



# What's new in Angular

2016-12-08





Angular 1.x



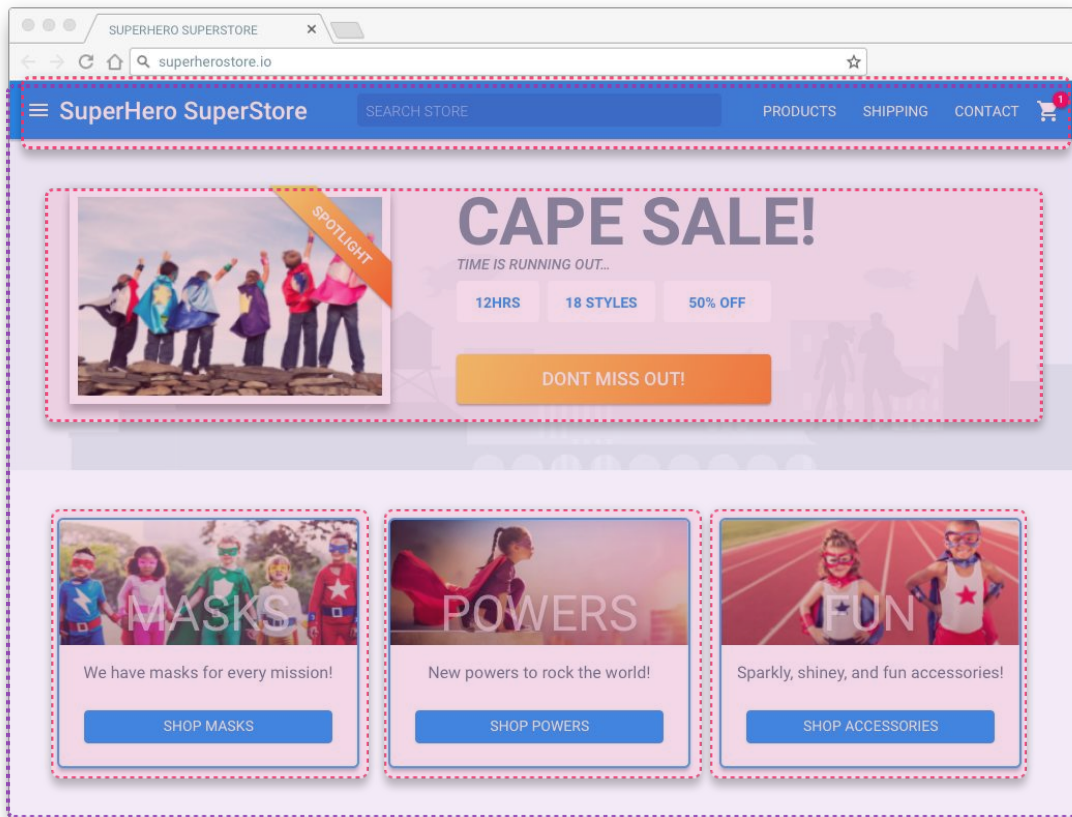
Angular



# Component Architecture



# Application Composition



← NAV COMPONENT

← SALE COMPONENT

← PRODUCT COMPONENTS

← APP COMPONENT



# Application Composition

## PRODUCT COMPONENT

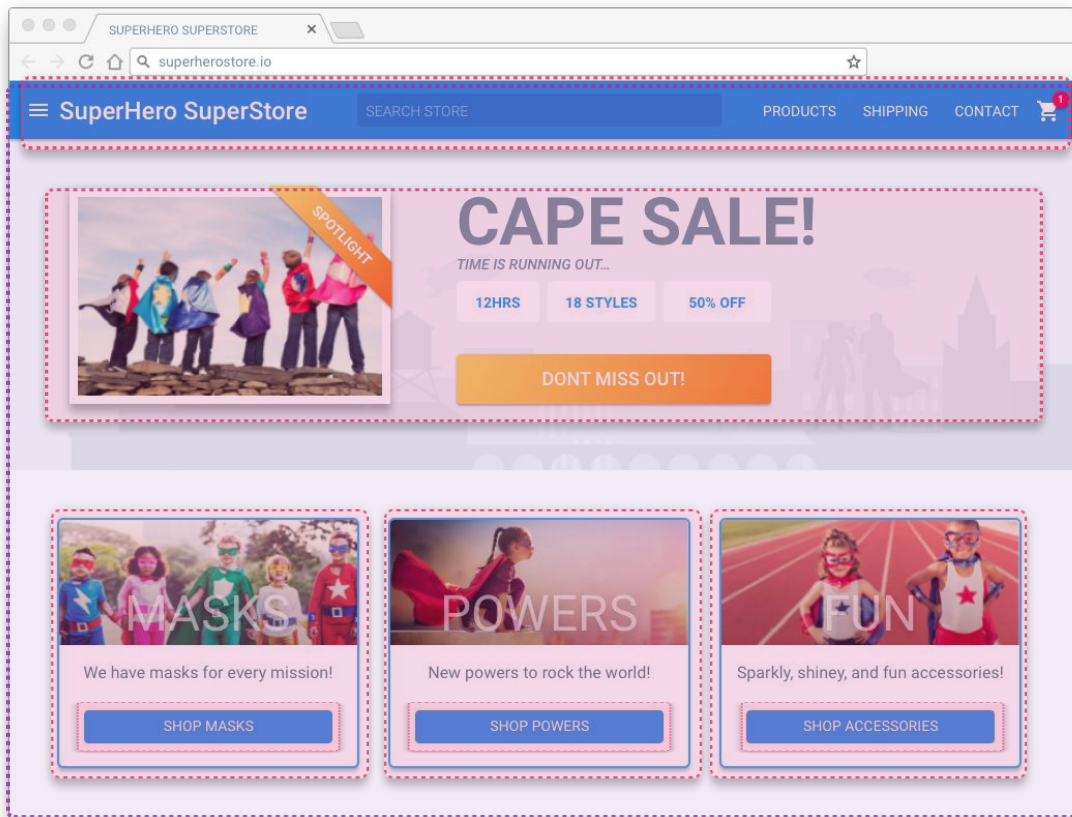


## BUTTON COMPONENT





# Application Composition



← NAV COMPONENT

← SALE COMPONENT

← PRODUCT COMPONENTS

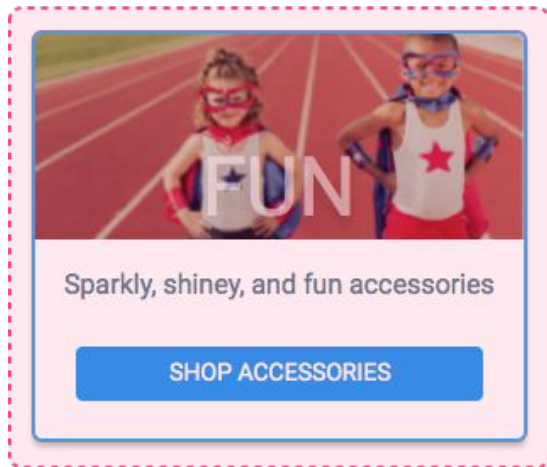
← BUTTON COMPONENTS

← APP COMPONENT



# Components

## PRODUCT COMPONENT



=

HTML  
< >

+

CSS  
[ ]

+

Class  
{ }



## Standard HTML

app/hero-list.component.html


```
<h2>Hero List</h2>

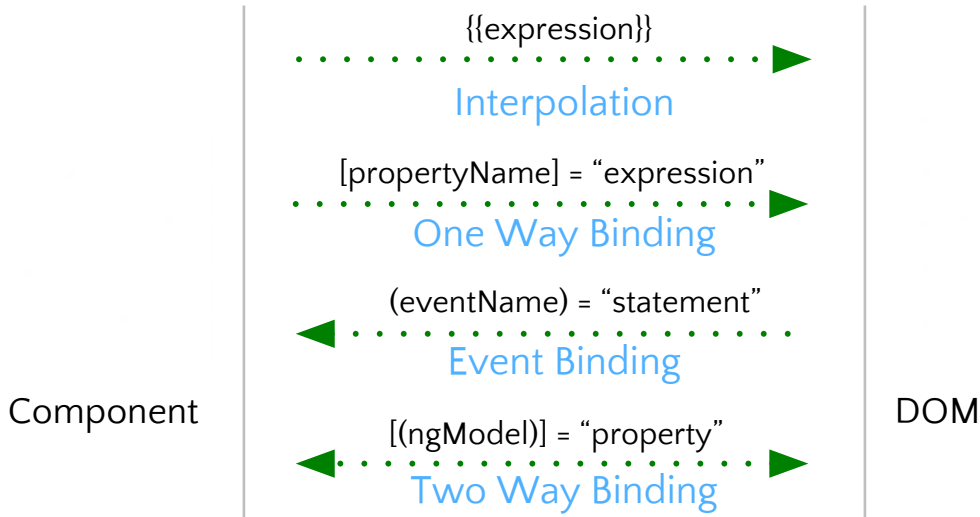
<p><em>Pick a hero from the list</em></p>
<ul>
  <li *ngFor="let hero of heroes" (click)="selectHero(hero)">
    {{hero.name}}
  </li>
</ul>

<hero-detail *ngIf="selectedHero" [hero]="selectedHero"></hero-detail>
```

# Templates

 HTML


 **Property &  
Event Binding**



app/hero-list.component.html

```
...  
<li *ngFor="let hero of heroes" (click)="selectHero(hero)">  
  {{hero.name}}  
</li>  
...  
<hero-detail *ngIf="selectedHero" [hero]="selectedHero"></hero-detail>
```

