The Powerful Three

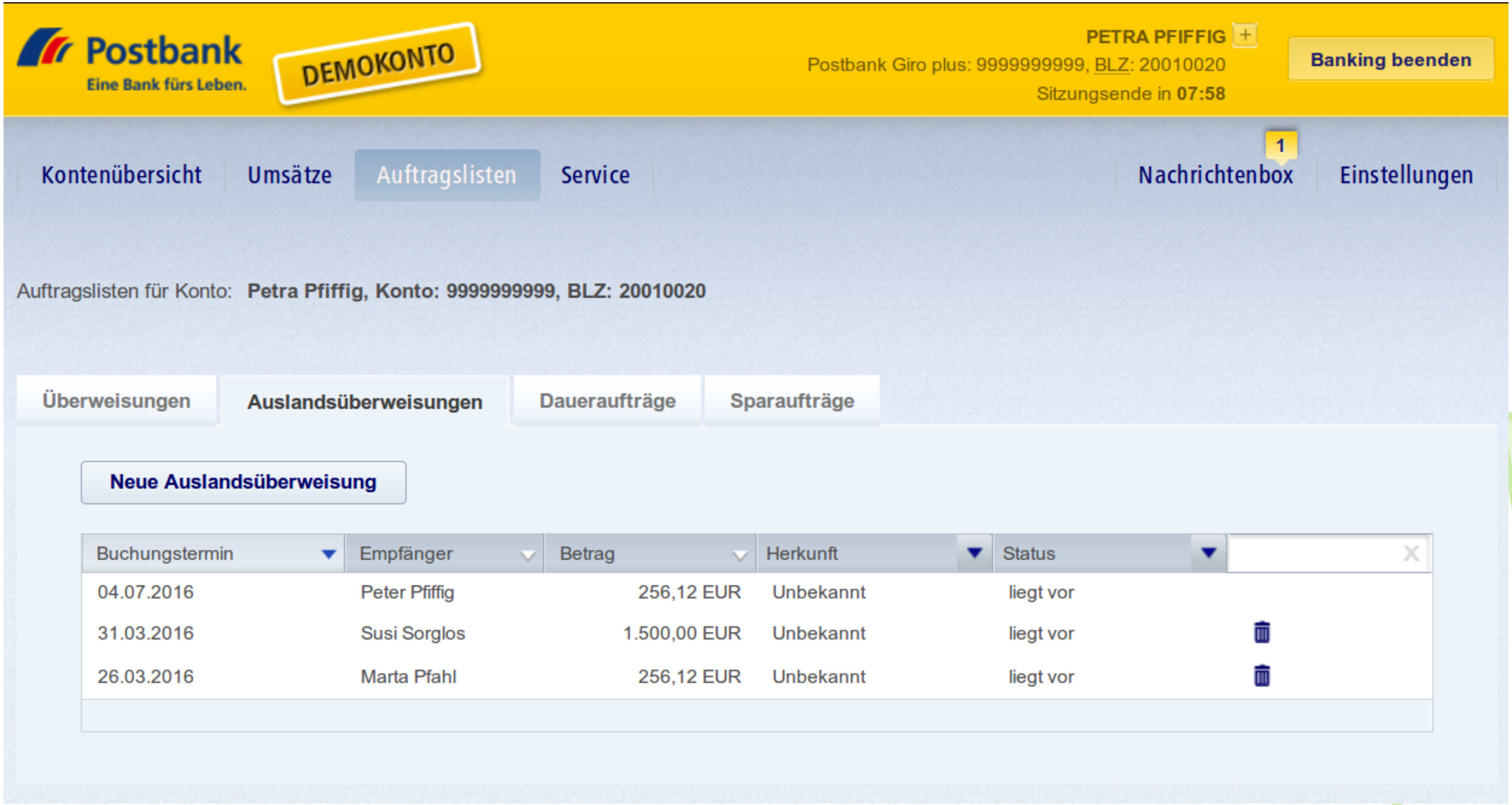
NetBeans IDE, TypeScript, Angular 2

KARSTEN
SITTERBERG

@kakulty

- Freelance trainer/consultant since 2013
- Working for trion especially for frontend topics
- Co-founder of the JUG Münster

