

# Angular

Superheroic framework



# Training Agenda

- ☐ TypeScript : Introduction
- ☐ Angular : Introduction
- ☐ Angular Building Blocks
  - Component
  - Modules
  - Directives
  - Services
  - Pipes
- ☐ Data Binding
- ☐ Forms
- ☐ HTTP
- ☐ Routing
- ☐ Authentication / Authorization
- ☐ Security
- ☐ Deployment

Angular is easy

ES2015+ features

Corporate Care-taker

Performance and Mobile

Project architecture and Maintenance

Component based architecture

# Why Angular ?

# AngularJS vs. Angular

Description	AngularJS	Angular
Nested scopes (\$scope, watches)	Used heavily	Gone
Directive vs controllers	Used together	Component directives
Component and service implementations	Functions	ES6 classes
Module system	Angular's modules	ES6 module system
Transpilation	Not used	Typescript

# 01

Angular is a structural framework for dynamic (SPA) web apps.

# 02

Extension of standard HTML markups.

# 03

Keeps the front-end clean; separation of concerns.

# What is Angular ?

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Microsoft extension for JS

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Object oriented features

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ES6+ features

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Type definition

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Angular itself programmed in TS

Why Typescript ?

# TypeScript features

- Classes & Inheritance
- Module system
- Arrow functions
- Template String
- Constants and block scopes
- Destructuring
- Spread & Rest operators
- Decorators
- Additional types

# Understanding Angular Environment Setup

- Node
- TypeScript
- SystemJS / Webpack
- Angular Packages
- RxJS
- ZoneJS



# Components

- A component controls a patch of screen real estate that we could call a view, and declares reusable UI building blocks for an application.
- Passing data into components
  - Property binding
  - Event binding
  - Two way data-binding
- Nested components
- Data projection
- Component types :
  - Smart components
  - Dumb components

*ngOnChanges* - called when an input binding value changes

*ngOnInit* - after the first *ngOnChanges*

*ngDoCheck* - after every run of change detection

*ngAfterContentInit* - after component content initialized

*ngAfterContentChecked* - after every check of component content

*ngAfterViewInit* - after component's view(s) are initialized

*ngAfterViewChecked* - after every check of a component's view(s)

*ngOnDestroy* - just before the component is destroyed

# Component Life Cycle

# Directives

- A Directive modifies the DOM to change appearance, behavior or layout of DOM elements.
- Directive Types :
  - *Component Directive* : directive with template
  - *Attribute Directive* : directives that change the behavior of a component or element but don't affect the template
  - *Structural Directives* : directives that change the behavior of a component or element by affecting how the template is rendered

# Pipes

- Pipes are used to filter/format data for template
- Built-in Pipes :
  - Currency
  - Date
  - Uppercase
  - Lowercase
  - Number
  - JSON
  - Percent
  - Async
- Custom pipes
  - Pure
  - Impure

# Forms

## Template Driven Forms

- Angular infers the Form Object from the DOM
- App logic resides inside the template

## Model Driven Forms

- Form is created programmatically and sync with the DOM
- App logic resides inside the component
- Use of FormControl, FormGroup, FormBuilder

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Angular's DI system is controlled through **@NgModule**.

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Services implement DI concepts in an Angular App.

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Services are simple ES6 classes.

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Services are registered with Angular App using providers.

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Services are Singleton.

## DI & Services

# Hierarchical Injector

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Root Module	Same instance of service is available Application-wide
Root Component	Same instance of service is available for all components (but not for other services)
Other Component	Same instance of service is available for the component and it's own child components

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# HTTP

- Http is Angular's mechanism for communicating with a remote server over HTTP.
- To make Http available everywhere in the app :