 HTML

 Property &  
Event Binding

 Directives

## Structural

app/hero-list.component.html

```
...  
<li *ngFor="let hero of heroes" (click)="selectHero(hero)">  
  {{hero.name}}  
</li>  
...  
<hero-detail *ngIf="selectedHero" [hero]="selectedHero"></hero-detail>
```


## Attribute

app/hero-detail.component.html

```
<input [(ngModel)]="hero.name">
```

# Templates

 HTML

 Property &  
Event Binding

 Directives

 Component

app/hero-list.component.html

```
<h2>Hero List</h2>

<p><em>Pick a hero from the list</em></p>
<ul>
  <li *ngFor="let hero of heroes" (click)="selectHero(hero)">
    {{hero.name}}
  </li>
</ul>
```

**Component Class**

app/hero-list.component.ts

```
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; }
}
```



# Component Architecture



## Service Composition

## Just A Class

app/hero.service.ts

```
@Injectable()
export class HeroService {
  constructor (
    private http: Http,
    private errorHandler: ErrorHandler) { }
  getHeroes () {
    return this.http.get('app/heroes')
      .map(res => res.json().data)
      .catch(this.errorHandler.handle);
  }
}
```



# Component Architecture

Service Composition

Dependency Injection

## Injector

CrisisService



HeroService



PowerService



VillianService



app/hero-list.component.html

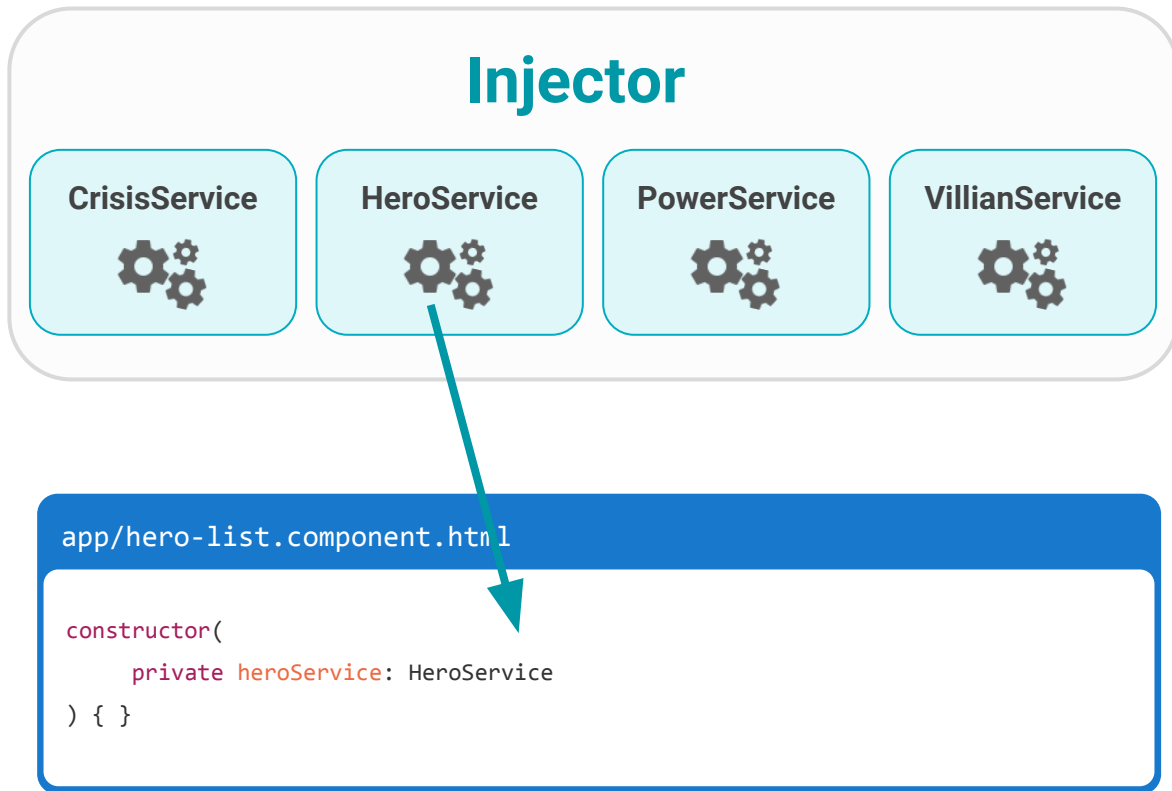
```
constructor(  
  private heroService: HeroService  
) { }
```



# Component Architecture

Service Composition

Dependency Injection

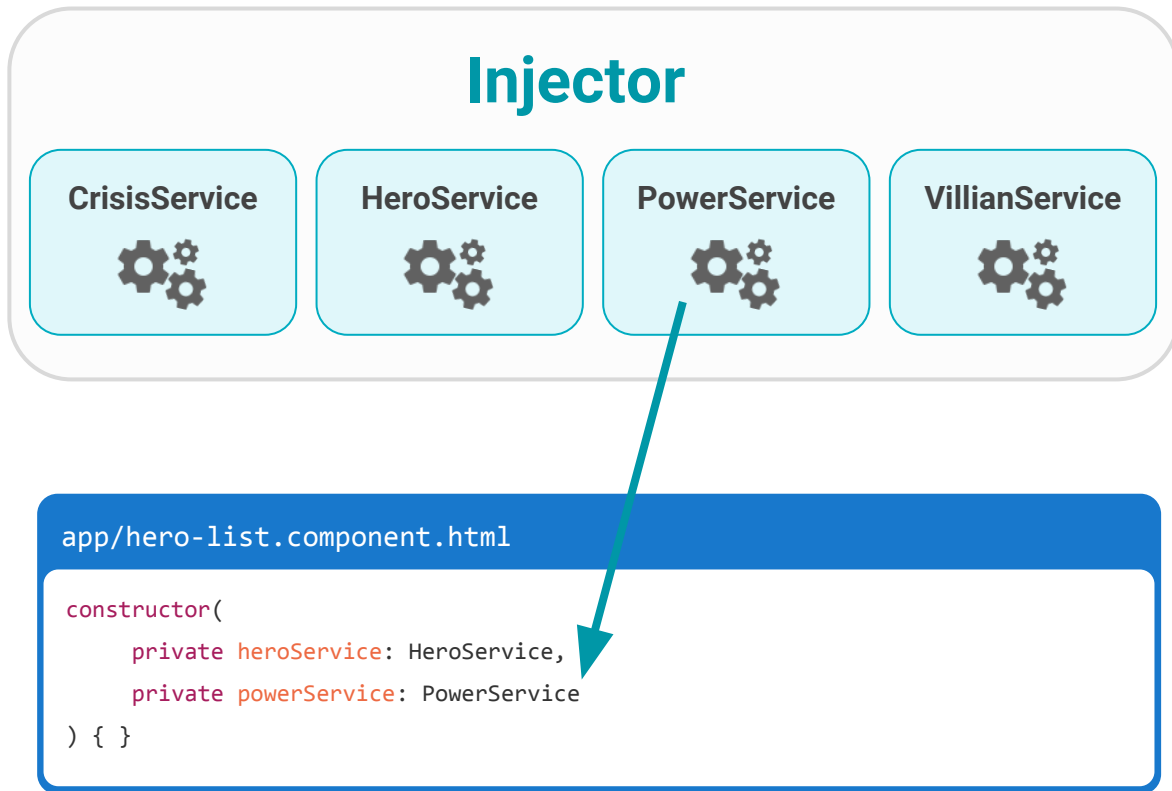




# Component Architecture

Service Composition

Dependency Injection







# Component Architecture

 Service Composition

 Dependency Injection

 **Routing**

app/app.module.ts

```
@NgModule({  
  imports: [  
    RouterModule.forRoot([  
      { path: 'crisis-center', component: CrisisListComponent },  
      { path: 'heroes', component: HeroListComponent }  
    ])  
    ...  
  ],  
  ...  
});
```