Web applications

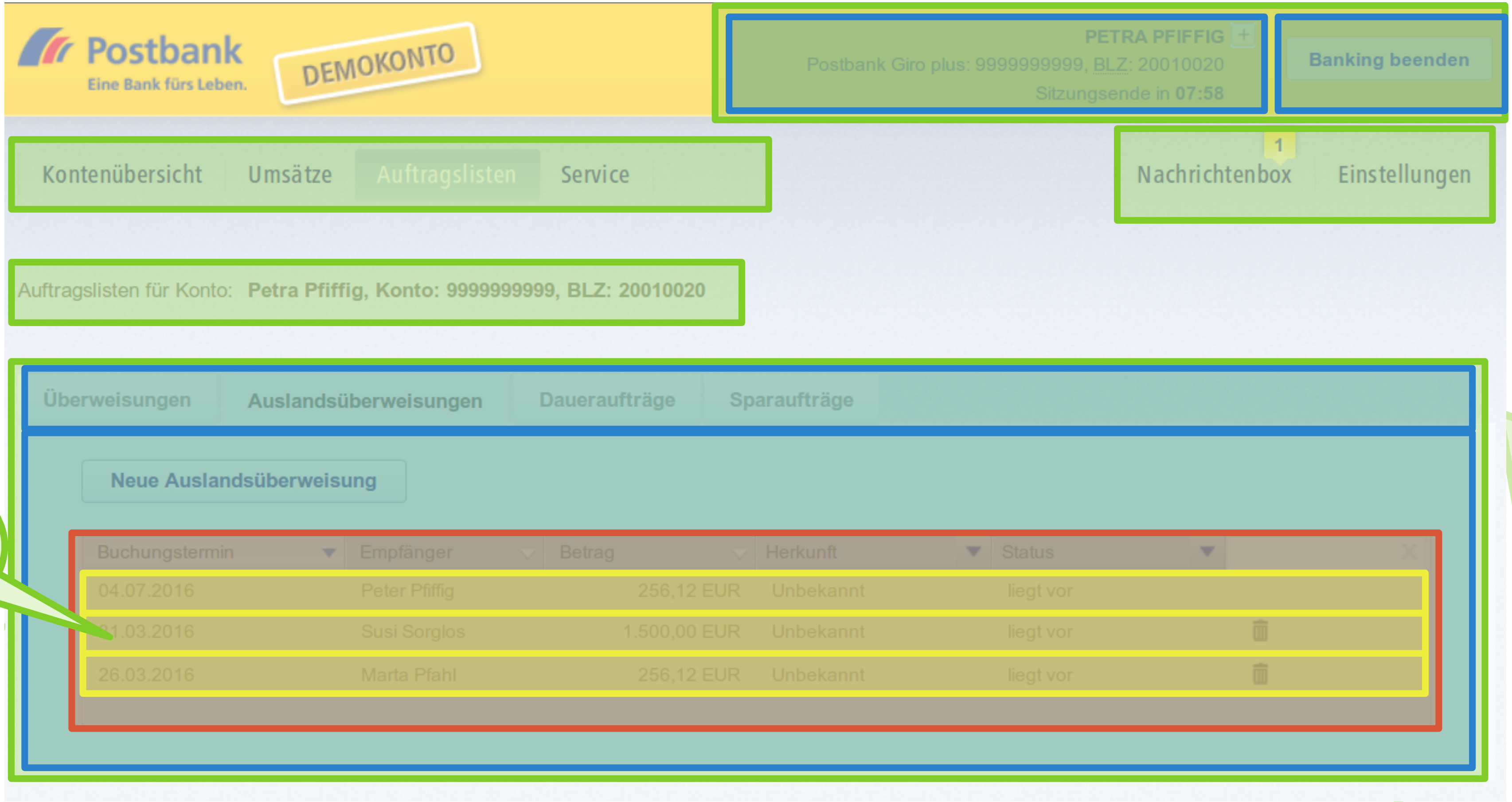


PETRA PFIFFIG +
Postbank Giro plus: 9999999999, BLZ: 20010020
Sitzungsende in **07:58**

Auftragslisten für Konto: **Petra Pfiffig, Konto: 9999999999, BLZ: 20010020**

Buchungstermin	Empfänger	Betrag	Herkunft	Status	X
04.07.2016	Peter Pfiffig	256,12 EUR	Unbekannt	liegt vor	
31.03.2016	Susi Sorglos	1.500,00 EUR	Unbekannt	liegt vor	🗑
26.03.2016	Marta Pfahl	256,12 EUR	Unbekannt	liegt vor	🗑

Components of web applications



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Reuse

Components

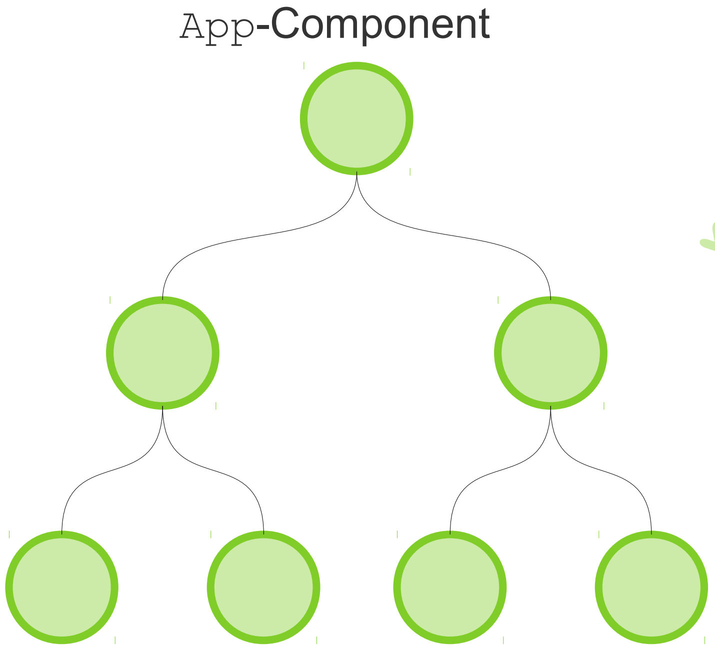
Component Stacking

Components in general

- Provide level of reuse
- Delegation and decoration
- **Single** responsibility of each component

Separation of Concerns

An app is just a tree of components!



Custom components in HTML

```
<postbank-banking></postbank-banking>
```

```
<postbank-page>
    <postbank-header></postbank-header>
    <postbank-app></postbank-app>
</postbank-page>
```

```
...
<transfer-menu></transfer-menu>
<transfer-tab>
    <new-transfer-button></new-transfer-button>
    <transfers-table></transfers-table>
</transfer-tab>
...
```

Components in web applications

- Improve developer productivity
  - Easier to write, reduced noise
  - Better way of re-use than copy-pasta
- Well established on server side, f.e. JSF/Apache Wicket
- Client side (HTML/JS) applications on the rise
  - Past: HTML/JS + jquery, no components
- **Current approach**:
  - **Single page applications (SPA's) –** client side HTML/JS-Applications
  - **Server** provides persistence and business transactions

Single Page Applications

- Technology

- Custom HTML tags
  - Web Components

- SPA-Frameworks

  → AngularJS, Angular 2

Single Page Applications

- Mobile first
- Responsive
- Also Offline First

- One HTML Document (Single Page)
- **Contents dynamically** loaded & interchanged
  - Content-Updates small (compared to overall new Page)

  → Less Network Traffic / Loading Times

  → Better User Experience
- More Modular (Components)

  → Loose Coupling ↔ Separation of Concern

Angular 2

- Angular 2 RC 1 is there!
- **Multilingual** Development
  - ES5, ES2015, **TypeScript**, Dart, …
  - Major Part of Documentation is TypeScript
  - Angular 2 itself developed in TypeScript
- Modular Applications
  - Dependency Injection

  → Testability
- Event-Based Change Detection

Angular 2

- **Reactive** Change Detection: Built for **Speed**
- **Components: Simple**/Productive
- URL Routing
- Legacy Browser Support (down to IE9)
- Templates for DOM-Changes
- Shadow DOM for Encapsulation

WebComponents

- Optional rendering without DOM access
  - Server side rendering (SEO, isomorphic applications)
  - WebWorker for rendering offload

Angular 2 Under the Hood

Instead of reinventing the wheel:

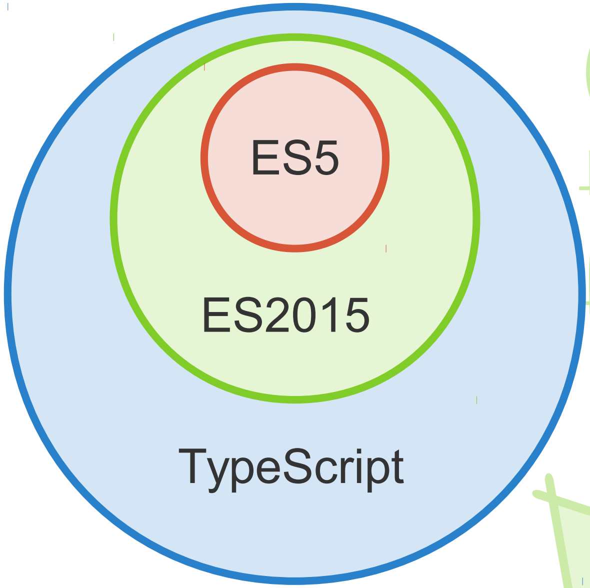
- SystemJS (Module loader)
- ES6-shim (Browsers without ES6 support)
- **RxJS** (Reactive programming)
  - Observables for **asynchronous**, event-based program flows
- **zone.js**
  - Execution **contexts** for asynchronous tasks
- reflect-**metadata**
  - Dependency injection via **decorators**

