INTRODUCTION TO ANGULAR

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Agenda

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- Angular Versions
- Why Angular?
- Where does Angular fit?
- Setting up Angular
- TypeScript
- Angular Building Blocks
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  - Component
  - Decorator
  - Data Binding
  - Directive
  - Pipe
  - Service
  - Router

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- Demo App
- Q & A

What is Angular?

- Developed in 2009 by Misko Hevery
- Currently maintained by Google
- Framework for building front-end JavaScript applications
- Angular apps
  - Can run on desktop and mobile devices
  - Are generally SPAs
- Open-source, TypeScript-based framework
- ‘A’ of MEAN stack

Angular Versions

- AngularJS (v1.x)
  - Aims to simplify the development and testing of web apps
  - Worked on the concept of scope and controllers
  - Initial release, v0.9.0 – Oct 2010
  - Latest release, v1.6.9 – Feb 2018
- Angular 2
  - Added component as a key building block
  - Complete rewrite of AngularJS, no backward compatibility.
  - Released in Sep 2016

Angular Versions

- Angular 4
  - Apps are smaller & faster
  - AOT compilation, Angular Universal - SSR
  - Backward compatible with Angular 2
  - Released in Mar 2017
- Angular 5
  - Smaller, faster and easier to use
  - Build optimizer, compiler improvements
  - New HttpClient, pipes, router lifecycle events
  - Released in Nov 2017

For more information regarding visit https://www.ngdevelop.tech/angular/history/

Why Angular?

- Single Page Apps (SPA)
  - Better user experience
  - Reduced full page reloads
  - Better overall performance
  - Less network bandwidth
- Declarative programming
  - Better readability, concise code
  - Better developer productivity
  - Faster development

Why Angular?

- Starting from a blank slate
- Project Structure
- Following a style guide
- Creating optimized build
- Customizing according to team conventions
- Configuring unit and end to end testing.

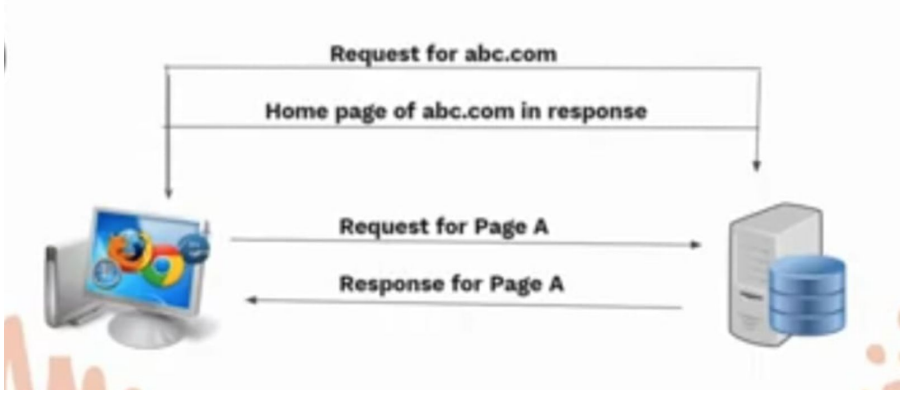
The Angular CLI makes it easy to create an application that works and follows best practices right out of the box.

Why Angular?

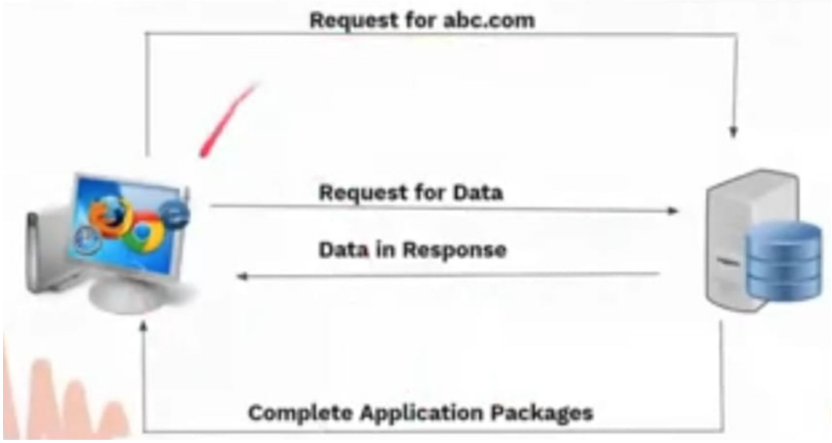
- Component based
  - Reusable
- Structures app code
  - Modular, Maintainable, Scalable
- Cross platform, mobile support
  - Target multiple browsers, platforms & devices
- Decouples DOM manipulation from app logic
  - Testable, TDD
- Move app code forward in the stack
- Reduces server load, reduces cost

What is SPA?