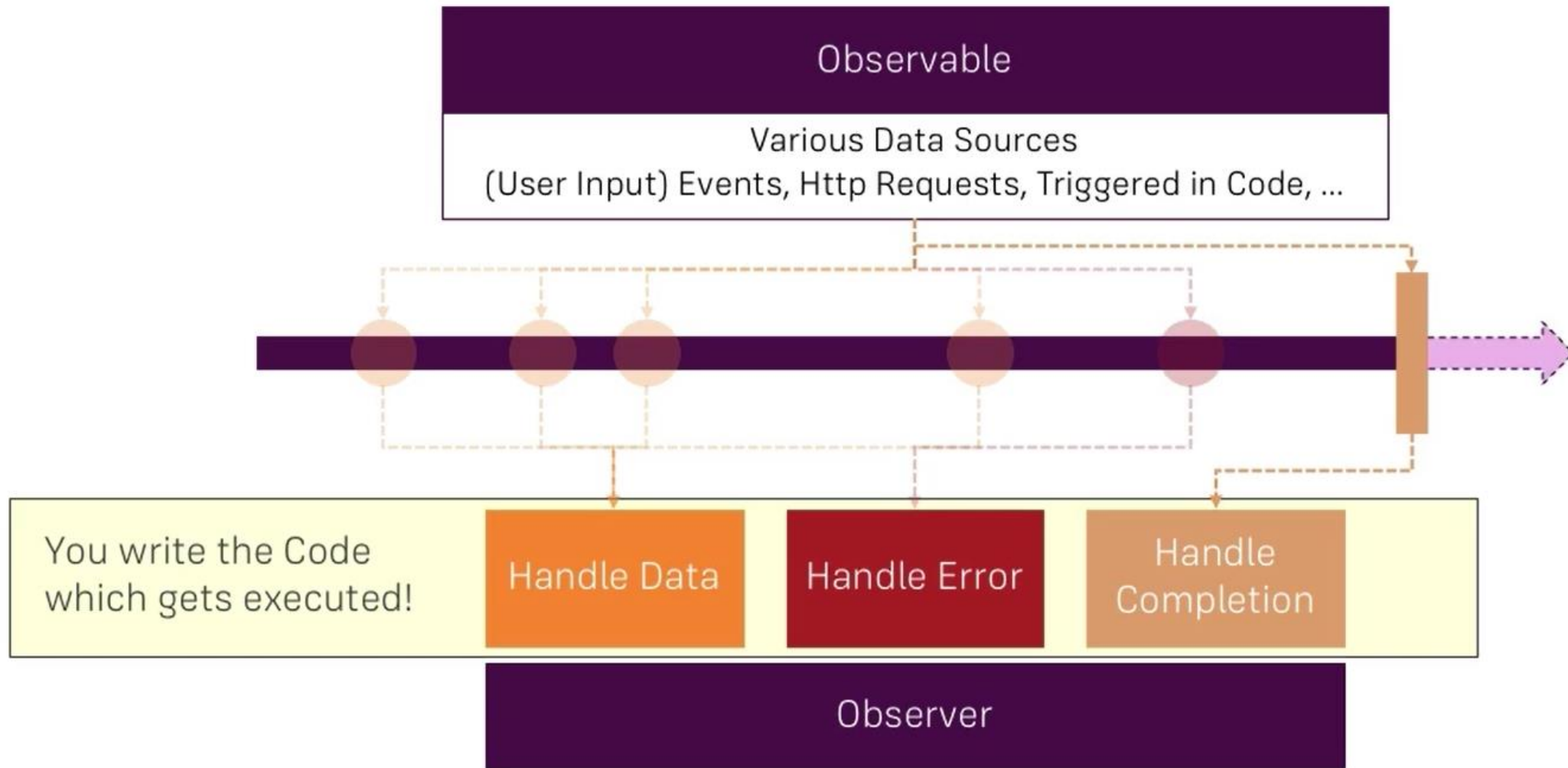
Open the root  
Module

Import the  
HttpModule symbol  
from @angular/http

Add it to the  
@NgModule.imports  
array



# Observables : An Overview



# HttpClient

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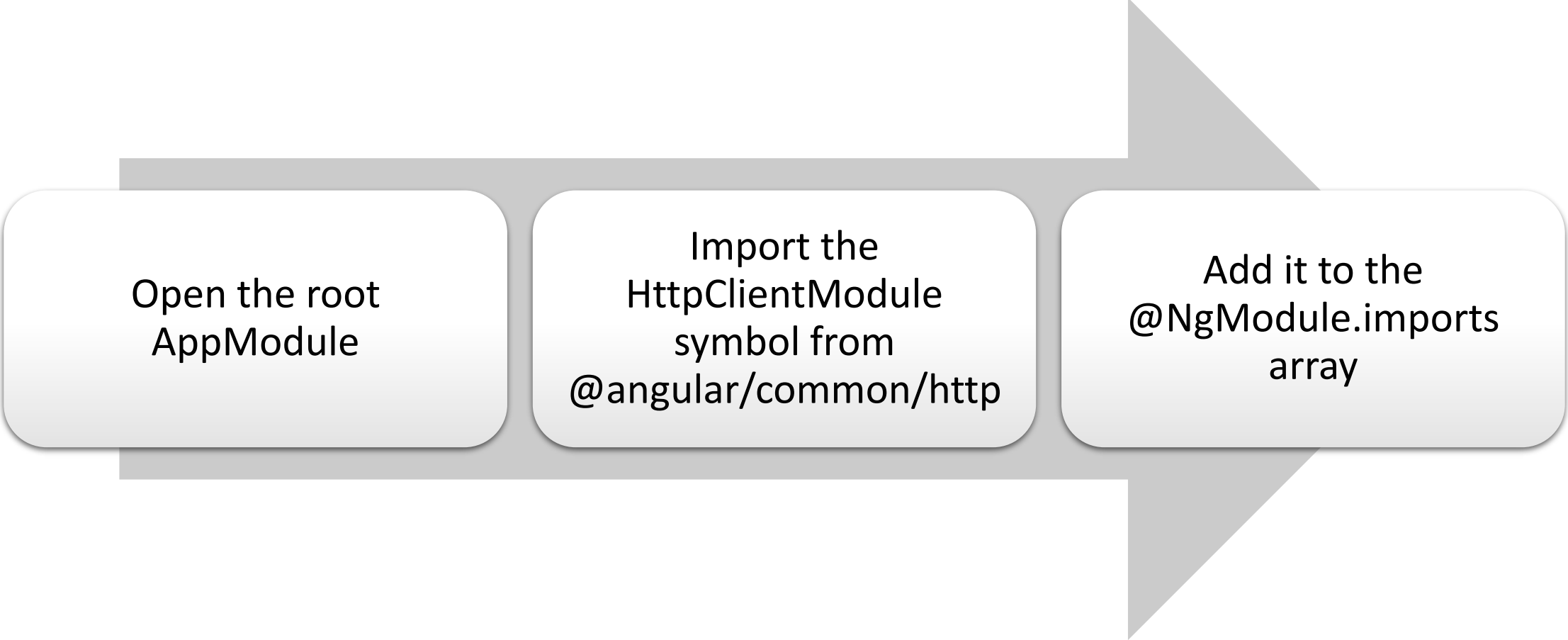
The HttpClient in @angular/common/http offers a simplified client HTTP API for Angular applications that rests on the XMLHttpRequest interface exposed by browsers.

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Benefits of HttpClient:	Typed request and response objects
	Request and response interception
	Observable APIs
	Streamlined error handling.

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# HttpClient : Unlocking



Open the root  
AppModule

Import the  
HttpClientModule  
symbol from  
`@angular/common/http`

Add it to the  
`@NgModule.imports`  
array

Routing allows to:

- Maintain the state of the application
- Implement modular applications
- Implement the application based on the roles (certain roles have access to certain URLs)

5 steps routing:

- Checking the base href tag in index file
- Configuring routes with components
- Tell angular about routing app
- Setting up the routing links
- Provide space on template to load the component

# Routing

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Programmatic navigation

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Child routing

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Routes with parameters

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Route guard (Authentication)