TypeScript

- TypeScript extends ES2015 extends ES5 functionality
- Static Typing
  - Compile-Time Security
  - Clearer Docs/Tooling/Refactoring
- Visibility, private/public
- Interfaces, Classes, Inheritance

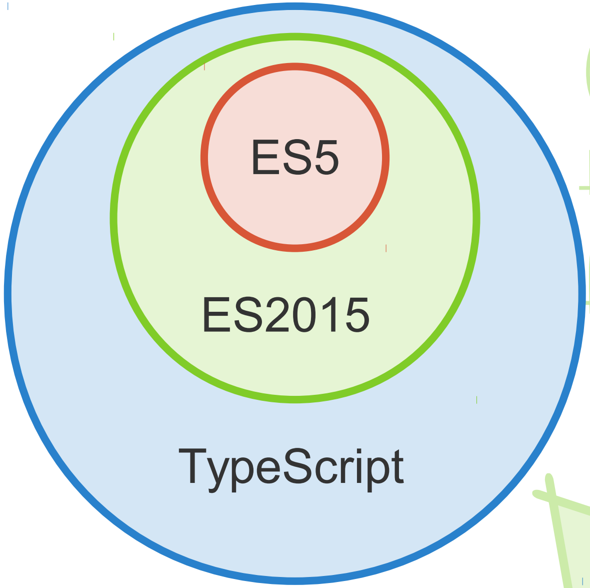
Compile-Time

→ IDE can do static analysis and Code-Completion



TypeScript

- TypeScript extends ES2015 extends ES5 functionality
- Browser Support only for ES5
  - Even lacking ES2015 support
  - ES5 as “Web-Assembler”
- Compilation from TypeScript to ES5:
  - Often called “Transpilation”
  - TypeScript Compiler: `tsc`



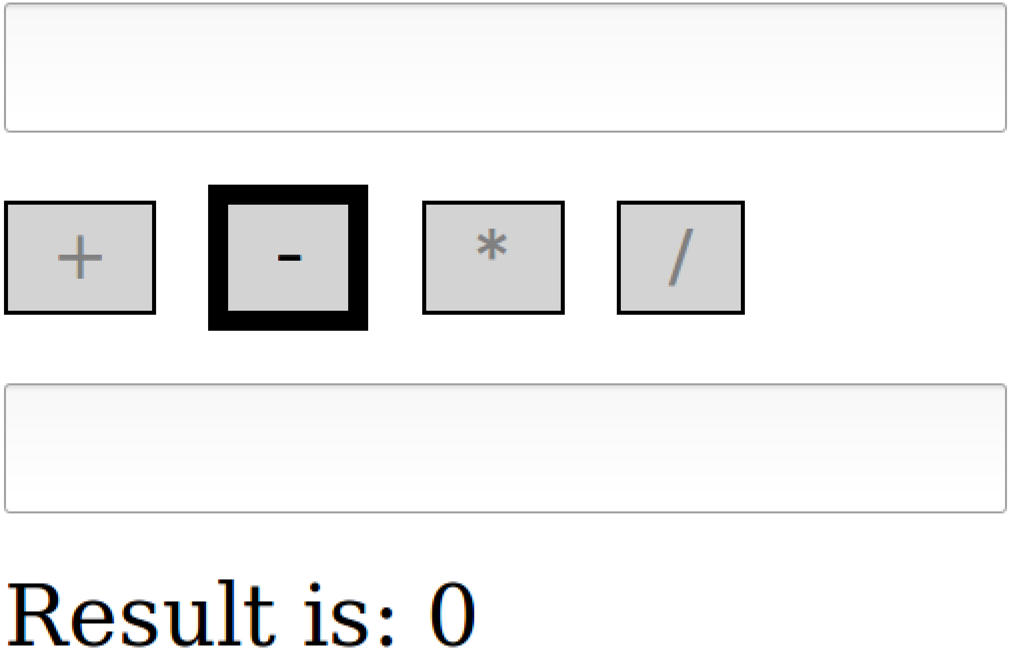
TypeScript – Example

```
interface Person {
    firstName: string;
    lastName: string;
}
function greet(person : Person) {
    return "Hello, " + person.firstName + " " + person.lastName;
}
```

TypeScript – Example

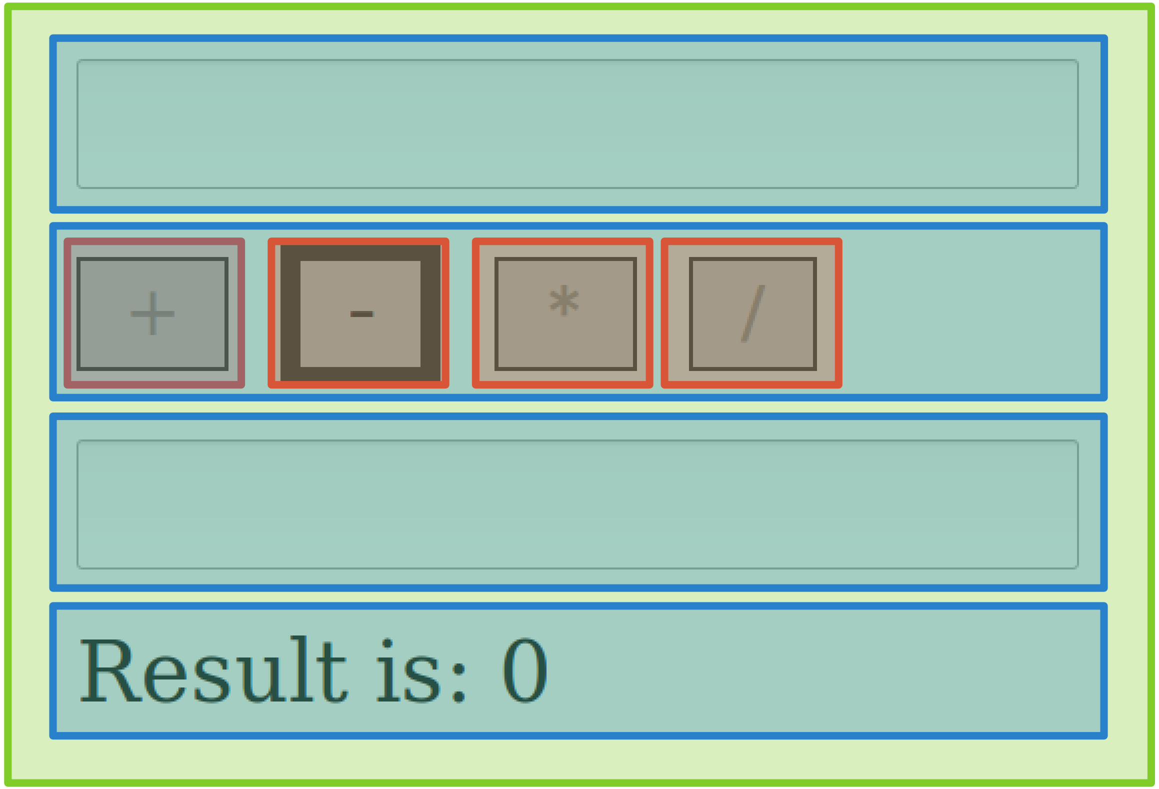
```
interface Person {
    firstName: string;
    lastName: string;
}
function greet(person : Person) {
    return "Hello, " + person.firstName + " " + person.lastName;
}


class Student implements Person {
    constructor(public firstName, public lastName, public course) {
    }
}
var user = new Student("Jane", "User", "Biology");
document.body.innerHTML += greet(user);
```