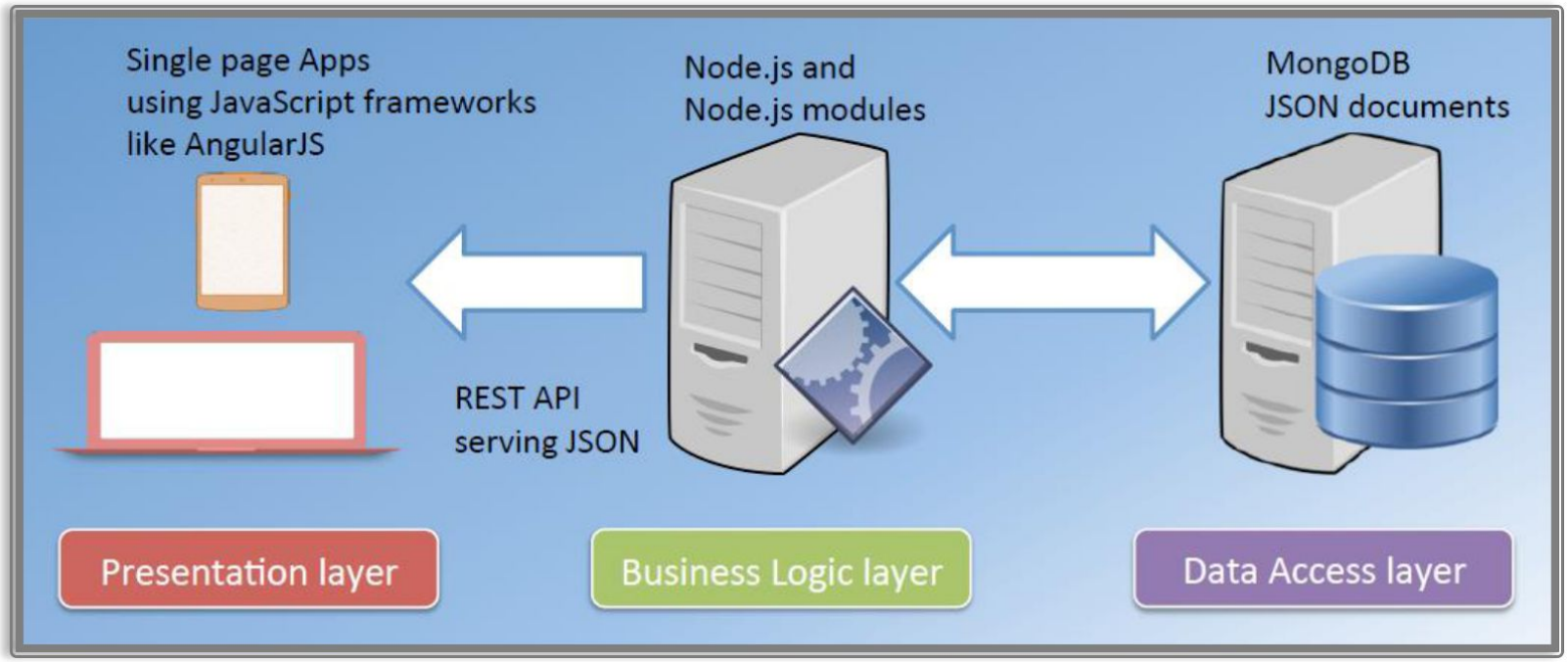
- Simple Website



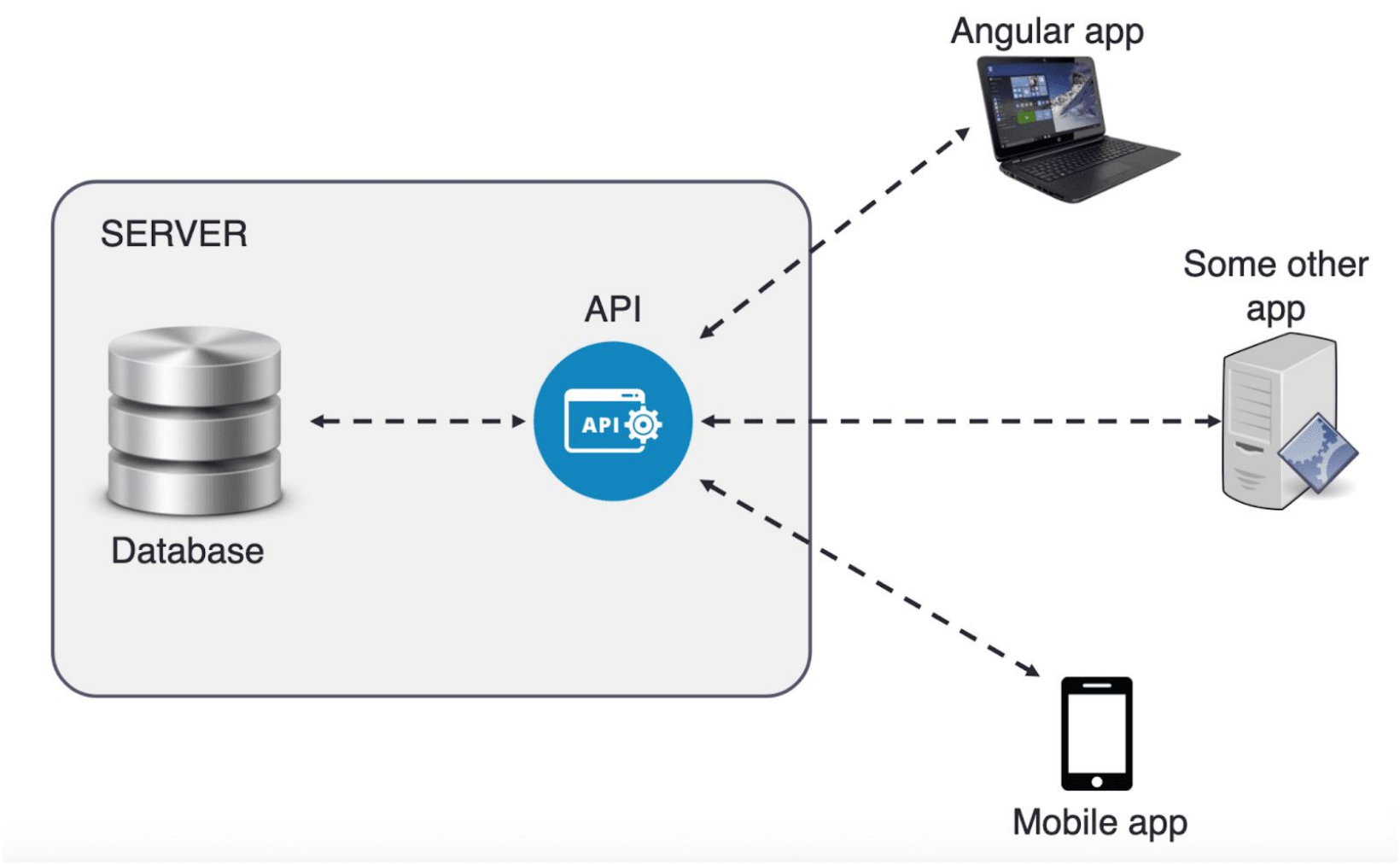
- Single Page Application



Where does Angular fit?



Where does Angular fit?



Setting up Angular

- Angular CLI
  - Toolset that makes creating, managing and building Angular apps very simple
  - Great tool for big Angular projects
    - Website: https://cli.angular.io
    - Wiki: https://github.com/angular/angular-cli/wiki