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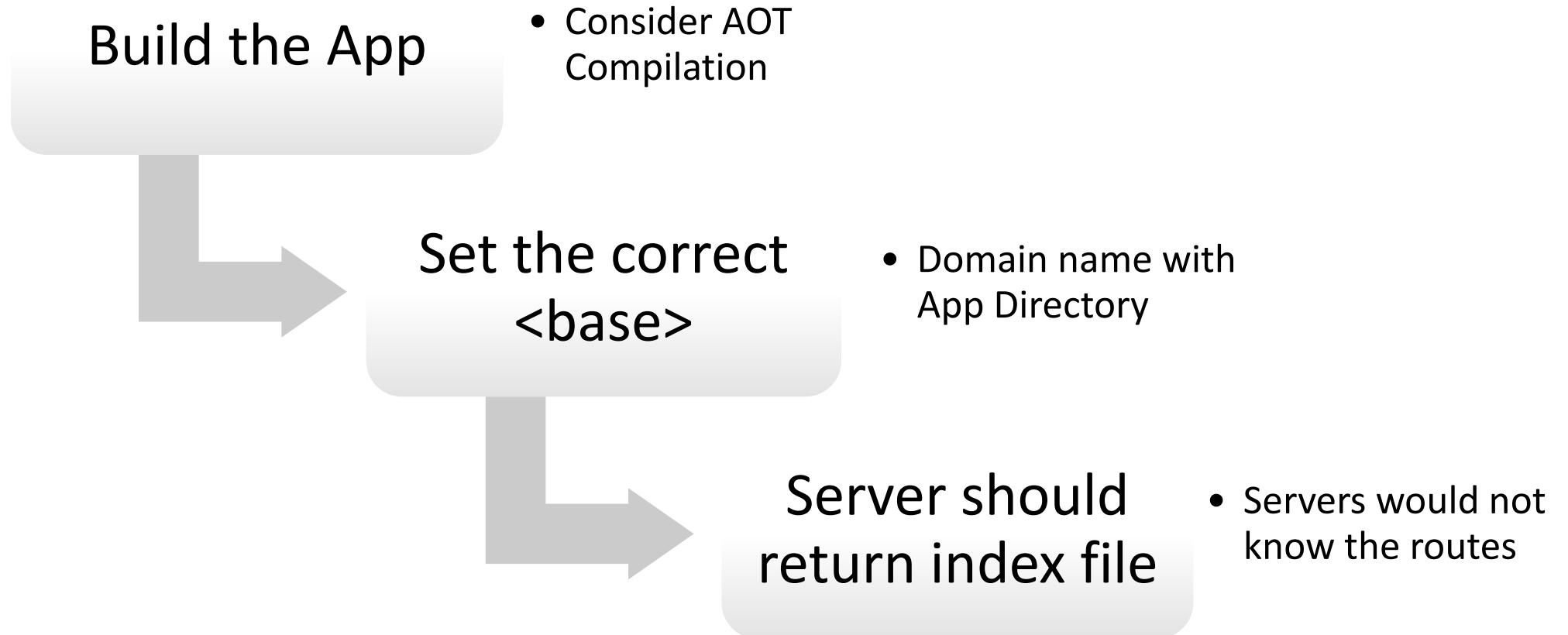
Query Parameters

Routing  
(Cntd..)

# Modules

- A module is a mechanism to group components, directives, pipes and services that are related
- Module Types -
  - Root Module : one per application
  - Feature Module : depends on application features
- Modules can be instantiate lazily

# Deployment Steps :



# Debugging Angular Apps

- Prevent Bugs with TypeScript
- Using Debugger Statements to Stop JavaScript Execution
- Inspect Data with the JSON pipe
- Console Debugging
- Augury Chrome Plugin
- Debugging RxJS Observables using 'do' operator



# Securing Angular Apps

- Best Practices :
  - Keep current with the latest Angular library releases
  - Don't modify your copy of Angular.
  - Avoid Angular APIs marked in the documentation as “*Security Risk.*”
- Preventing cross-site scripting (XSS)
  - Angular treats all values as untrusted by default.
  - Angular sanitizes and escapes untrusted values.
    - Interpolated content is always escaped
    - Angular recognizes the *binded value* as unsafe and automatically sanitizes it
  - Never generate template source code by concatenating user input and templates, instead use the offline template compiler (template injection)

# Securing Angular Apps

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## Avoid direct use of DOM APIs

The built-in browser DOM APIs don't automatically protect you from security vulnerabilities

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## Content security policy

To enable CSP, configure your web server to return an appropriate Content-Security-Policy HTTP header

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## Use the offline template compiler

Use the offline template compiler in production deployments; don't dynamically generate templates.

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## Server-side XSS protection

Don't generate Angular templates on the server side using a templating language; doing this carries a high risk of introducing template-injection vulnerabilities.

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# Securing Angular Apps

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**Trusting Safe Values :** To mark a value as trusted, inject *DomSanitizer* and call one of the following methods -

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bypassSecurityTrustHtml

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bypassSecurityTrustScript

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bypassSecurityTrustStyle

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bypassSecurityTrustUrl

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bypassSecurityTrustResourceUrl

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**HTTP-level vulnerabilities :** Angular has built-in support to help prevent two common HTTP vulnerabilities -

Cross-Site Request Forgery (CSRF or XSRF)

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Cross-Site Script Inclusion (XSSI) / JSON vulnerability

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# Optimizing Angular App Performance

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Using onPush change detection strategy

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Using trackBy function

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Avoid computing values in templates

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Using lazy loading

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Disable change detection (if required)

# References

## Books

- Rangle's Angular2 Training Book
- Ngbook2

## Web

- <http://angular.io>
- <http://rangle.io>
- <http://www.egghead.io>
- <http://www.youtube.com>