# Component Architecture

 Service Composition

 Dependency Injection

 **Routing**

app/app.component.ts

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

@Component({
  selector: 'my-app',
  template: `
    <h1>Angular Router</h1>
    <nav>
      <a routerLink="/crisis-center">Crisis Center</a>
      <a routerLink="/heroes">Heroes</a>
    </nav>
    <router-outlet></router-outlet>
  `
})
export class AppComponent {}
```



# Component Architecture

 Service Composition

 Dependency Injection

 **Routing**

## Component Router

Crisis Center

Heroes



# Angular Platform

Angular Material

i18n

Forms

Animations

ngUpgrade



# Angular Everywhere

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# Scenarios

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**PWA**

Progressive Web Apps



Mobile

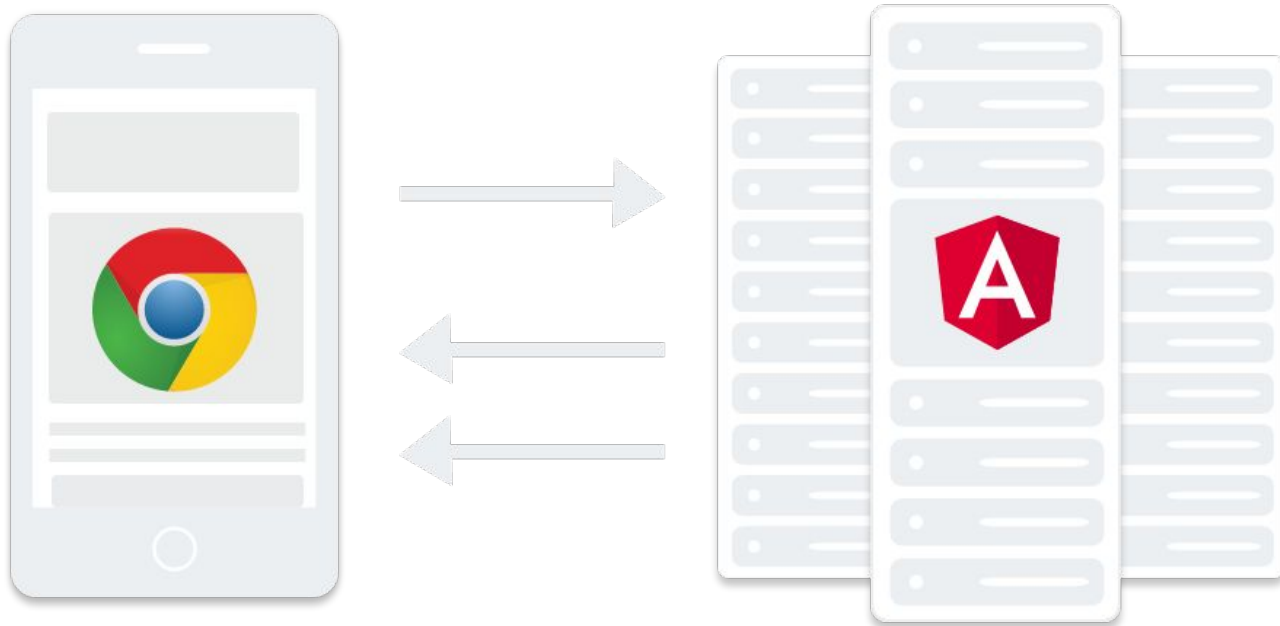


Desktop



# Server Scenarios

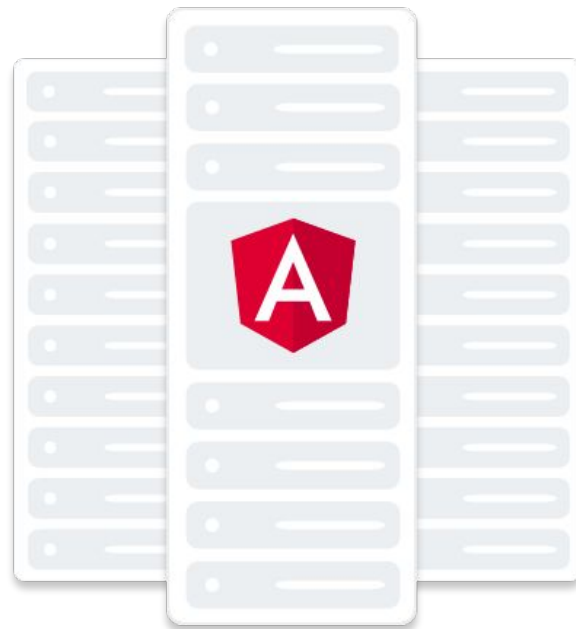
---





# Server Scenarios

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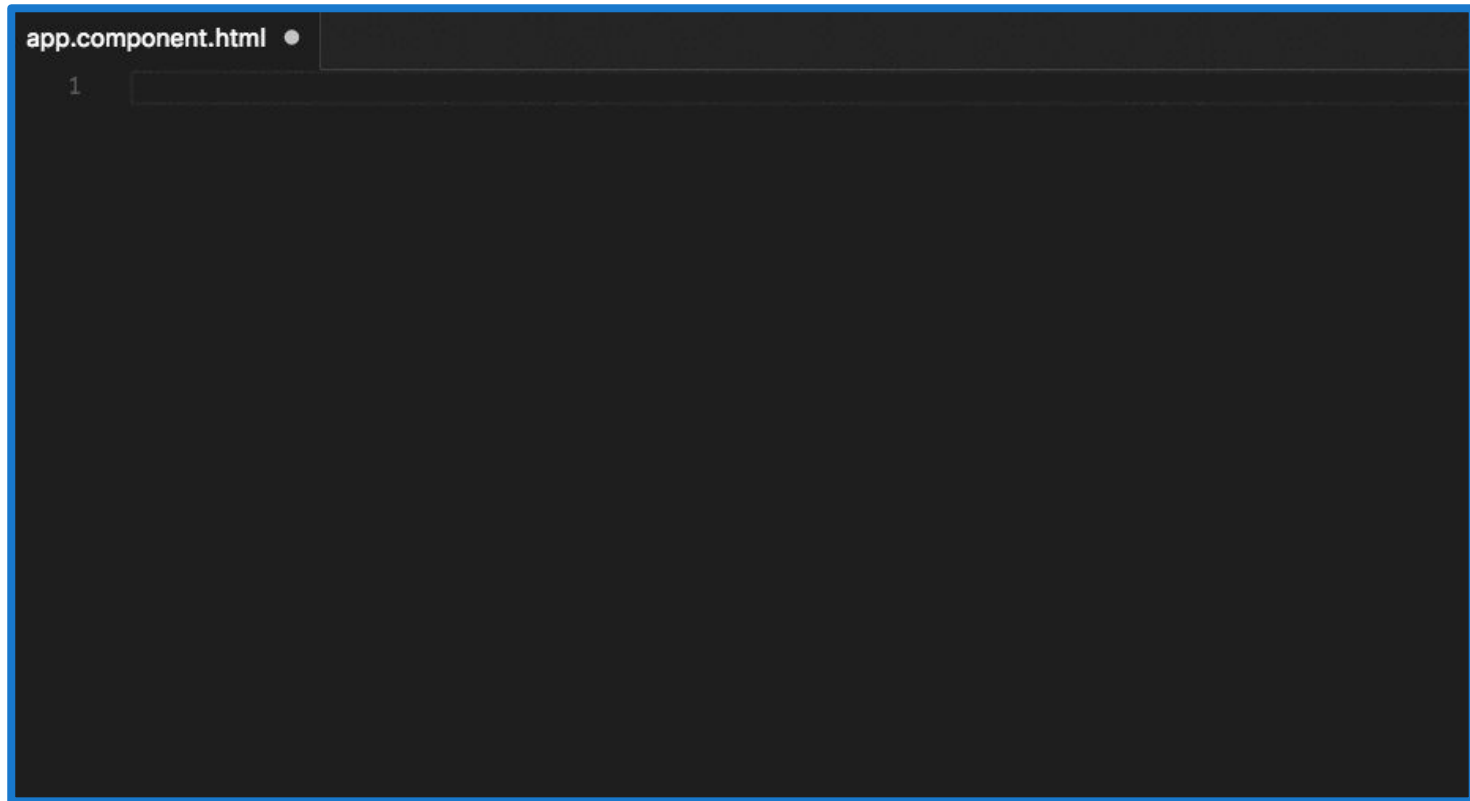
# TS

- Superset of Javascript
- Because Types!!
- Readability
- Familiarity
- Tooling



# Language Services

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# Angular CLI

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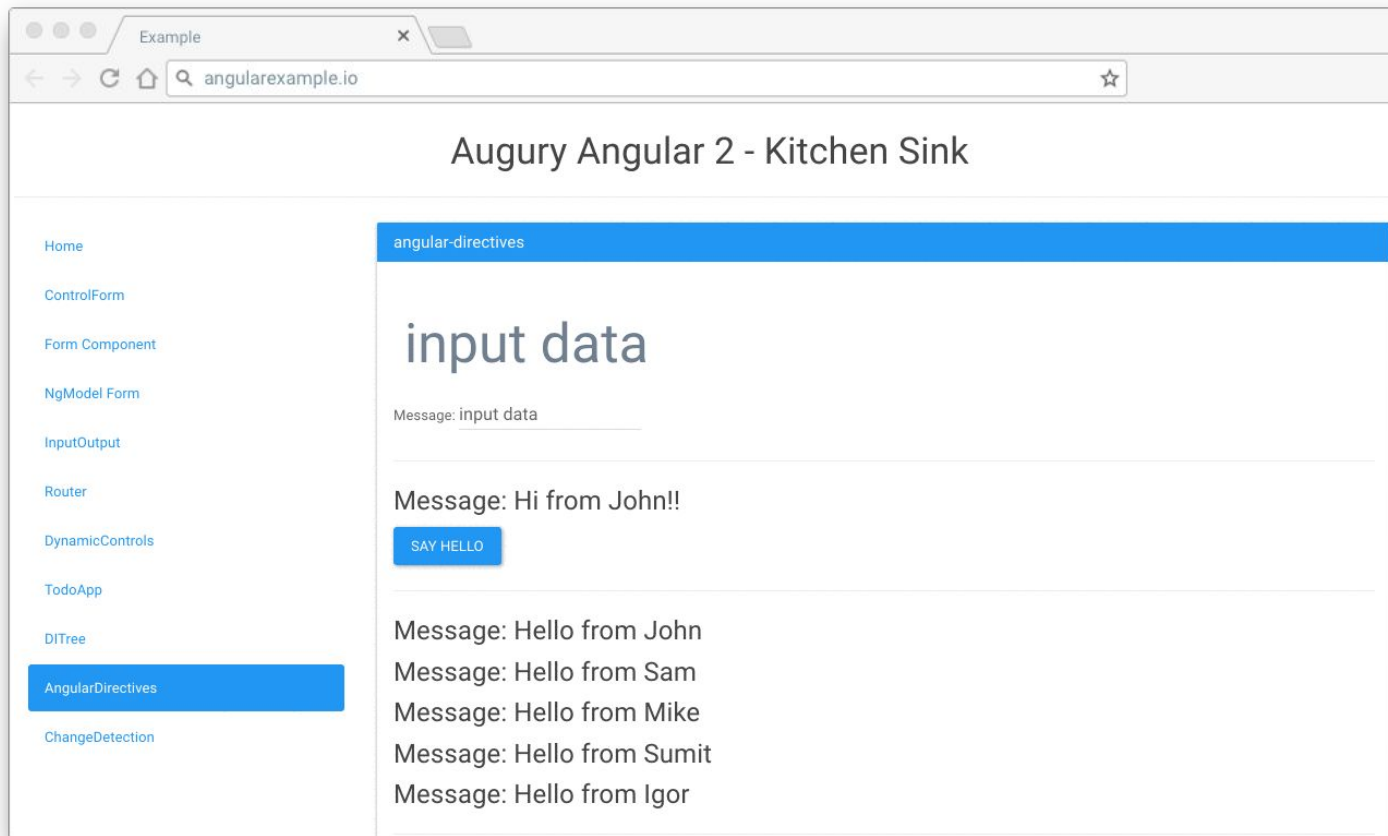


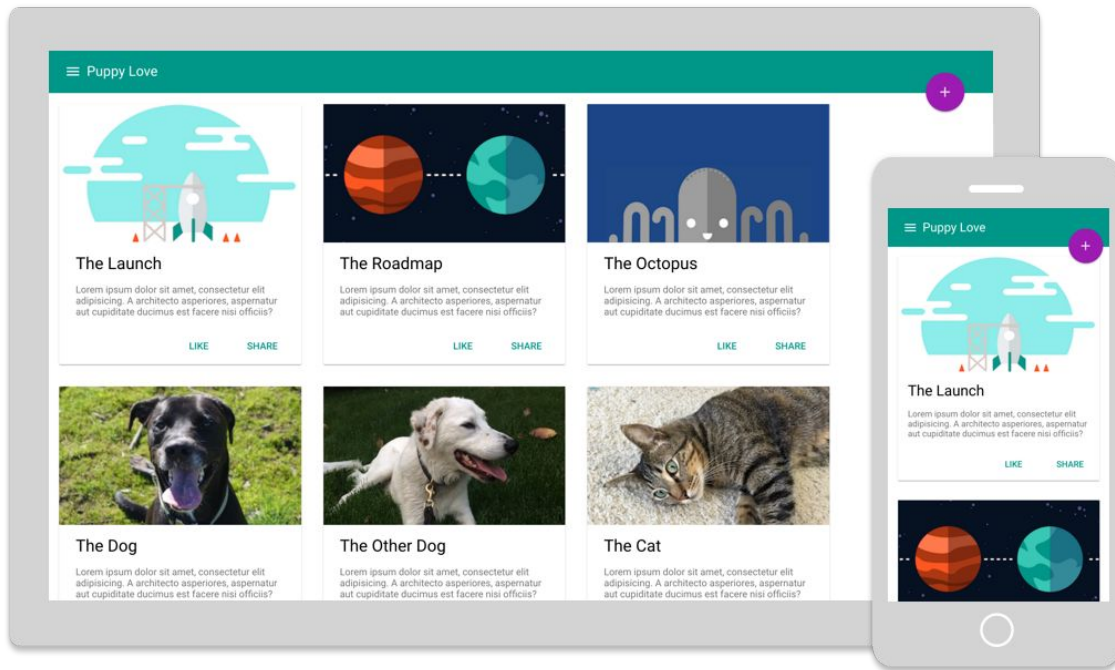
# Protractor