- Requires Node.js
  - https://nodejs.org

```
> npm install -g @angular/cli
> ng new my-first-app
> cd my-first-app
> ng serve
```

Setting up Angular

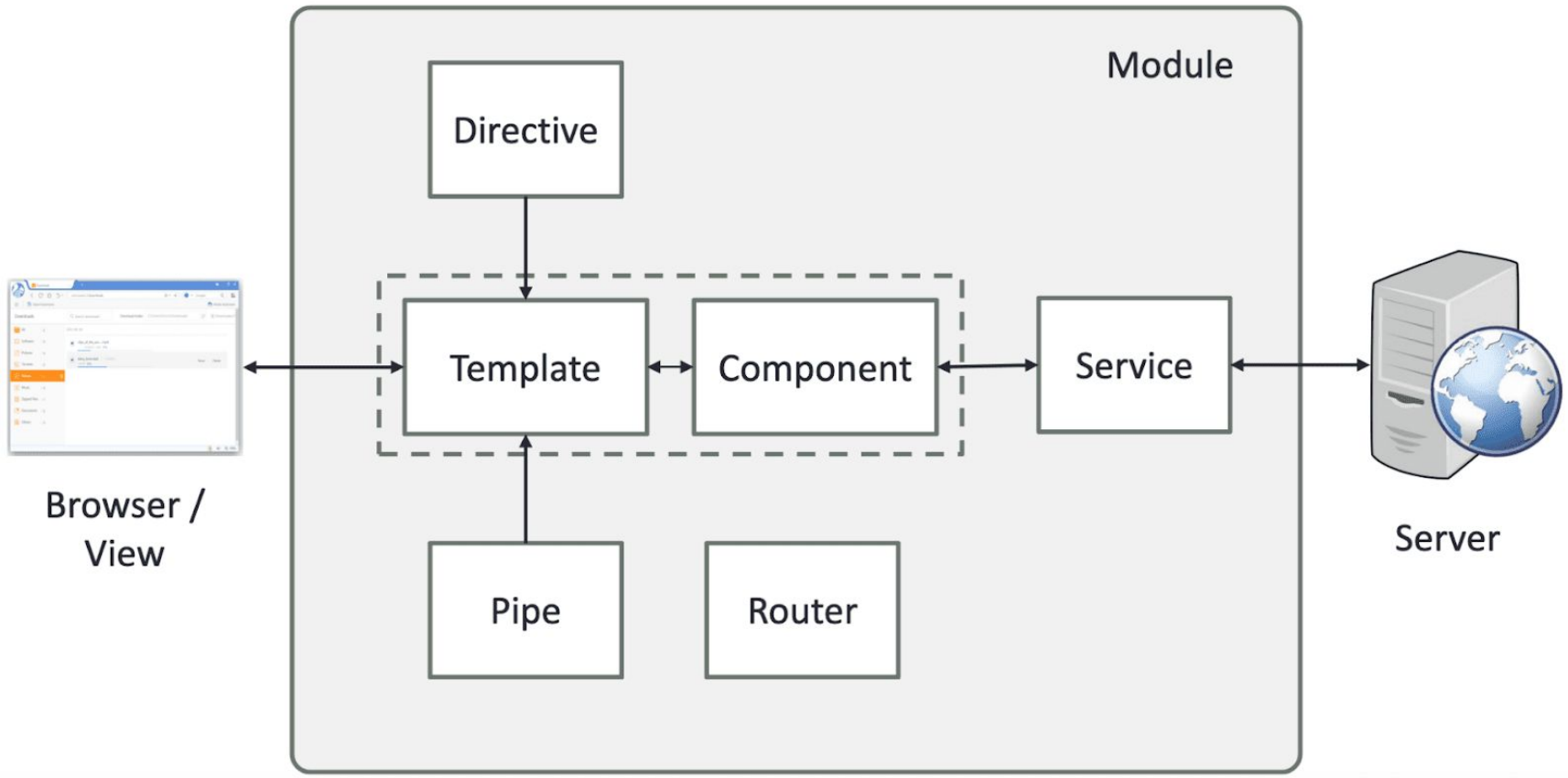
- Angular CLI commands

```
> ng new <project-name>

> ng serve

> ng build

> ng test

> ng generate <type> <name>

      where <type> can be one any one of:class |
      component | directive | interface | module | pipe
      | service | enum | guard
```