Angular 2 – Example: Calculator



Result is: 0

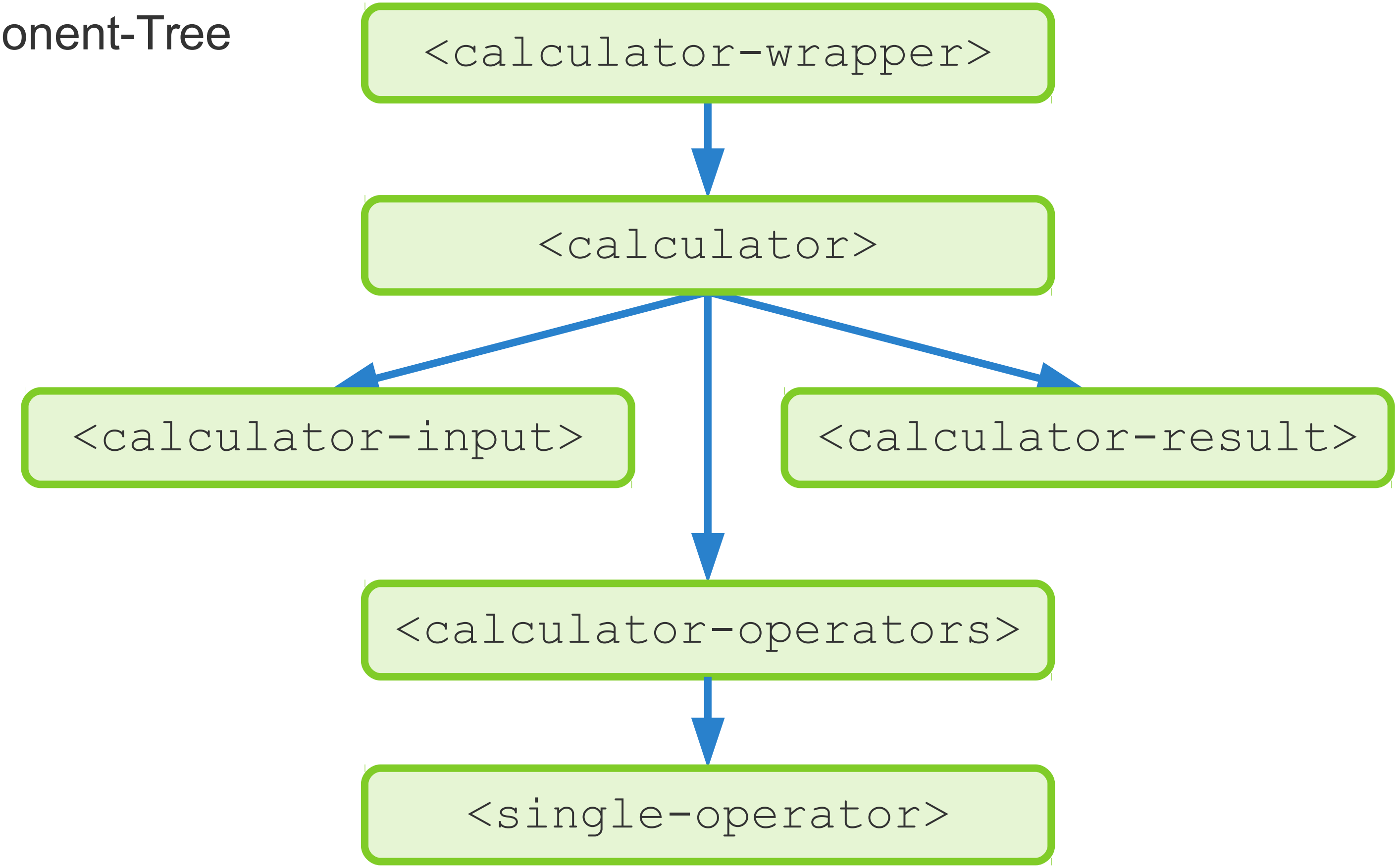
Angular 2 – Example: Calculator



Result is: 0

Angular 2 – Component

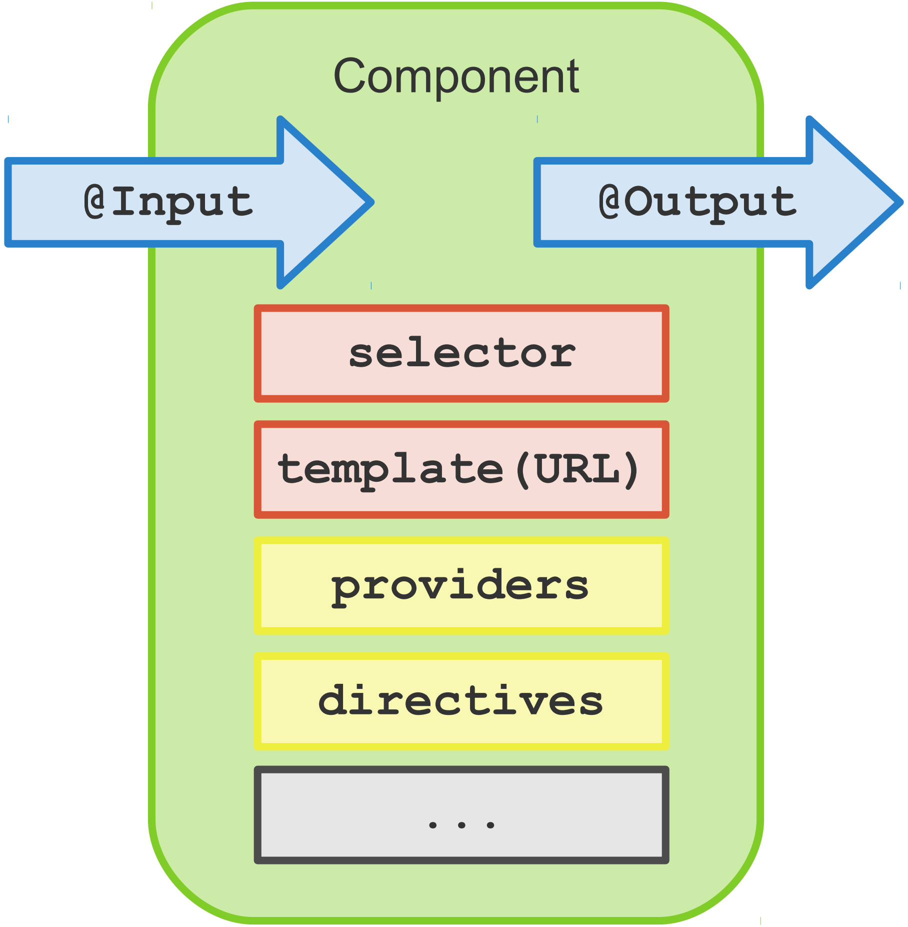
- Component-Tree



Angular 2 – Component

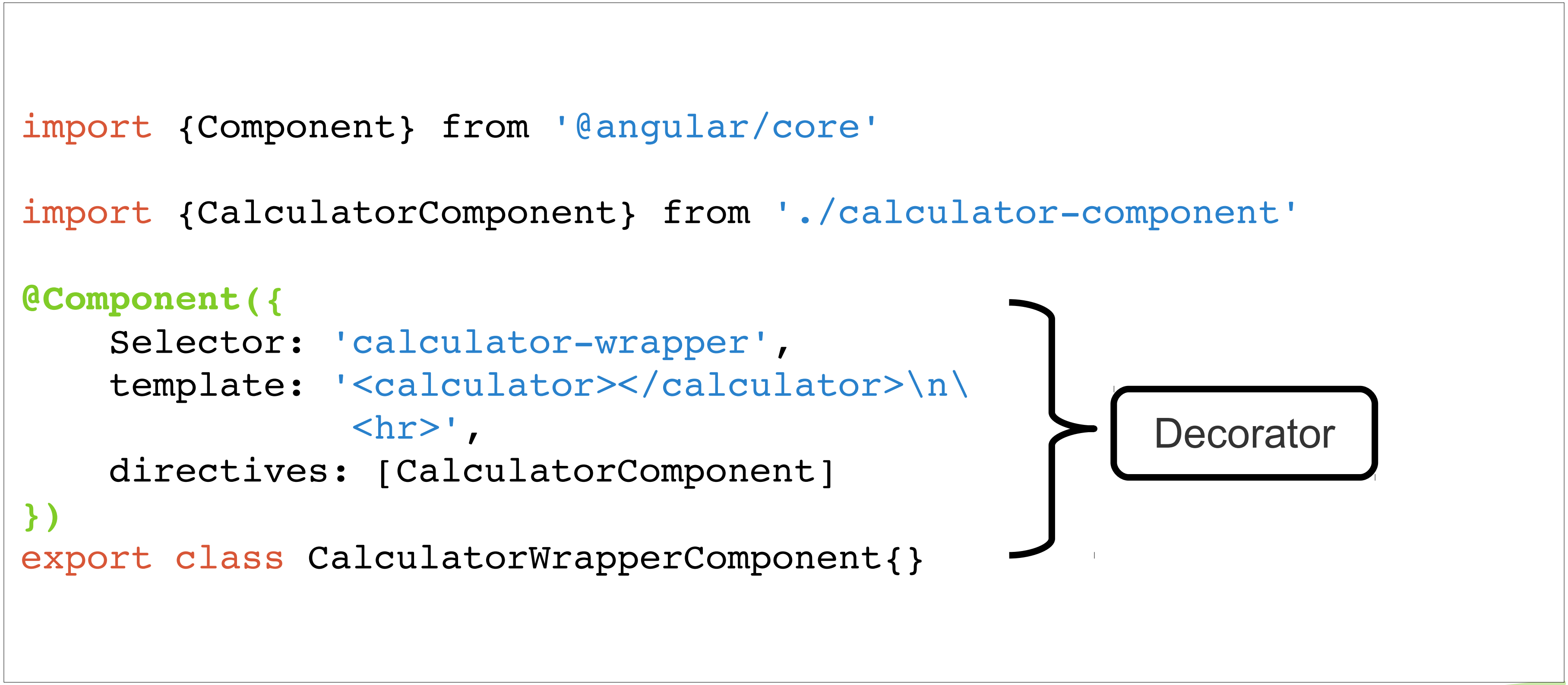
- Acts as Container for View
- Communicates with other Components
- Delegate Logic to Services/ Fetch Data from Services

Services:
- View-Specific Logic
- Communication to Back-End



Angular 2 – Component

- Basic Blueprint: `CalculatorWrapperComponent.ts`



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

import {CalculatorComponent} from './calculator-component'

@Component({
    Selector: 'calculator-wrapper',
    template: '<calculator></calculator>\n\
               <hr>',
    directives: [CalculatorComponent]
})
export class CalculatorWrapperComponent{}
```

Angular 2 – Component

- Basic Blueprint: `CalculatorComponent.ts`

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

import {OperationsComponent} from './operations-component';
import {InputComponent} from './input-component';
import {ResultComponent} from './result-component';