```
Console2 - npm
File Edit View Help
Console2 - npm Console2 Console2 Console2
1:37:50] Using ChromeDriver directly...
1:37:50] [launcher] Running 1 instances of WebDriver
1:37:52] AppDir: public/docs/_examples/quickstart/ts
1:37:52] Suite: QuickStart E2E Tests
1:37:53] passed - should display: My First Angular 2 App
1:37:53] Suite passed: QuickStart E2E Tests
1:37:53] [launcher] 0 instance(s) of WebDriver still running
1:37:53] [launcher] chrome #01 passed
1:37:53] completed: protractor C:/github/angular.io.ideablade/public/docs/_examples/quickstart/protractor.config.js --params.appDir=public/docs/_examples/quickstart/ts --params.outputFile=C:/github/angular.io.ideablade/protractor-results.txt
1:37:53] running: npm run http-server:e2e -- -s
1:37:53] running: npm run tsc
1:37:53] completed: npm run http-server:e2e -- -s
1:37:54] angular2-examples-master@1.0.0 tsc C:/github/angular.io.ideablade/public/docs/_examples/router/ts tsc
1:37:54] angular2-examples-master@1.0.0 http-server:e2e C:/github/angular.io.ideablade/public/docs/_examples/router/ts http-server "-s"
```



# Angular Augury





# Live Coding Demo



Kara Erickson





# Performance

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# Performance

## SIZE

Smaller

Lazy

## SPEED

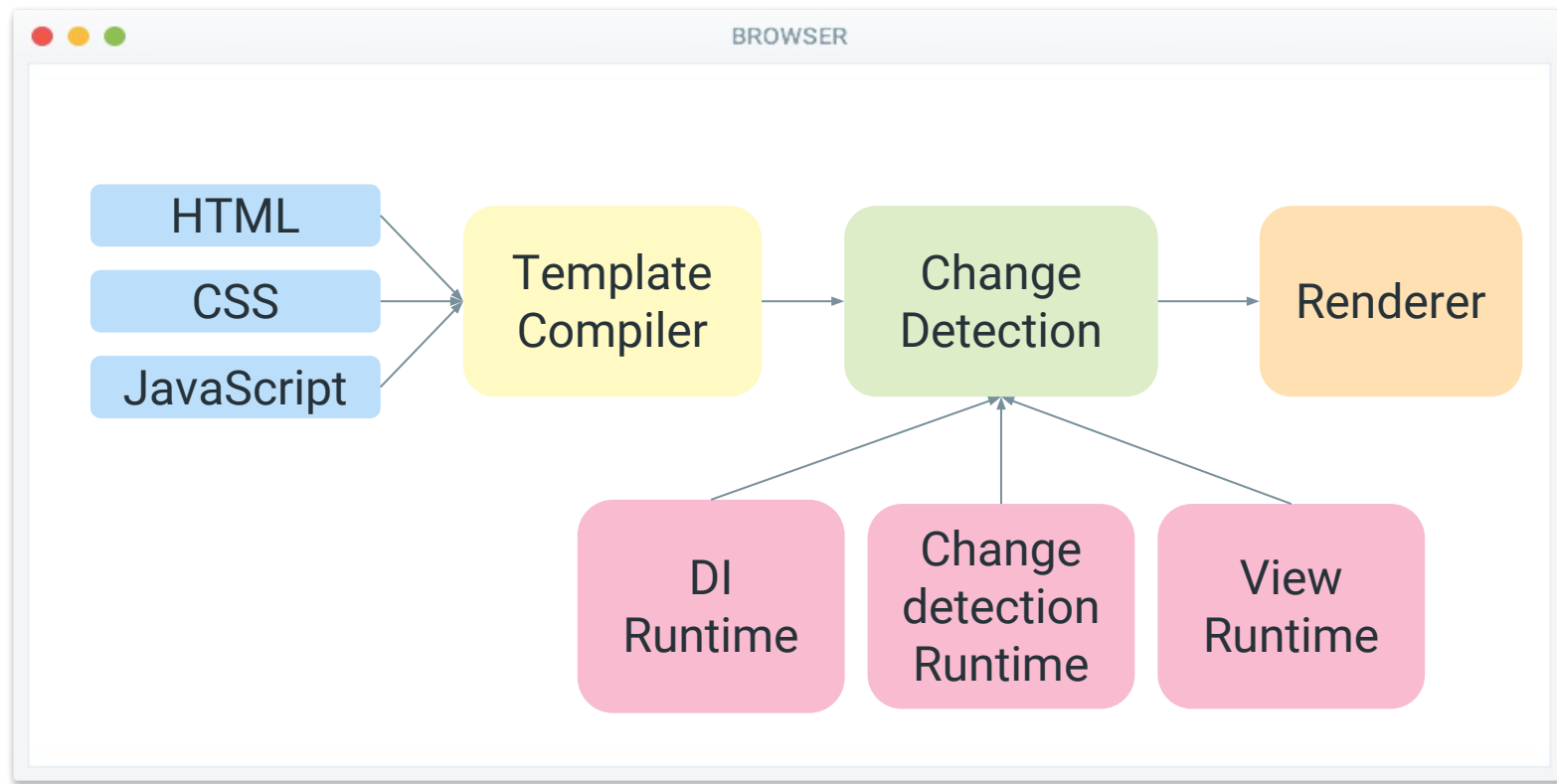
Execute  
Faster

Do Less

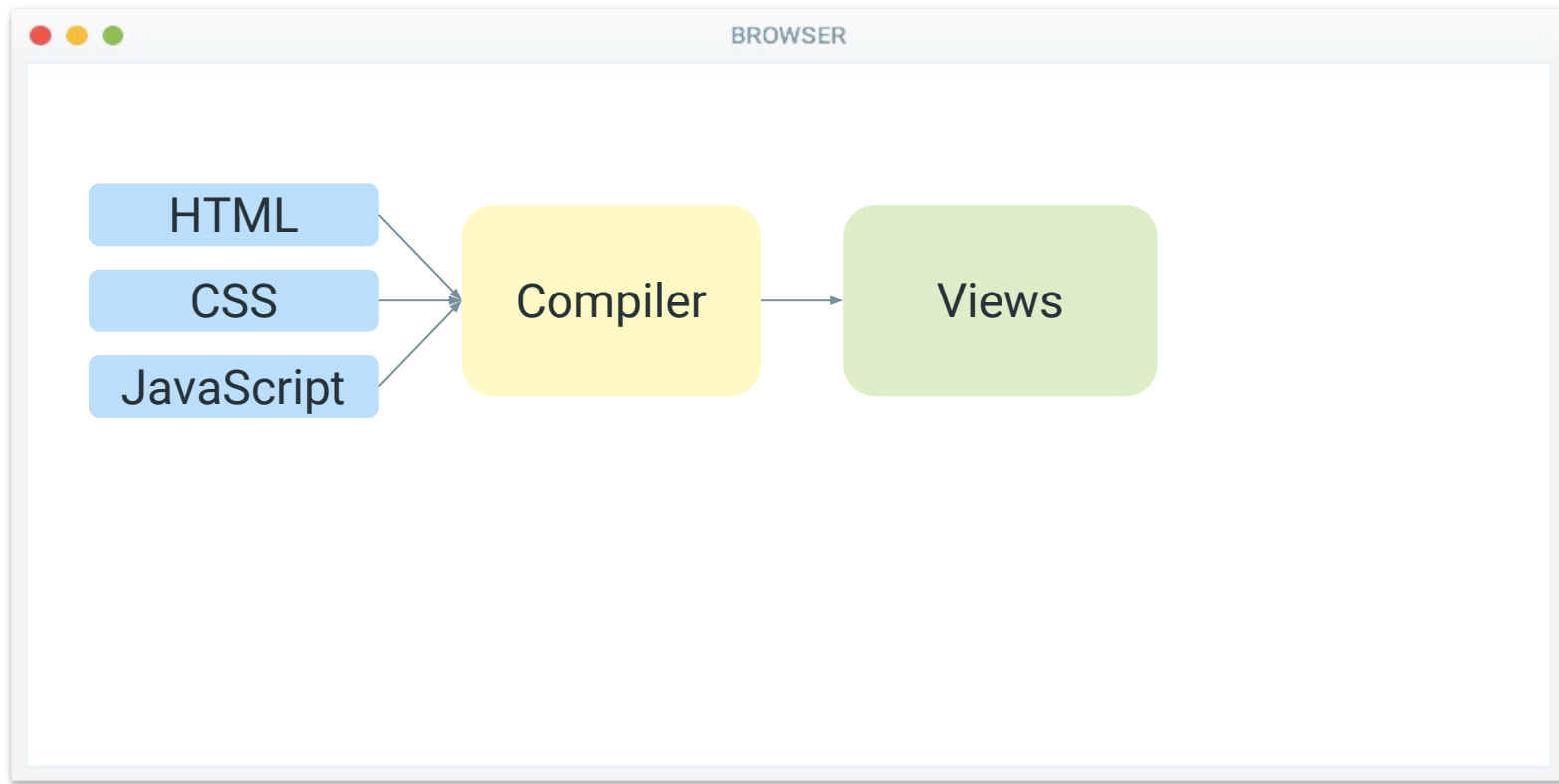
Memory  
Pressure

More...

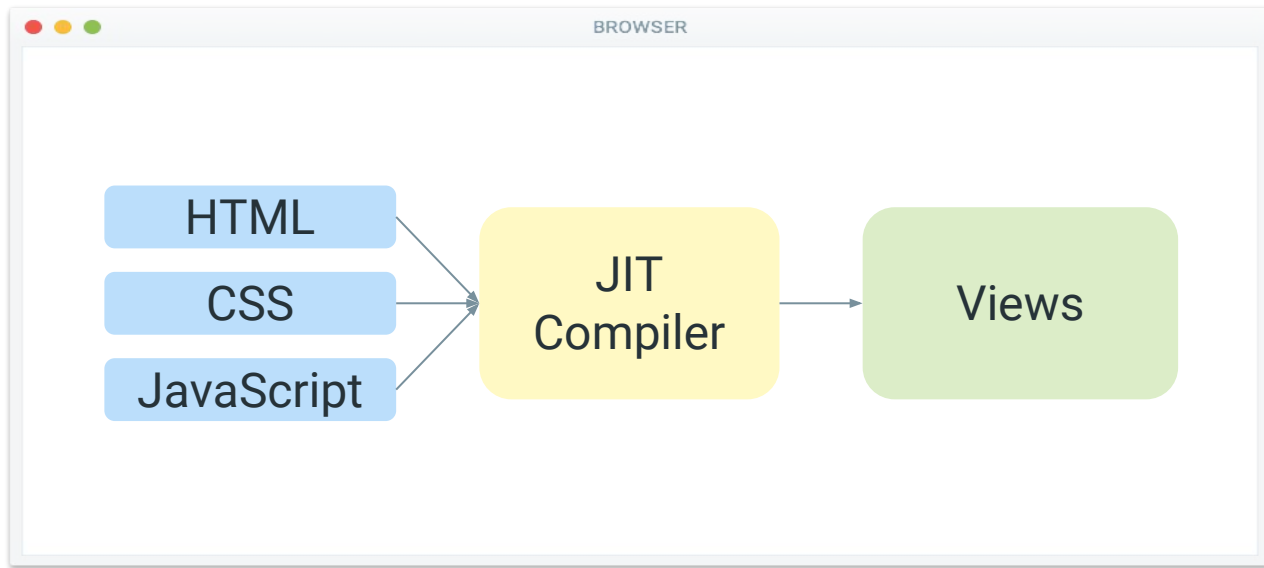
# Angular 1: Interpreted Templates



# Angular 2: Compiler Generates Code



# Just In Time (JIT) Compilation





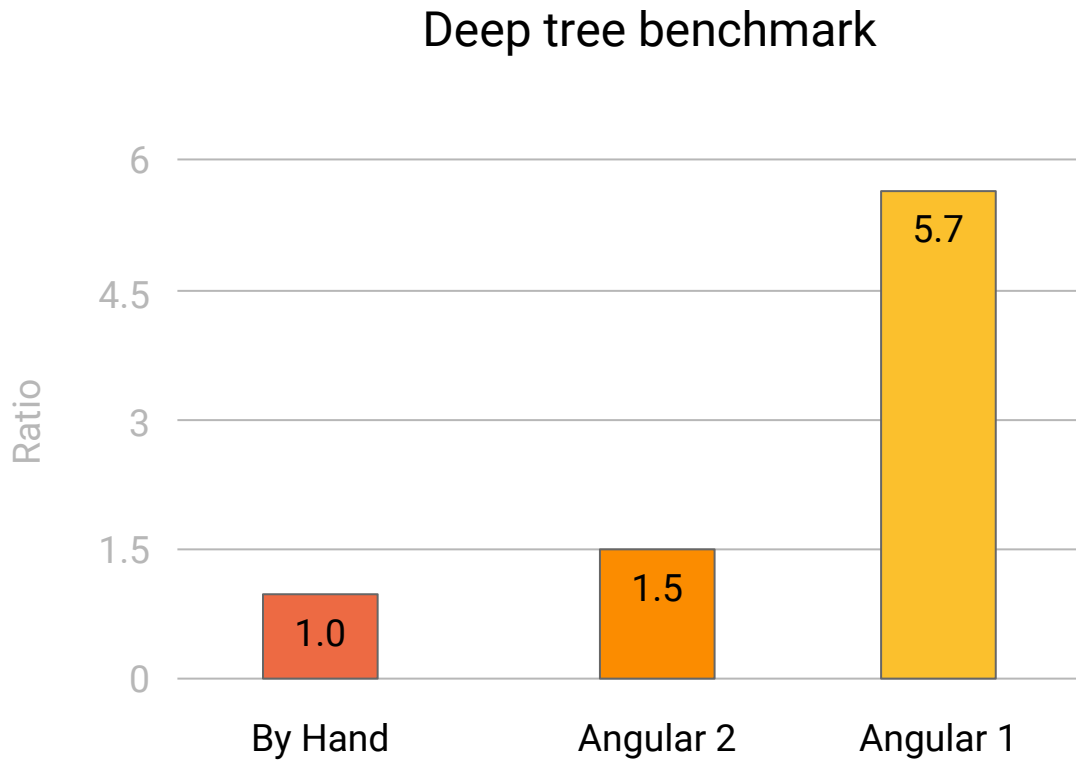
# Just In Time (JIT) Compilation

---

Optimized for JavaScript  
Virtual Machines

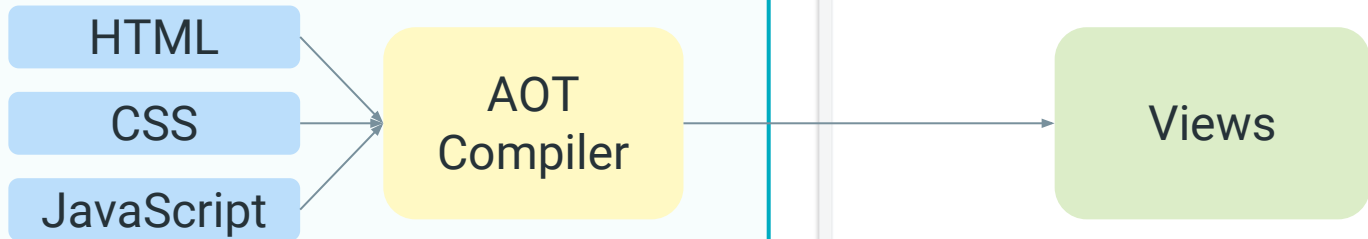
Change detection  
10x faster!

# Angular 2 Compiler Perf Improvement



# Ahead of Time (AOT) Compilation

## Build Step



# Ahead of Time (AOT) Compilation

---

Optimized for JavaScript  
Virtual Machines

No in-browser parsing  
or compilation

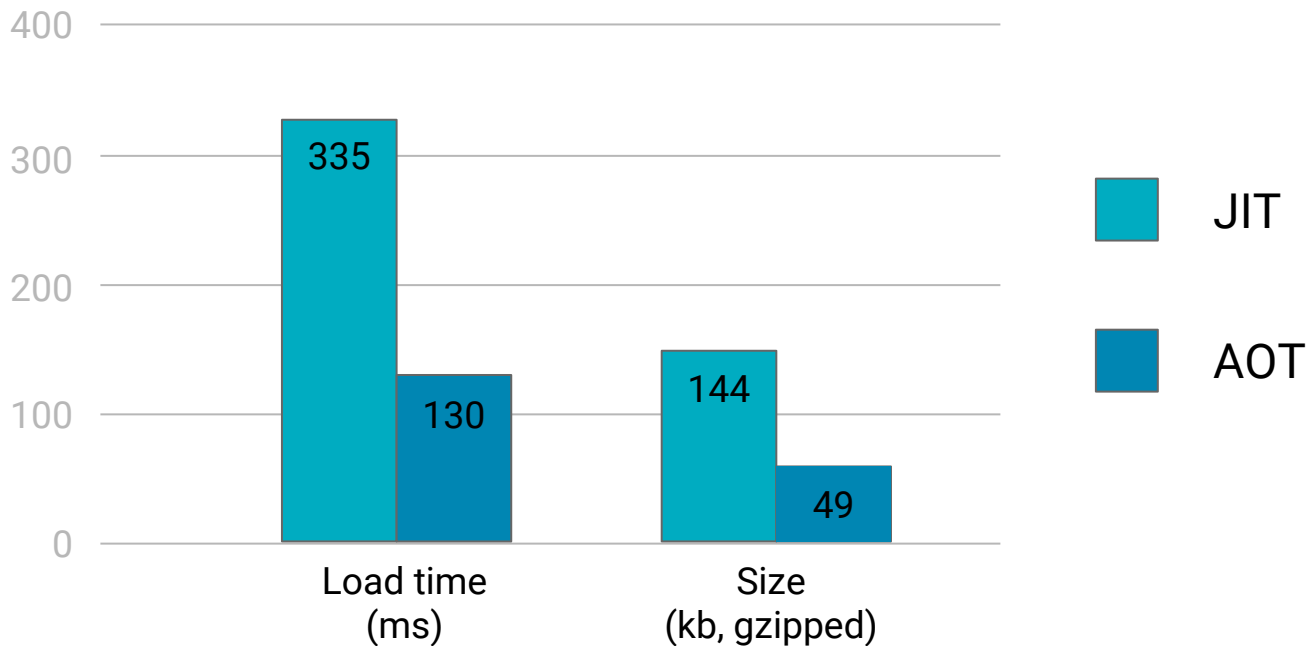
Ship less code

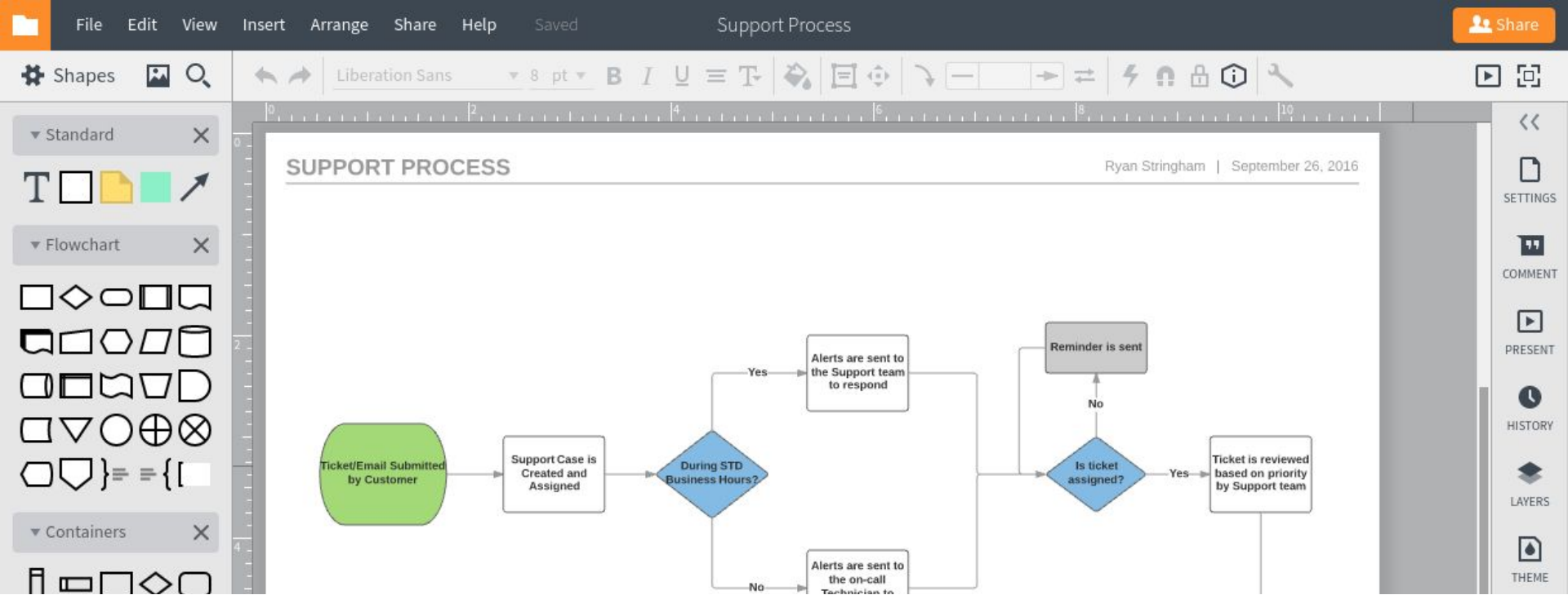




# JIT vs AOT Compilation - Page Load Performance

Deep tree benchmark