TypeScript

- Superset of JavaScript
  - Any valid JavaScript code is also valid TypeScript code
- Developed and maintained by Microsoft
- Primary language for Angular app development
- Does not run in the browser, it is “transpiled” into JS.
- Why TypeScript?
  - Static typing
    - Compile-time errors, provides IDE support, easier to debug
  - Object-oriented features
    - Classes, Interfaces, Properties, Generics, Decorators, …
  - Next gen JS features
    - Modules, Import, Export, …

Angular Building Blocks



Module

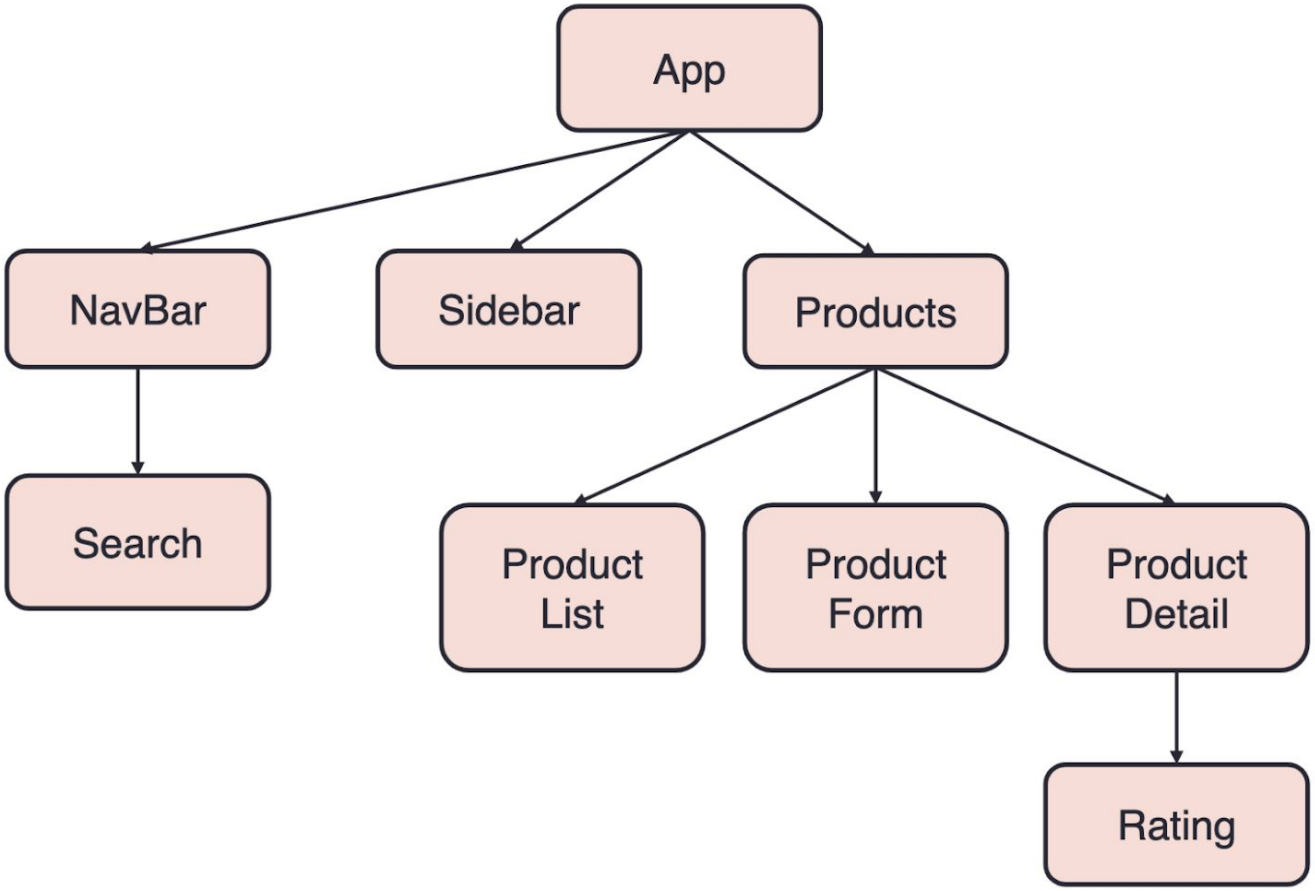
- Organizes an app into cohesive blocks of functionality
- A class marked by @NgModule decorator.
- Every Angular app has at least one module class, the ***root*** module

```
@NgModule({
   imports: [module1, module2, ...],
   declarations: [
      component(s), directive(s), pipe(s), ...
   ],
   providers: [service1, service2, ...],
   bootstrap: [AppComponent]
})
export class AppModule {}
```