import {CalculatorService} from './calculator-service';

@Component({
    selector: 'calculator',
    template: `... `,
    directives: [OperationsComponent, InputComponent, ResultComponent]
})
export class CalculatorComponent {
    \\...
}
```

Angular 2 – Component

- Basic Blueprint: `SingleOperatorComponent.ts`

```
import {Component, Input, Output, EventEmitter} from '@angular/core';

@Component({
    selector: 'single-operator',
    template: `<button [class.active]='selected'
               (click)='changeOperation()'> {{operation}} </button>`
})
export class SingleOperatorComponent {
    @Input() selected: boolean;
    @Output() operationChanged = new EventEmitter();
    private operation: string = '+';
    private changeOperation() {
        this.operationChanged.emit(this.operation);
    }
}
```

Angular 2 – Template Syntax

```
<single-operator (operationChanged)="operationChange(event)"
    [selected]="isSelected()" >
</single-operator>
```

@Input()
Property Binding

@Output()
Event Binding

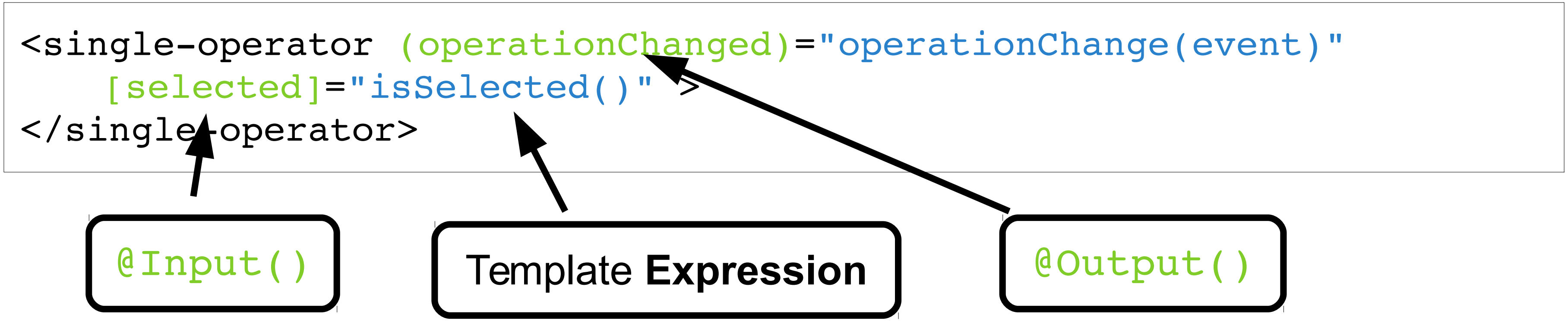
- **One-Way Binding:**
  - Possible Input-Bindings:
    DOM-Properties, CSS-Classes, Styles, HTML-Attributes