## Lucidchart in Angular 2

# Lucidchart Bootstrap Case Study

JIT

Angular 2  
Bootstrap

Lucidchart load  
document

Template  
parsing/compiling,  
etc

First Angular 2  
Tick

Loading screen  
fadeout

AOT

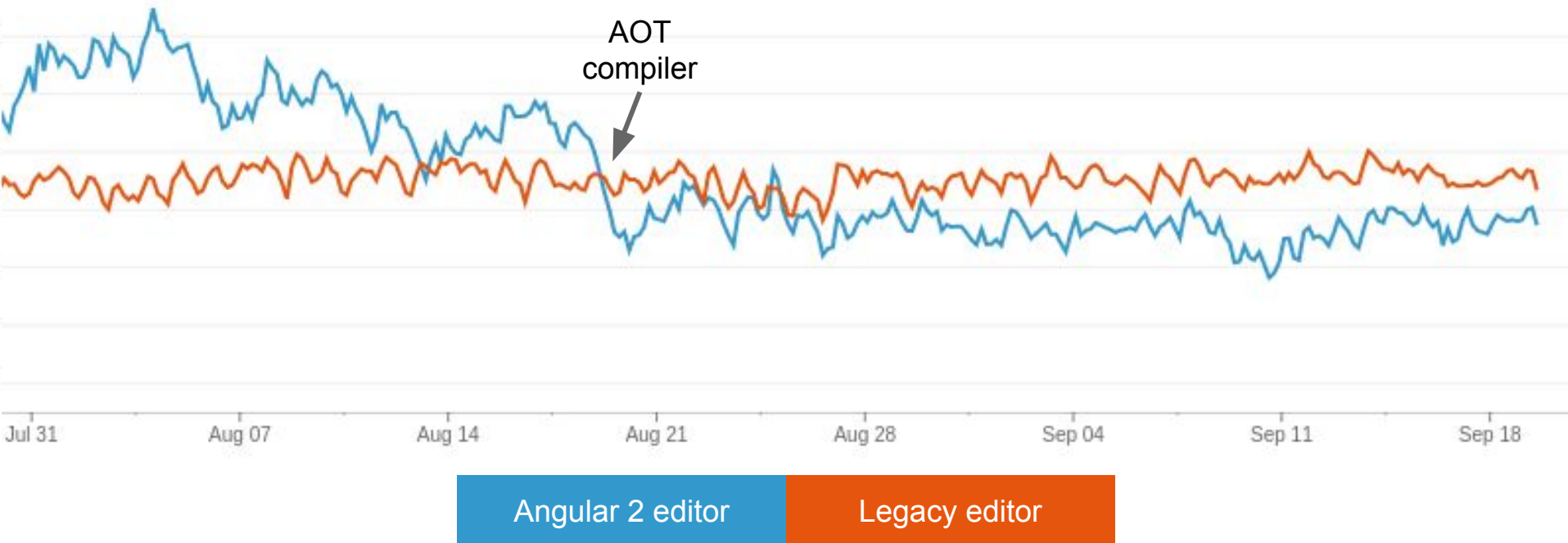
Angular 2  
Bootstrap

First Angular 2 Tick

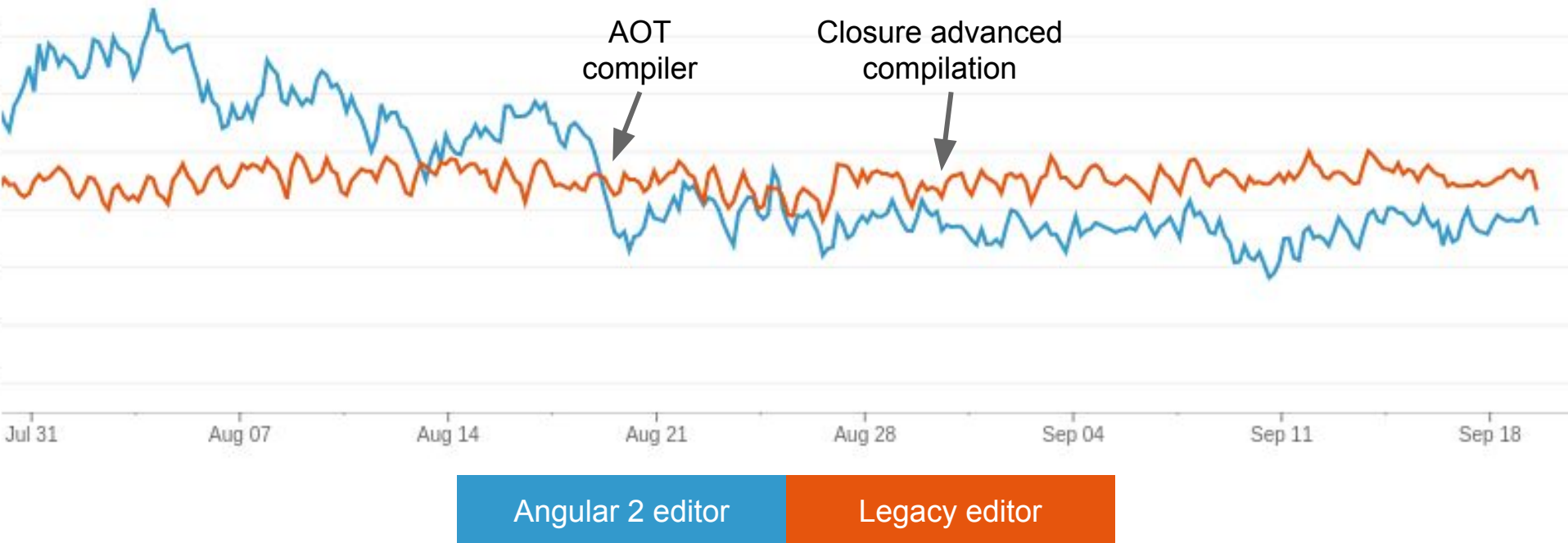
Lucidchart load  
document

Loading screen  
fadeout

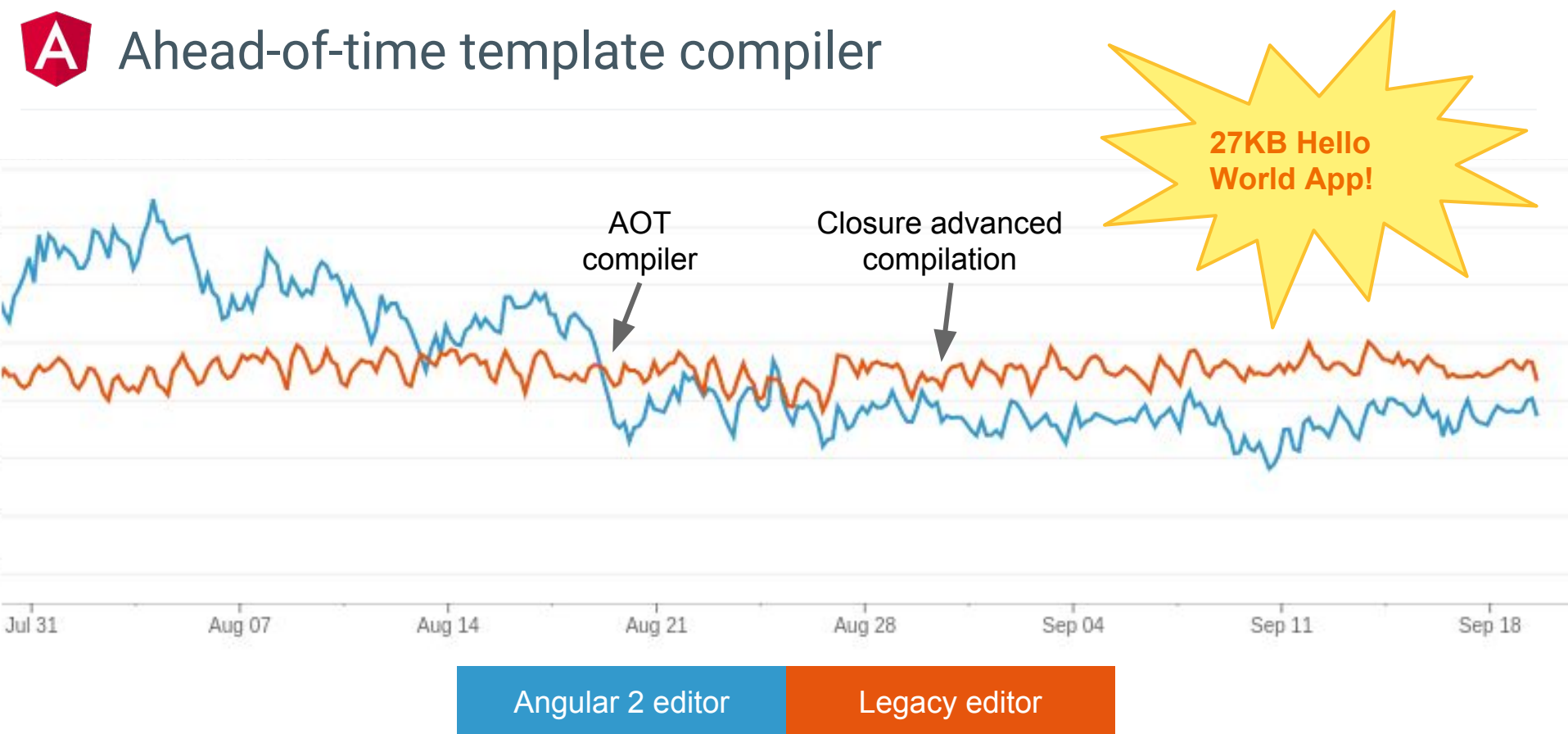
# Ahead-of-time template compiler



# Ahead-of-time template compiler

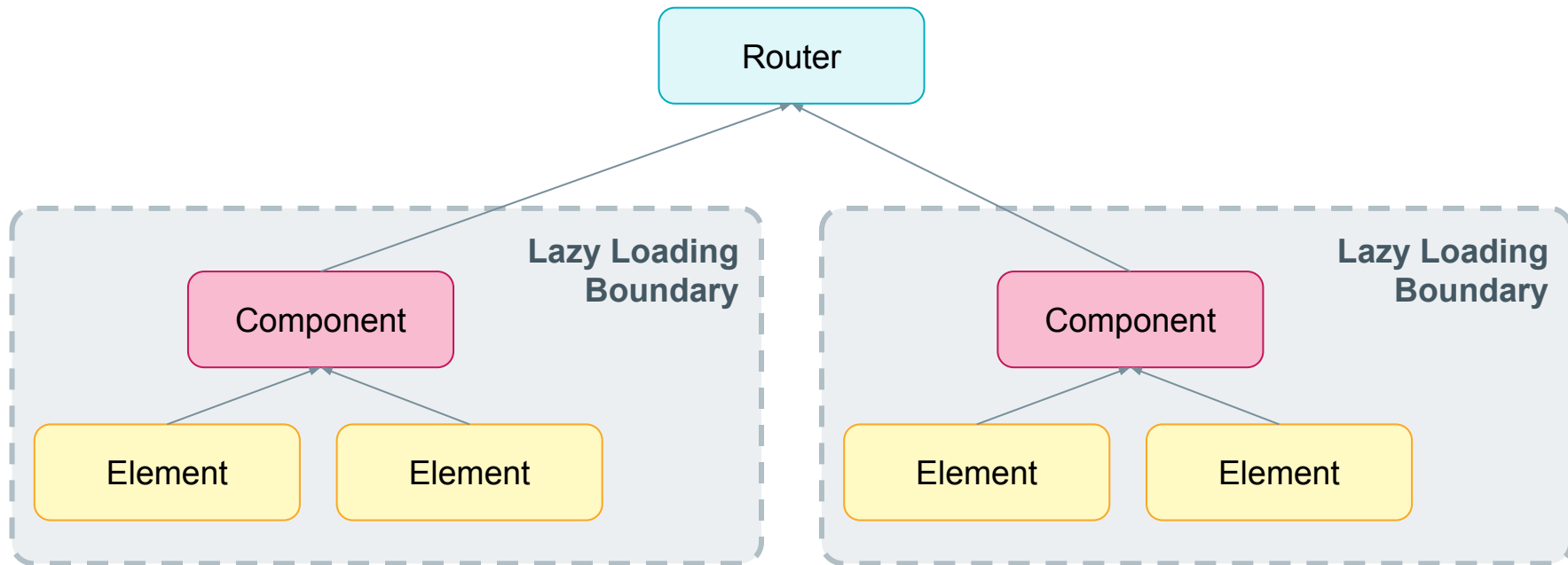


# Ahead-of-time template compiler



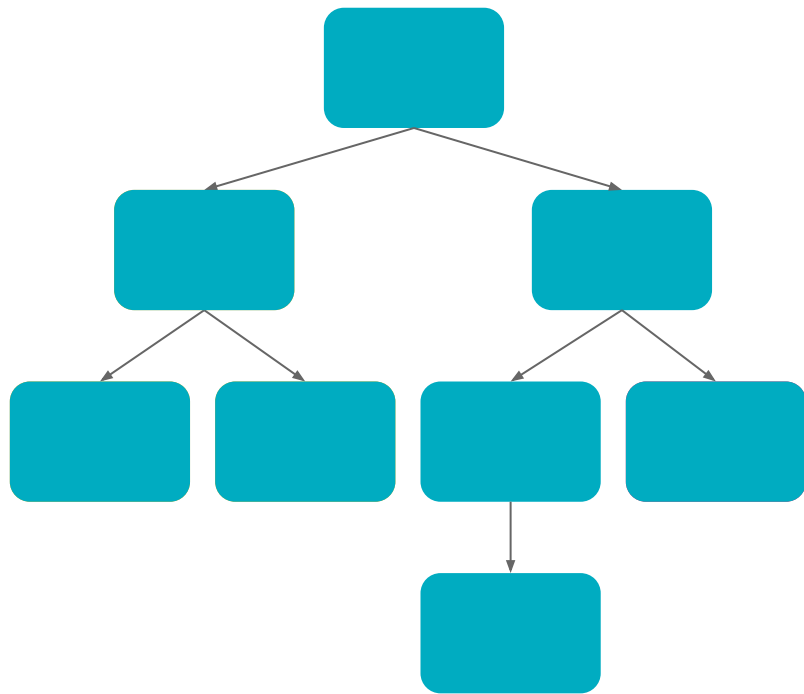


# Lazy loading





# Change detection strategies



Always (default)



On Push



Detached





# Yet more performance...

---

Web Workers



# Yet more performance...

---

Web Workers

Service Workers



# Yet more performance...

---

Web Workers

Service Workers

Faster Than Baseline



# Yet more performance...

---

Web Workers

Service Workers

Faster Than Baseline

10K Hello World





## Yet more performance...

---