Component

- Key feature of Angular apps
- Encapsulate the template, data and the behavior of a view
- Allows you to break a complex web page into smaller, manageable & reusable parts
- A Component has its own
  - Template – HTML markup
  - Style – CSS styles
  - Business logic (data and behavior) – TypeScript code
- App component
  - Root component
  - Other components are added to App component

Component


App
NavBar
Sidebar
Products
Search
Product List
Product Form
Product Detail
Rating

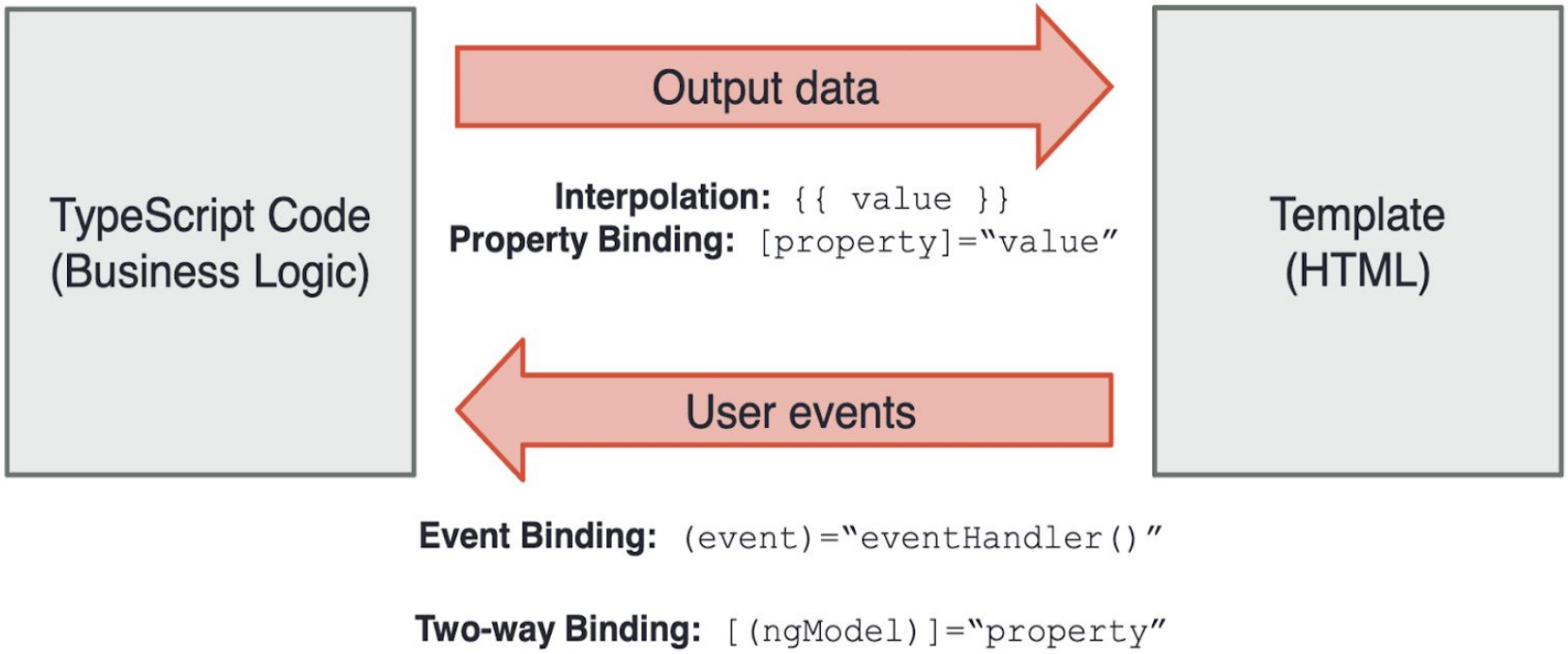
Decorator

- Extends the behavior of a class / function / property without explicitly modifying it.
- Attaches metadata to classes