- **Two-Way Binding** also possible

```
      <input [(ngModel)]="todo.text"></input>
```

Banana in a Box
[()]

Angular 2 – Template Syntax



```
<single-operator (operationChanged)="operationChange(event)"
    [selected]="isSelected()" >
</single-operator>
```

@Input()

Template **Expression**

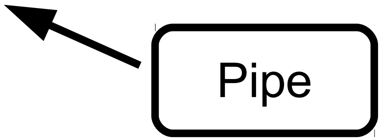
@Output()

- Expressions should
  - Have **no** (visible) **side effect**
  - Execute **quick**
  - Be **simple**
  - Be **idempotent**

Angular 2 – Template Syntax

- Pipes

```
<div>{{ title | uppercase }}</div>
```



Pipe

- “Elvis”-Operator `?.`

```
{{currentHero?.enabled}}
```

↔

```
{{currentHero && currentHero.enabled}}
```

Angular 2 – Service

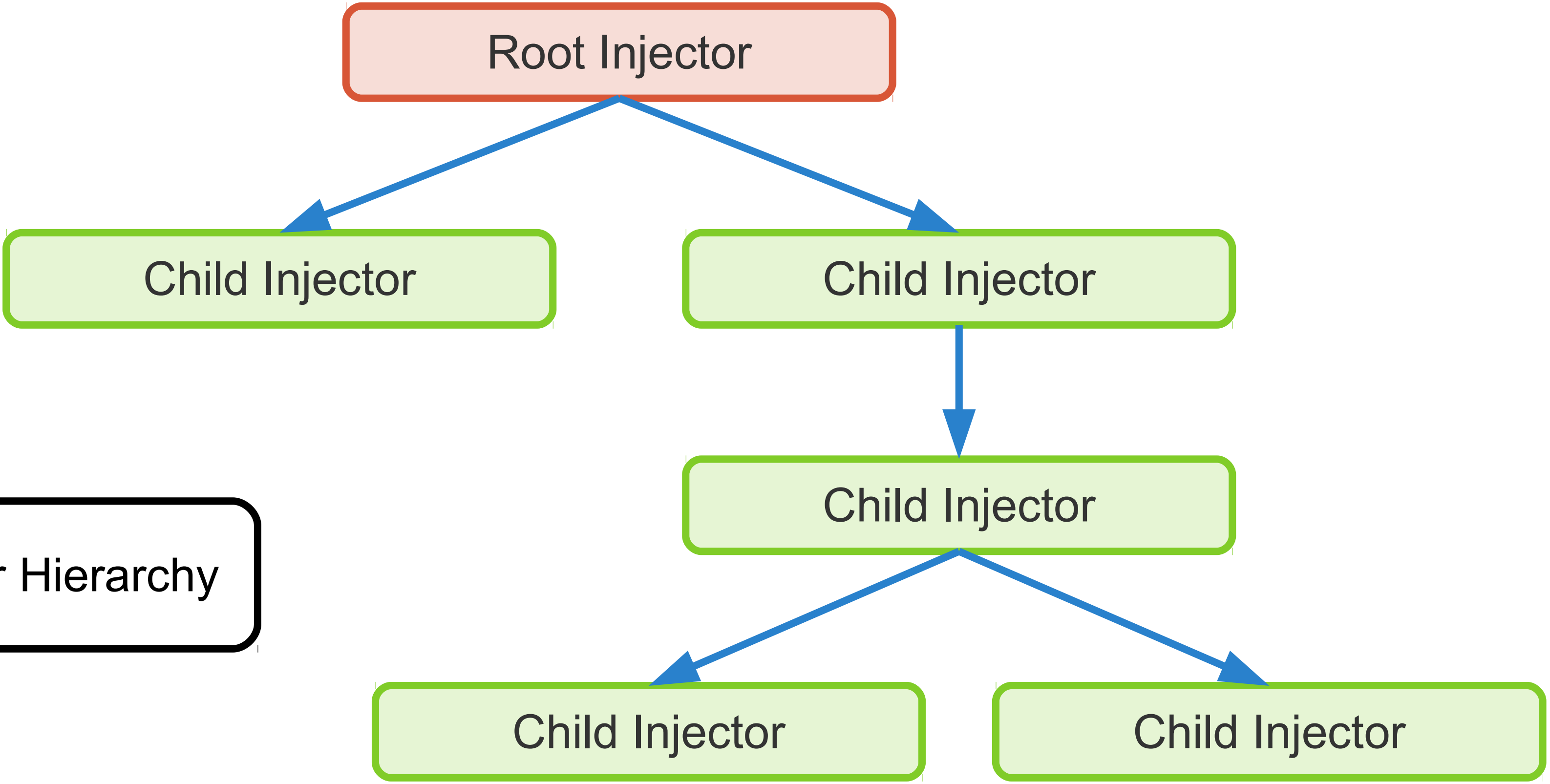
- Basic Blueprint

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

@Injectable()
export class CalculatorService {}
```

- Inject the Service into the Component

```
import {Component} from '@angular/core';
import {CalculatorService} from './calculator.service';

