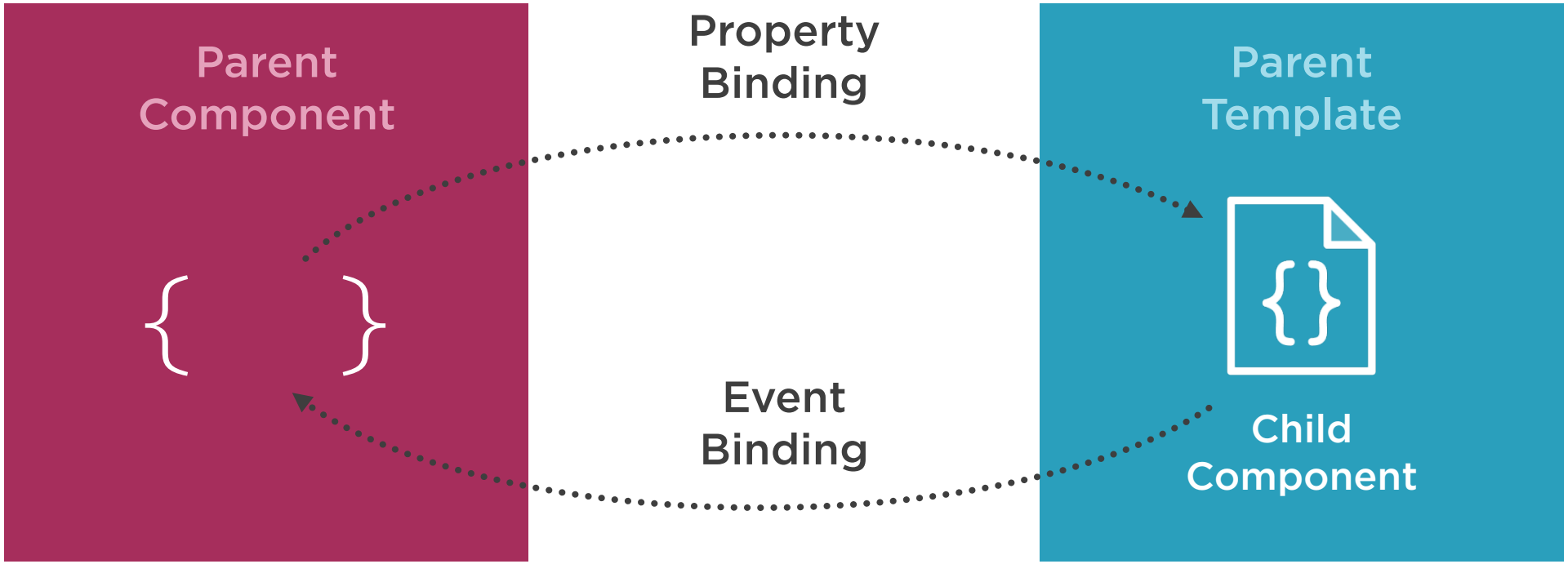
```
export class CharactersComponent implements OnInit {
  @Output() changed = new EventEmitter<Character>();
  @Input() storyId: number;
  characters: Character[];
  selectedCharacter: Character;

  select(selectedCharacter: Character) {
    this.selectedCharacter = selectedCharacter;
    this.changed.emit(selectedCharacter);
  }
```

Output property

Emit the output

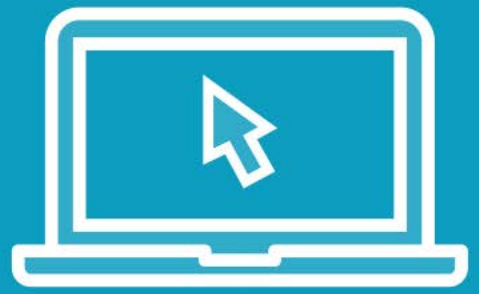
```
<div>
  <h1>Storyline Tracker</h1>
  <h3>Component Demo</h3>
  <story-characters [storyId]="7"
    (changed)=changed($event)>
  </story-characters>
</div>
```

Bind to the event in the Parent Component


Parent
Component
{ }
Property
Binding
Event
Binding
Parent
Template
{ }
Child
Component

Component Input and Output

Demo



ViewChild

Use ViewChild when a parent Component needs to access a member of its child Component

ViewChild

Components

Child

```
export class FilterComponent {
  @Output() changed: EventEmitter<string>;
  filter: string;

  clear() {
    this.filter = '';
  }
  // ...
}
```