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

@Component({
    selector: 'app-products',
    templateUrl: `products.component.html`,
    styleUrls: [`products.component.css`]
})
export class ProductsComponent {
   products: [];

   addProduct(product) {
      this.products.push(product)
   }
}
```

Data Binding

- Communication between the TypeScript code and the HTML template



Data Binding

- Interpolation
  - <h1>{{ product.name }}</h1>

Data Binding

- Property binding
  - <img [src]="product.imageUrl">

heroes.component.html

```
<img [src]="customer.imagePath" />
<button [disabled]="!isEnabled">Save</button>
<div [style.color]="textColor" [attr.aria-label]="text">..</div>
```

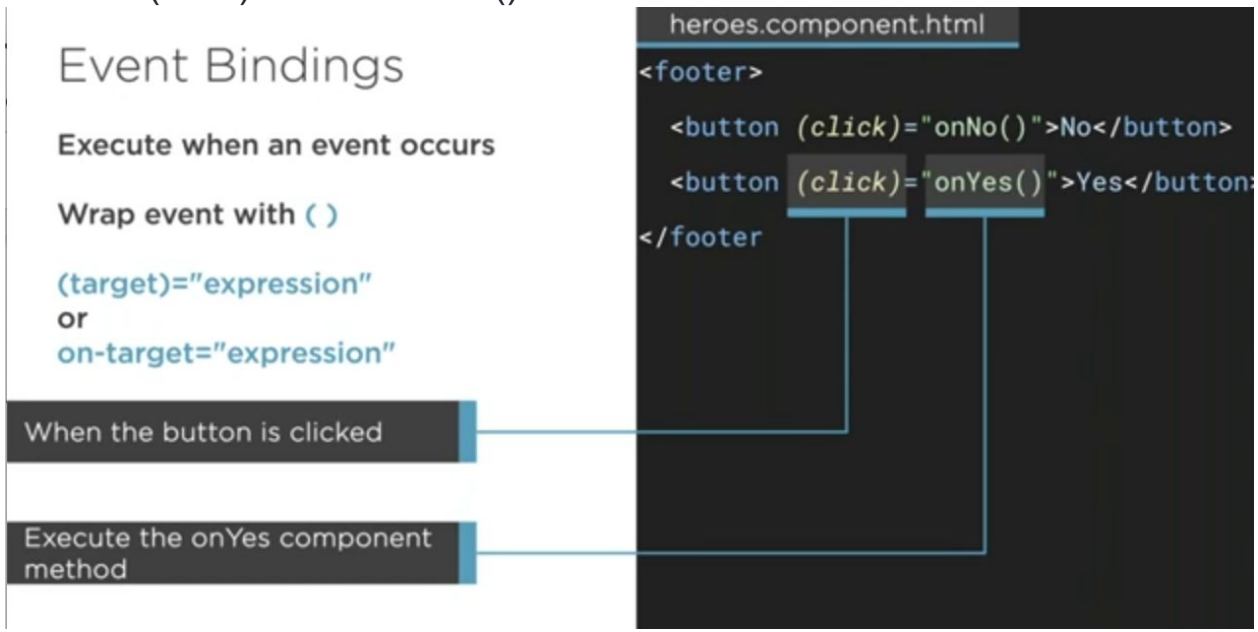
One Way Property Binding

Bind a DOM property to a value or expression using square brackets [ ]

Use dot syntax for nested properties and attr to bind to attributes

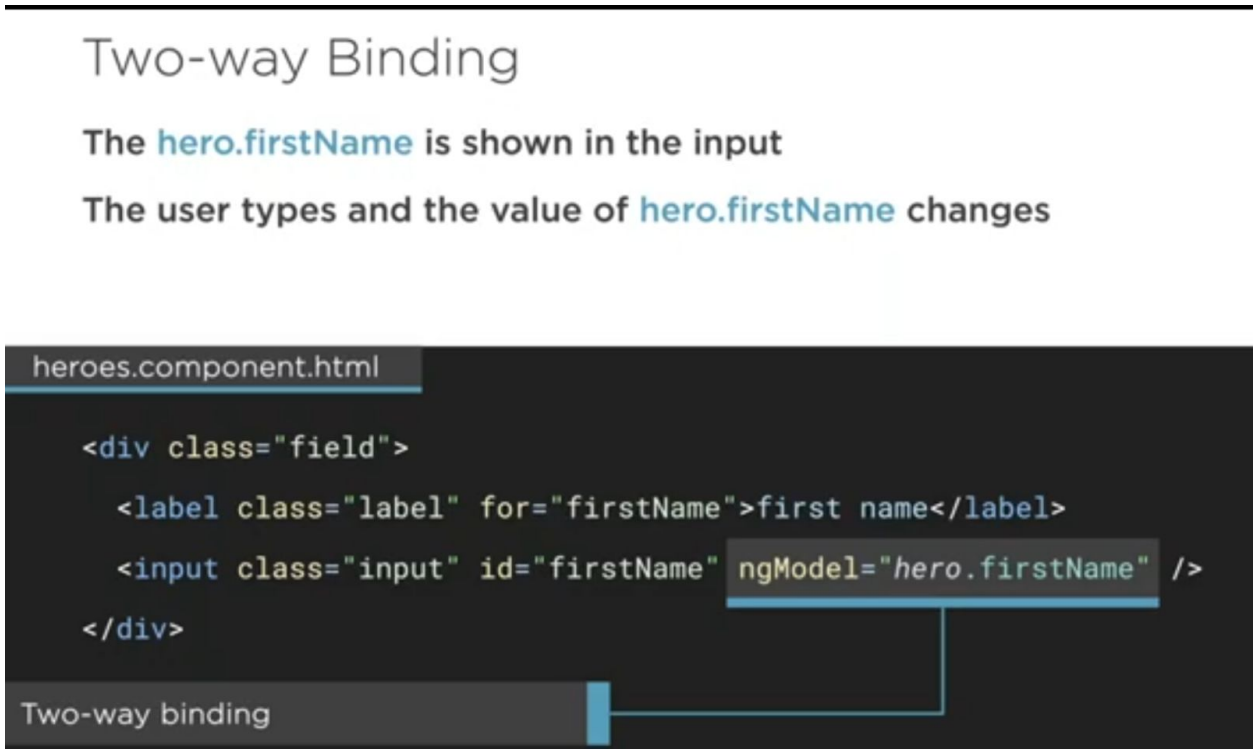
Data Binding

- <u>Event binding</u>
  - <button (click)="addProduct()">New</button>



Data Binding

- <u>Two-way data binding</u>
  - <input type="text" name="productName" [(ngModel)]="product.name">



Directive

- Helps you to extend HTML to support dynamic behavior
- Transforms the DOM according to the instructions given
- Can be built-in or custom
- Built-in directives
  - Structural directives
    - Have a leading *
    - Alter layout by adding, removing, and replacing elements in DOM
    - E.g. *ngIf, *ngFor
  - Attribute directives
    - Look like a normal HTML attribute
    - Modify the behavior of an existing element by setting its display value property and responding to change events
    - E.g. ngStyle, ngClass

Directive

- Structural Directive

  1.*ngFor

heroes.component.html

