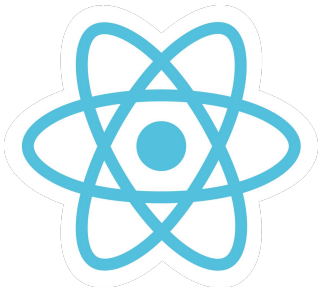


# Qualität im Web Frontend

Werkzeuge und Vorgehen

vor Produktion



# Fokus

## Überblick zur Technik

- nicht in diesem Talk -  
komplementäre Praktiken  
Code-Review / Pull-Requests / Pairing

# Karsten Sitterberg

- Entwickler, Trainer, Berater
  - [sitterberg.com](http://sitterberg.com)
  - @kakulty
- Java User Group Münster
- Frontend Freunde Münster



# Qualitätsziele

- Keine Fehler
- Gut verständliches Programm
- Neue Features leicht zu ergänzen
- Langfristige Wartbarkeit sichergestellt
- Hohe Entwicklerproduktivität

Vorsicht  


**Nicht gratis**

# Von Idee zu Programm

Architektur / Design

Erstellung Quellcode

Fehlerbehebung / Optimierung / Refactoring

Kollaboration

Dokumentation

Ergänzung von Features

**linter**

**IDE**

**Tests**

**VCS**

**CI Server**

**Libraries**

**Input**

**Conditional  
Rendering**

# Demo Anwendung

**Routing**

**Flux**

# Welcome to angular-quality!

Name

Kundennummer

Aktuelle Angebote

Commit: 7567cc2d3029a84ad2eb65141bab7913e20378db

Build: Wed Sep 19 09:54:37 UTC 2018

# Welcome to angular-quality!



## Gummibären

Gratis

Nur solange der Vorrat reicht

[Hier](#)



## Äpfel

2,50€

In rot, gelb, grün und blau!

[Hier](#)



## 3 gelbe Bananen

4,70€

In dick, dünn, lang und kurz!

[Hier](#)