@Component({    ...
    providers: [CalculatorService]
})
export class CalculatorComponent {    ...
    constructor(private calculatorService: CalculatorService) { }
}
```

Angular 2 – Dependency Injection



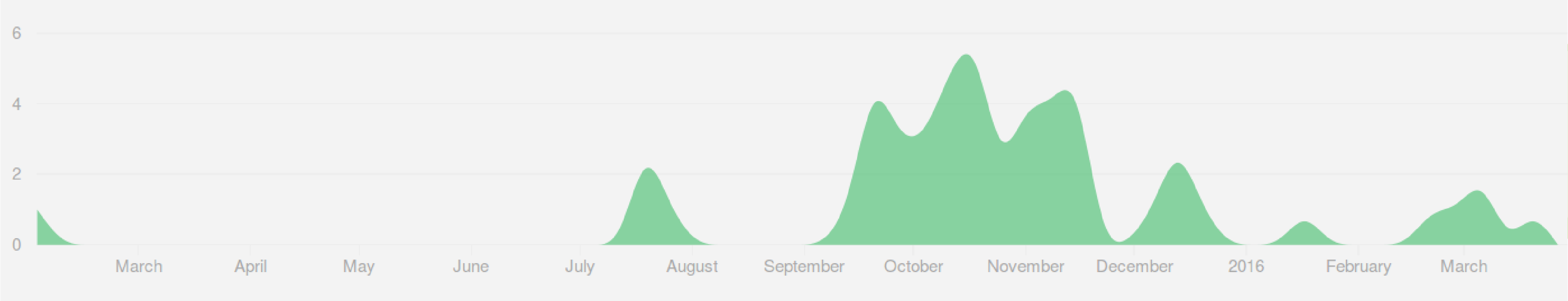
Injector Hierarchy

NetBeans IDE

- Free, Open Source IDE
- Web Development Capabilities:
  - HTML/CSS/JS
  - AngularJS (Angular 1) Support
  - PHP
- Functionality extensible via Plugins
  - ~200 official Plugins
  - Even more available from unofficial Sources
  - Develop your **own Plugin**!

NetBeans – TypeScript Support

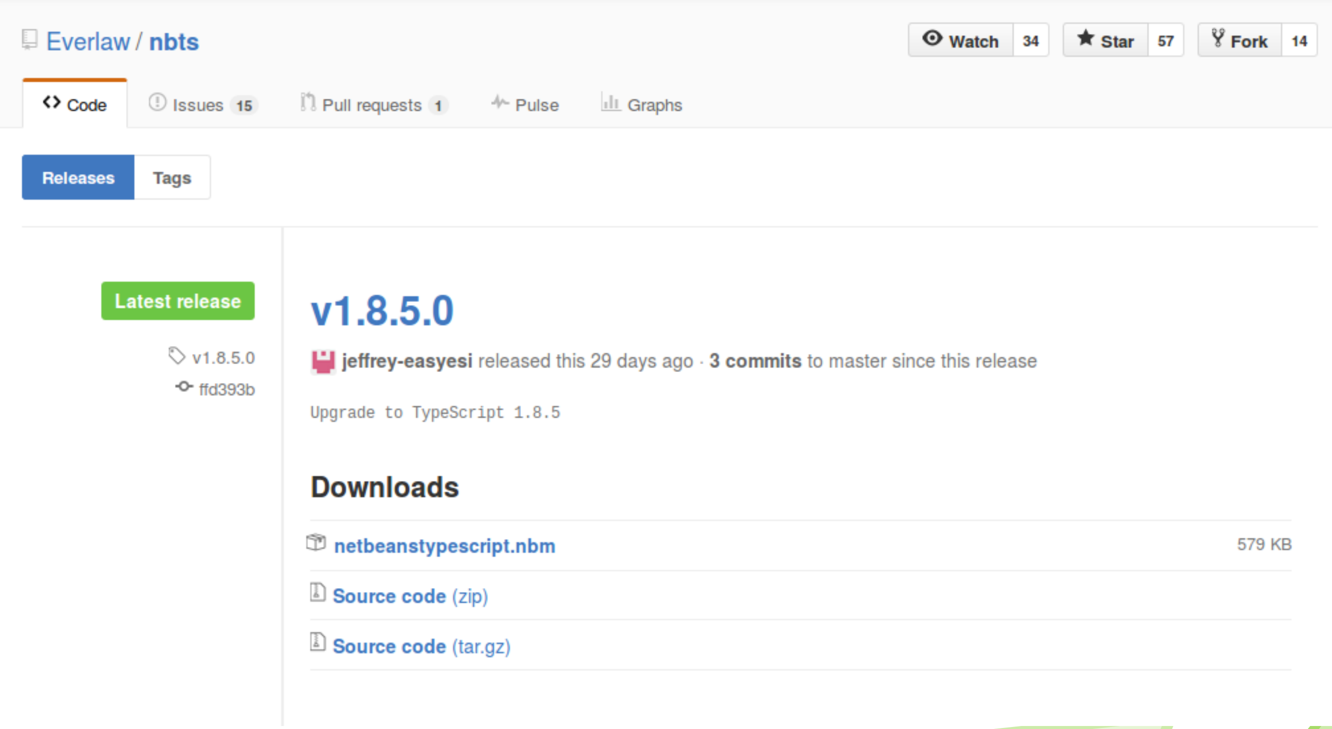
- GeertjanWielenga/TypeScript
  - 26 Sep. 2015 – 01 Okt. 2015
- Everlaw nbts
  - (01 Feb. 2015) 29 Sep. 2015 – 20 Mar. 2016



Everlaw nbts-Plugin

- Community Driven Plugin
- Actively Developed
- Multiple Contributors
- Collaboration via GitHub

https://github.com/Everlaw/nbts



v1.8.5.0

jeffrey-easyesi released this 29 days ago · 3 commits to master since this release

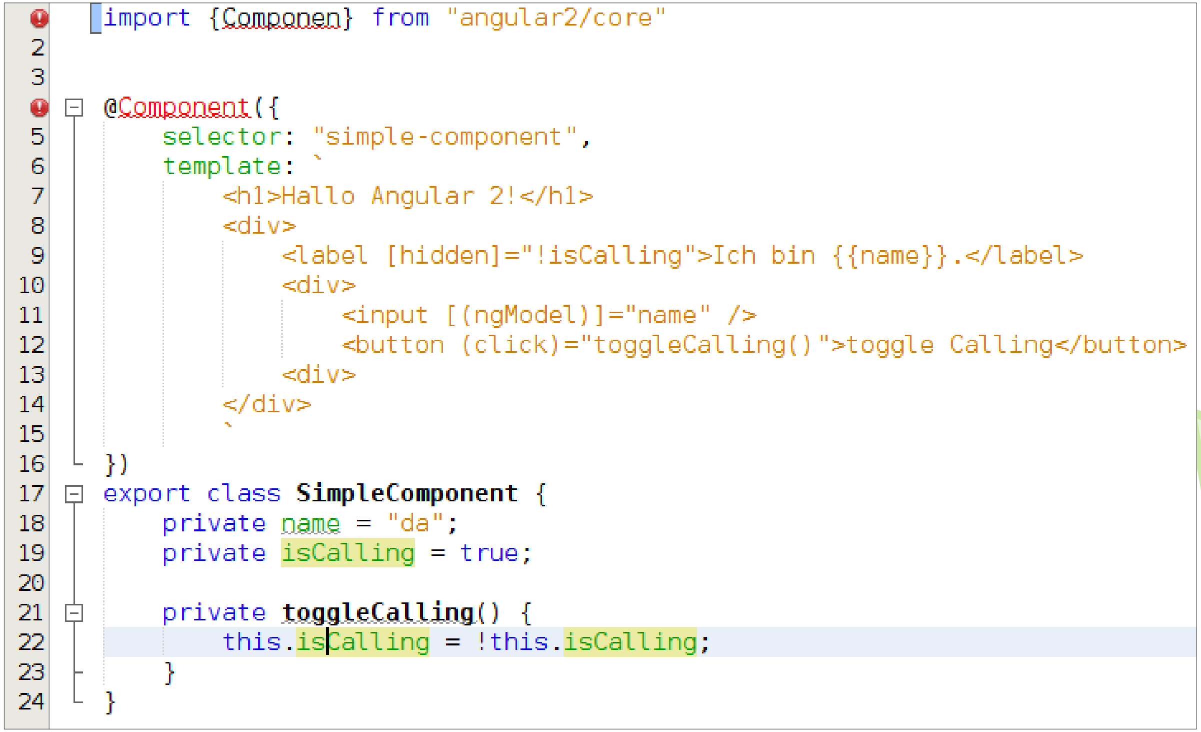
```
Upgrade to TypeScript 1.8.5
```

Downloads

netbeanstypescript.nbm	579 KB
Source code (zip)	
Source code (tar.gz)	

Everlaw Plugin Features

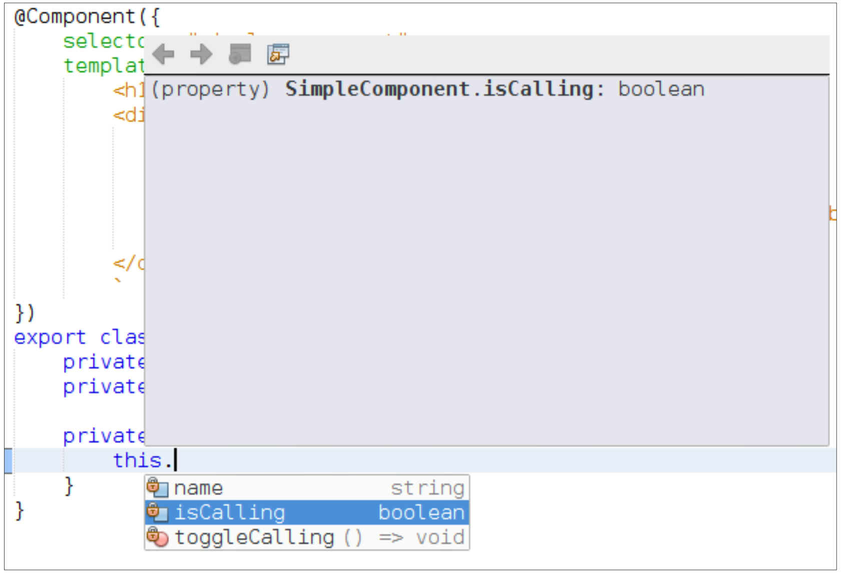
- Syntax highlighting
- Error Checking
- Usages Highlighting
- Basic Refactoring