```
<tr *ngFor="let hero of heroes">
  <td>{{ hero.firstName }}</td>
  <td>{{ hero.lastName }}</td>
</tr>
```

Render a List

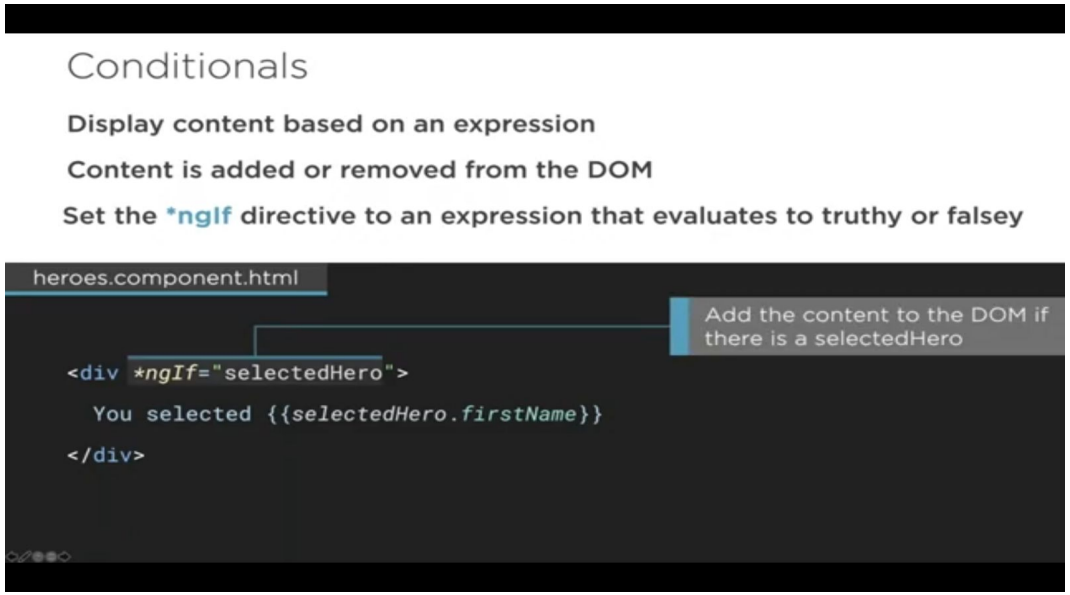
Iterate over a list of items in a model with *ngFor

Repeats the HTML content for each item in the list

Directive

- Structural Directive

  2.*ngIf



Directive

- Attribute Directive

  1.ngClass

heroes.component.html