Child Component's function

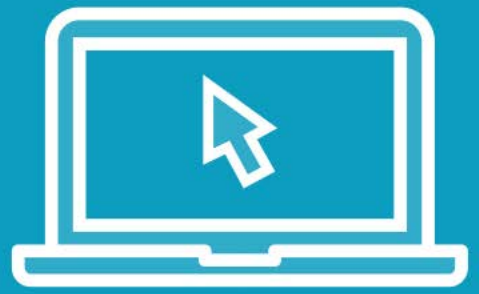
Parent

```
export class CharacterListComponent {
  characters: Character[];
  @ViewChild(FilterComponent) filter: FilterComponent;

  filtered = this.characters;

  getCharacters() {
    this._characterService.getCharacters()
      .subscribe(characters => {
        this.characters = this.filtered = characters;
        this.filter.clear();
      });
  }

  // ...
}
```

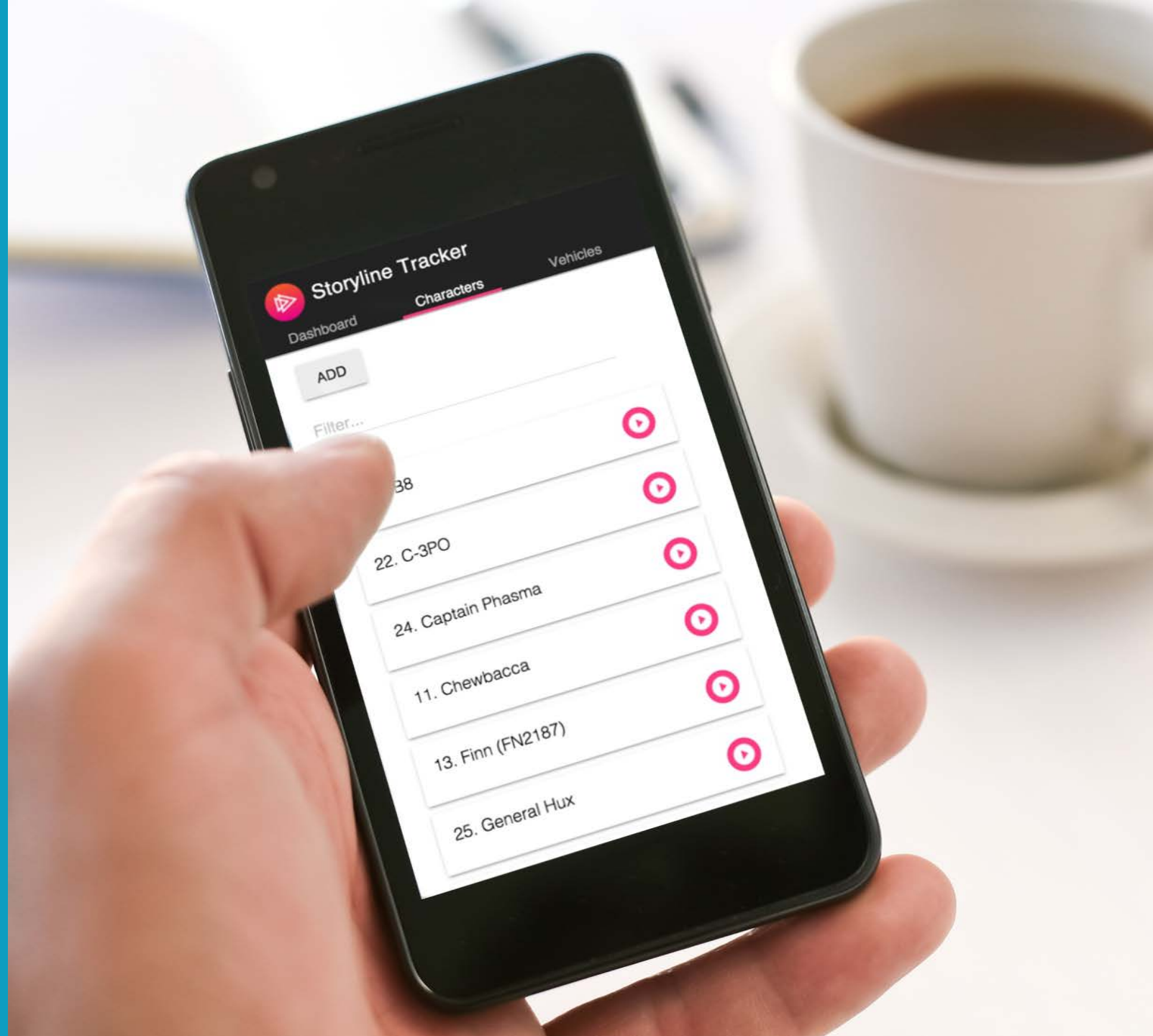
Grab the child

Call its member

Demo



Putting It All Together



Summary

Modules encapsulate like objects

Components control a region of the page

Templates tell Angular how to render

Metadata describes objects