Web Workers

Experimental

Service Workers

Experimental

Faster Than Baseline

In Development

10K Hello World

In Development



# Documentation



FEATURES DOCS EVENTS NEWS

GET STARTED

SEARCH DOCS...

DOCS HOME

CORE DOCUMENTATION

QUICKSTART

GUIDE

API REFERENCE

ADDITIONAL DOCUMENTATION

TUTORIAL

ADVANCED

COOKBOOK

## ANGULAR DOCS

TYPESCRIPT

Angular release is **2.1**. Learn about the latest [updates to the documentation](#). View the [Angular change log](#) for enhancements, fixes, and breaking changes in Angular itself.

### Quickstart

A short beginner guide explaining the basic concepts of Angular

[View Quickstart](#)

### Developer Guide

An intermediate development guide covering all major features of Angular

[View Guide](#)

### API Reference

An advanced reference of all Angular Classes, Methods, etc.

[View API](#)

#### ADVANCED DOCUMENTATION

[Angular Modules](#)

[Animations](#)

[Attribute Directives](#)

[Browser Support](#)

[Component Styles](#)

[View All...](#)

#### COOKBOOK

[Ahead-of-Time Compilation](#)

[Angular 1 to Angular 2](#)

[Angular Module FAQ](#)

[Component Interaction](#)

[Component-Relative Paths](#)

[View All...](#)

#### TOOLS & LIBRARIES

[Angular Universal](#)

[Augury](#)

[Celerio Angular Quickstart](#)

[Codifyer](#)

[Lite-server](#)

[View All...](#)

Angular for TypeScript



## Quickstart



## Developer Guides













## Cookbooks



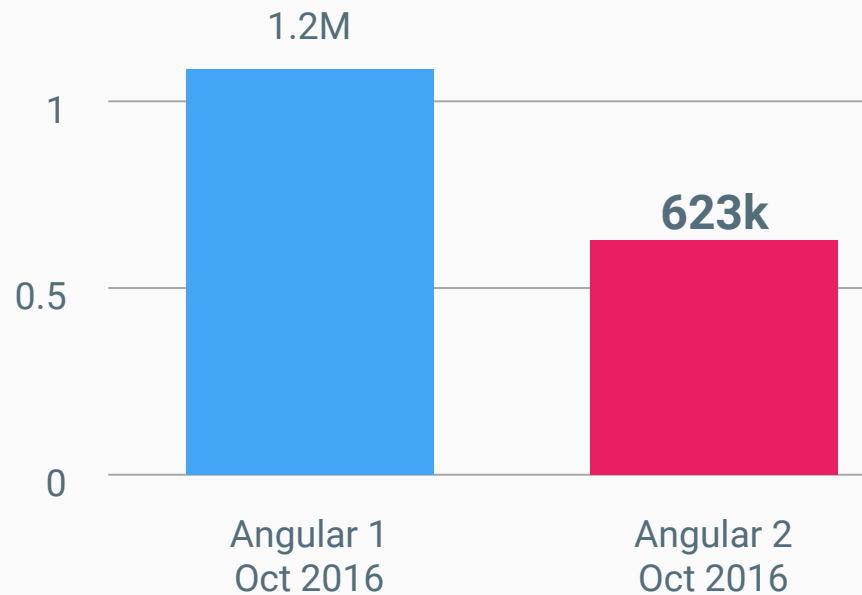
## API Reference



Organizations with the most open source contributors

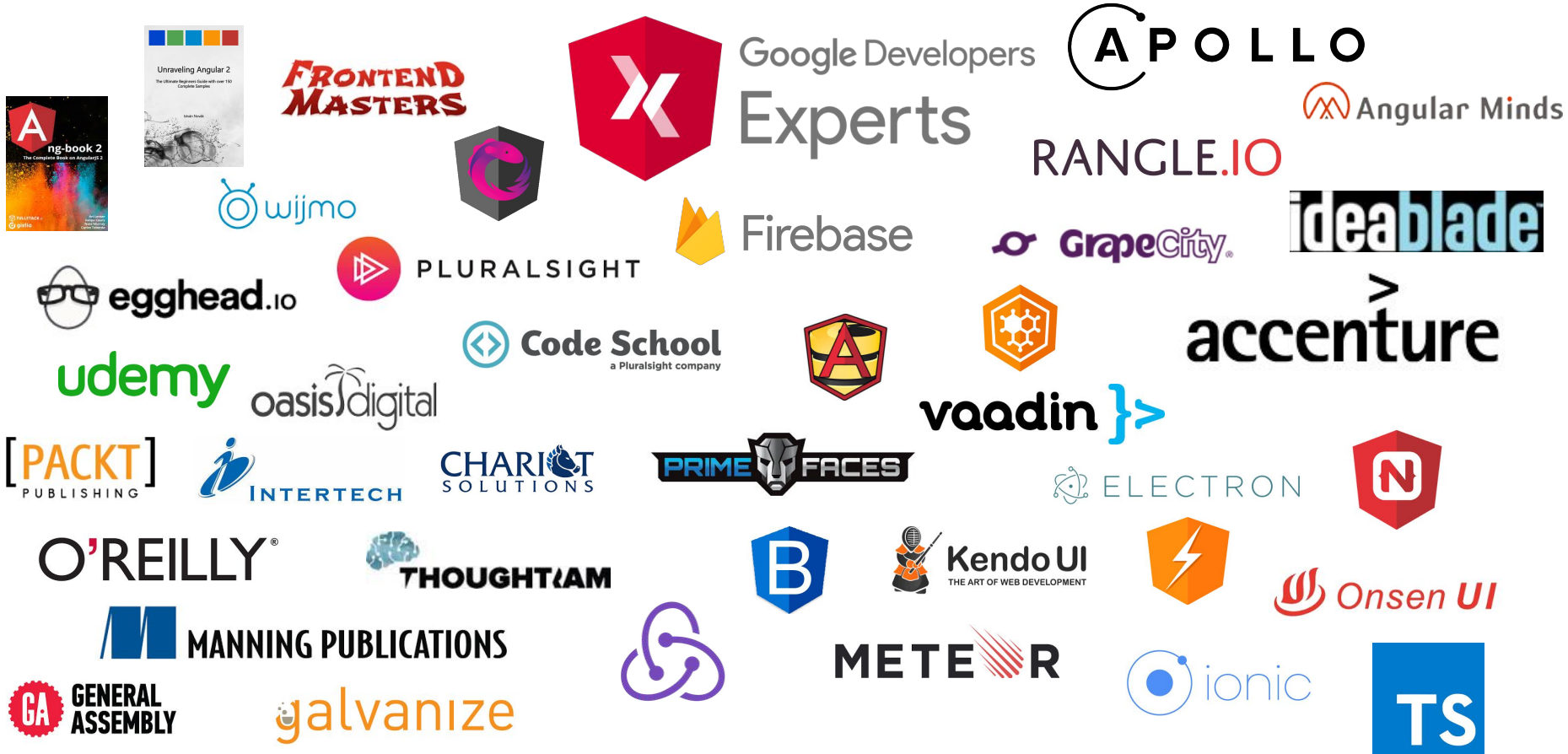
	Microsoft	16,419
	facebook	15,682
	docker	14,059
	angular	12,841
	google	12,140
	atom	9,698
	FortAwesome	9,617
	elastic	7,220
	Apache	6,999
	npm	6,815

[Source: State of Octoverse 2016](#)



*Based on 30-day active visitors to Angular docs*

# Ecosystem







# Angular 2 In Production

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greentea 

Google fiber



npr one<sup>SM</sup>

Microsoft  
Azure Functions



Lucidchart



Google  
AdWords



DoubleClick by Google



**Fidelity**  
INVESTMENTS<sup>®</sup>





# Thank You

[angular.cn](https://angular.cn)