```
<div [hidden]="!isVisible" [class.active]="isActive">...</div>

<div class="btn" [ngClass]="{foo:isActive, bar: isDisabled}">...</div>
```

If express is true

Apply this class

Class Bindings

Can use dot syntax

Or Can use class binding syntax :class="{classname: expression}"

Template Syntax

{{ model }}	interpolation
[property]	Bind to a DOM property
(event)	Bind to an event
ngModel	2 way data binding
*ngIf	Conditional element
*ngFor	Loop

Pipe

- Takes in data as input and transforms (formats) it to a desired output
- Does not modify the underlying data
- Some examples of built-in pipes
  - lowercase
  - uppercase
  - date
  - currency
  - percent

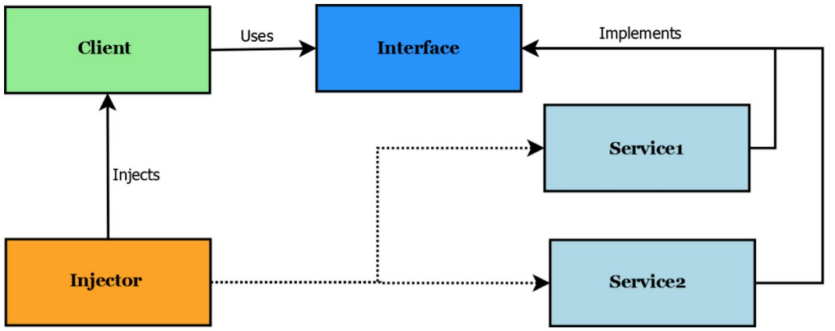
Service

- A class with a narrow, well-defined purpose
  - Shares data and/or functionality across components
  - Encapsulates any non-UI logic
    - For e.g.
      - Logging service
      - Data service
- Components consume services through Dependency Injection.

Dependency Injection

Dependency Injection (DI) is a core concept of Angular and allows a class to receive dependencies from another class. It is an important application design pattern. Angular has its own DI framework, which is typically used in the design of Angular applications to increase their efficiency and modularity.

Dependencies are services or objects that a class needs to perform its function. DI is a coding pattern in which a class asks for dependencies from external sources rather than creating them itself.

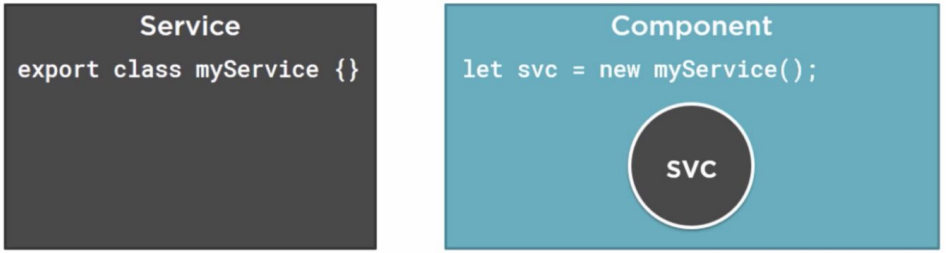


All the magic will be done behind the scene, all we have to do is create the class and provided in a root and injected into the constructor, service will be found.

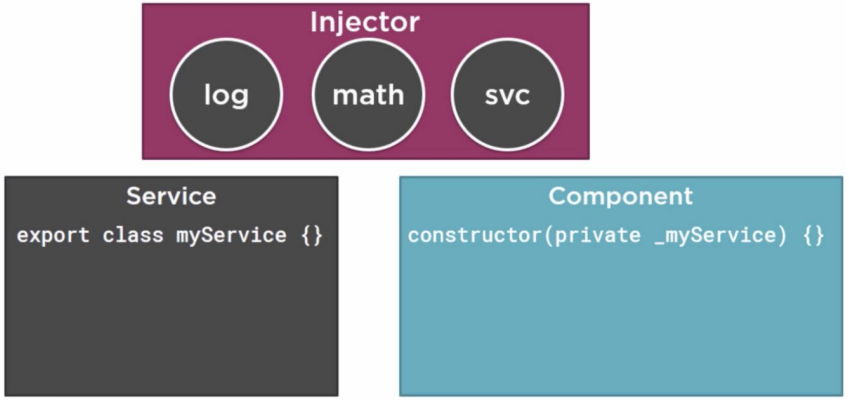
Dependency Injection

A coding pattern in which a class receives the instances of objects it needs (called dependencies) from an external source rather than creating them itself.

1.Without Dependency Injection



2.With Dependency Injection



Router

- Enables navigation from one view to another
- Maps a URL path to a component
- AppModule
  - Import RouterModule and Routes from ‘@angular/router’
  - Define array of routes for the app
  - Register routes with RouterModule using ‘forRoot()’ method
  - Add RouterModule to ‘imports’ array of AppModule
- AppComponent template
  - Add <router-outlet> element
- NavComponent template
  - Use ‘routerLink’ attribute directive in <a> tag to navigate to a specific route
    - <a routerLink="/students">Students

Server Communication

- HttpClient
  - Offers a simplified client HTTP API
  - Internally uses ‘XMLHttpRequest’ interface exposed by browsers
- AppModule
  - Import HttpClientModule from ‘@angular/common/http’
  - Add HttpClientModule to imports array of @NgModule decorator
- DataService
  - Import HttpClient from ‘@angular/common/http’
  - Inject HttpClient instance into constructor
  - Use following methods:
    - get()
    - post()
    - put() / patch()
    - delete()
  - Above methods return Observable<T>


Q&A


Thank you