```
import {Componen} from "angular2/core"


@Component({
    selector: "simple-component",
    template: `
        <h1>Hallo Angular 2!</h1>
        <div>
            <label [hidden]="!isCalling">Ich bin {{name}}.</label>
            <div>
                <input [(ngModel)]="name" />
                <button (click)="toggleCalling()">toggle Calling</button>
            <div>
        </div>
        `
})
export class SimpleComponent {
    private name = "da";
    private isCalling = true;

    private toggleCalling() {
        this.isCalling = !this.isCalling;
    }
}
```

Everlaw Plugin Features

- Code Completion

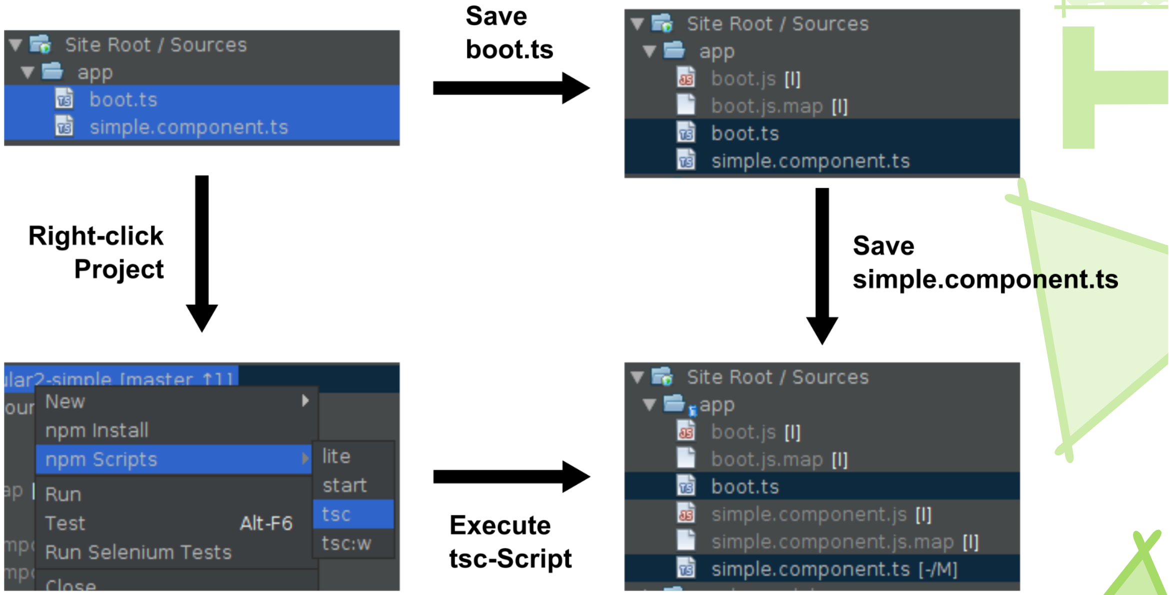


```
@Component({
    selecto
    templat
        <h1
        <di



        </c
})
export clas
    private
    private

    private
        this.
    }
}
```

(property) **SimpleComponent.isCalling**: boolean

name	string
isCalling	boolean
toggleCalling ()	=> void

Compile-on-Save



Save boot.ts

Right-click Project

Save simple.component.ts

Execute tsc-Script

Missing Features for Angular 2

- Template language support
- Debugger Support (Breakpoints, Variable inspection ...)
- Custom-component detection/support
- Extract functions-refactoring not available
- Refactoring of filenames leaves orphans
  - Workaround: Special build folder for ES5 artifacts
- tsconfig.json editing-support

Demo

Outlook: Alternatives to TypeScript

- ES6/ES2015 NetBeans support in development
  - Planned for 8.2
  - Transpilation to ES5 required (browser support)
- Dart: Not supported in NetBeans
  - Small ecosystem
  - Probably replaced by TypeScript or ES2017
- ES5
  - No transpilation
  - Language supported, but no special Angular 2 support

Interested in more?

We provide you with training, consulting, development

Java, Spring, AngularJS and Angular 2

Contact us: www.trion.de

Thank you
for your attention

I am looking forward to answer your questions at
karsten.sitterberg@trion.de