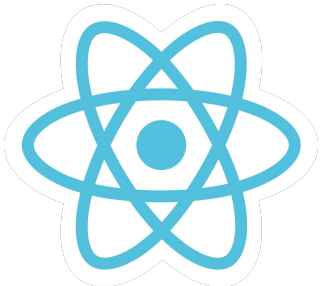
## Premiumangebote





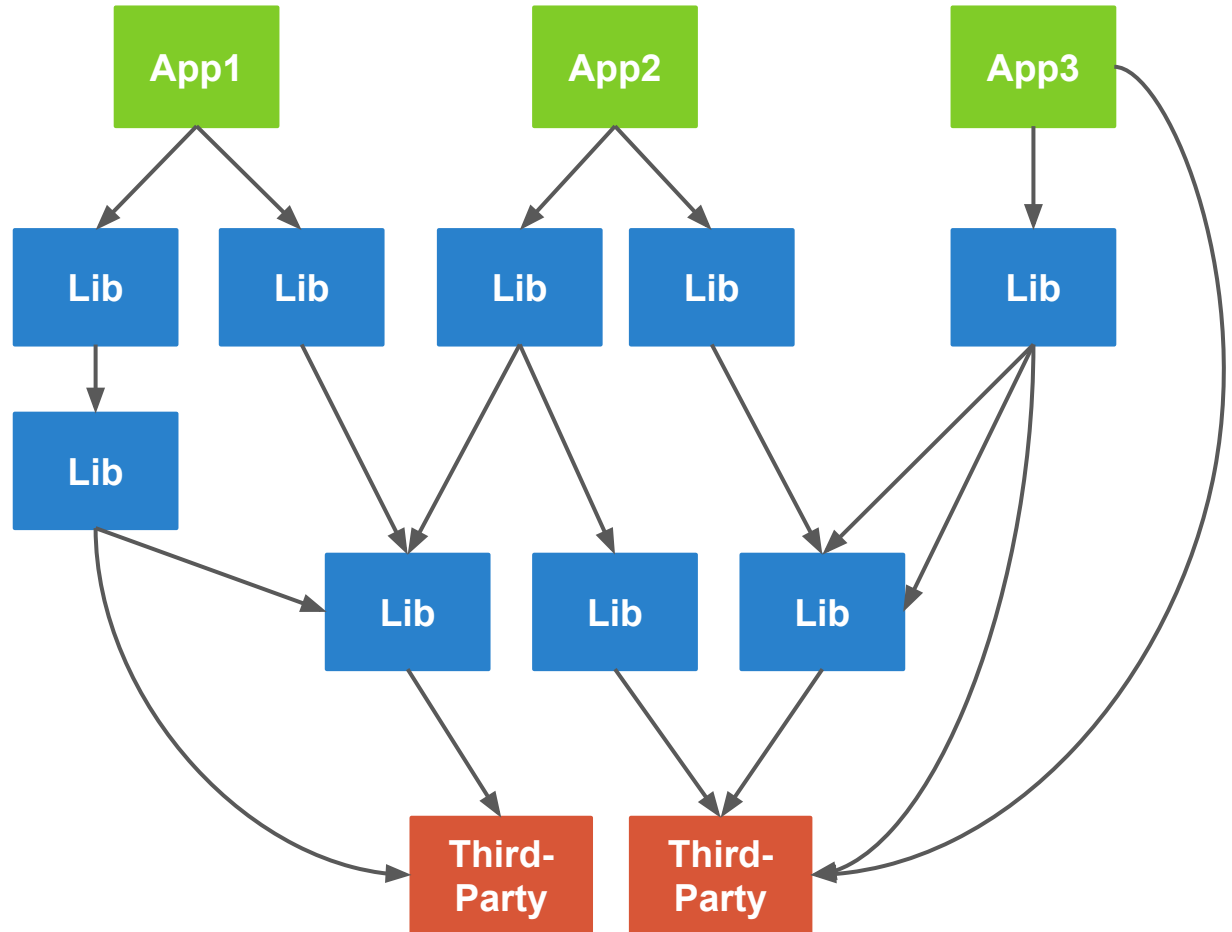
# Architektur

State Management

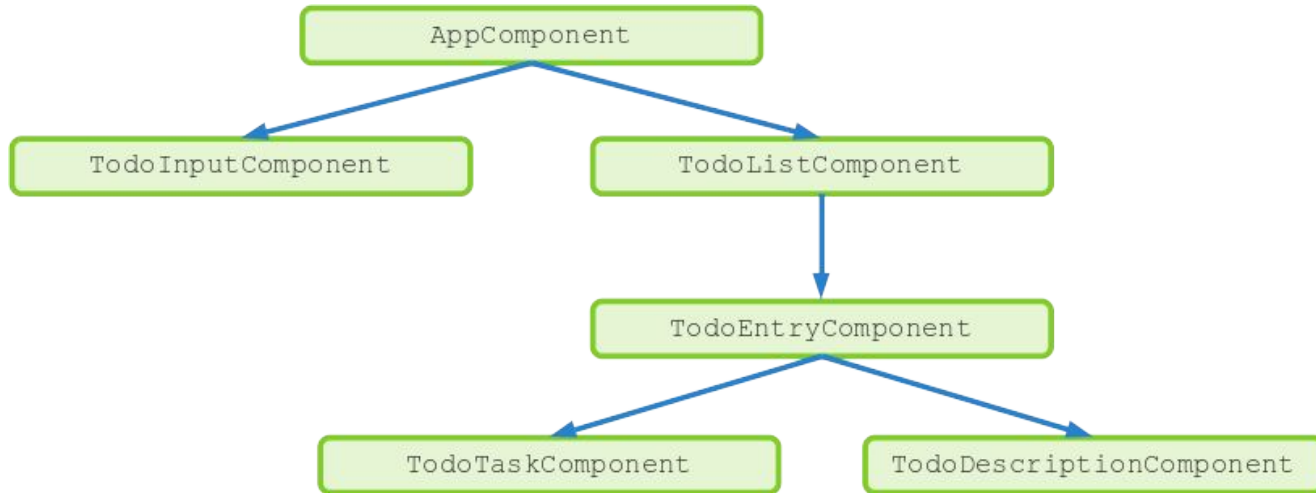


# Libraries

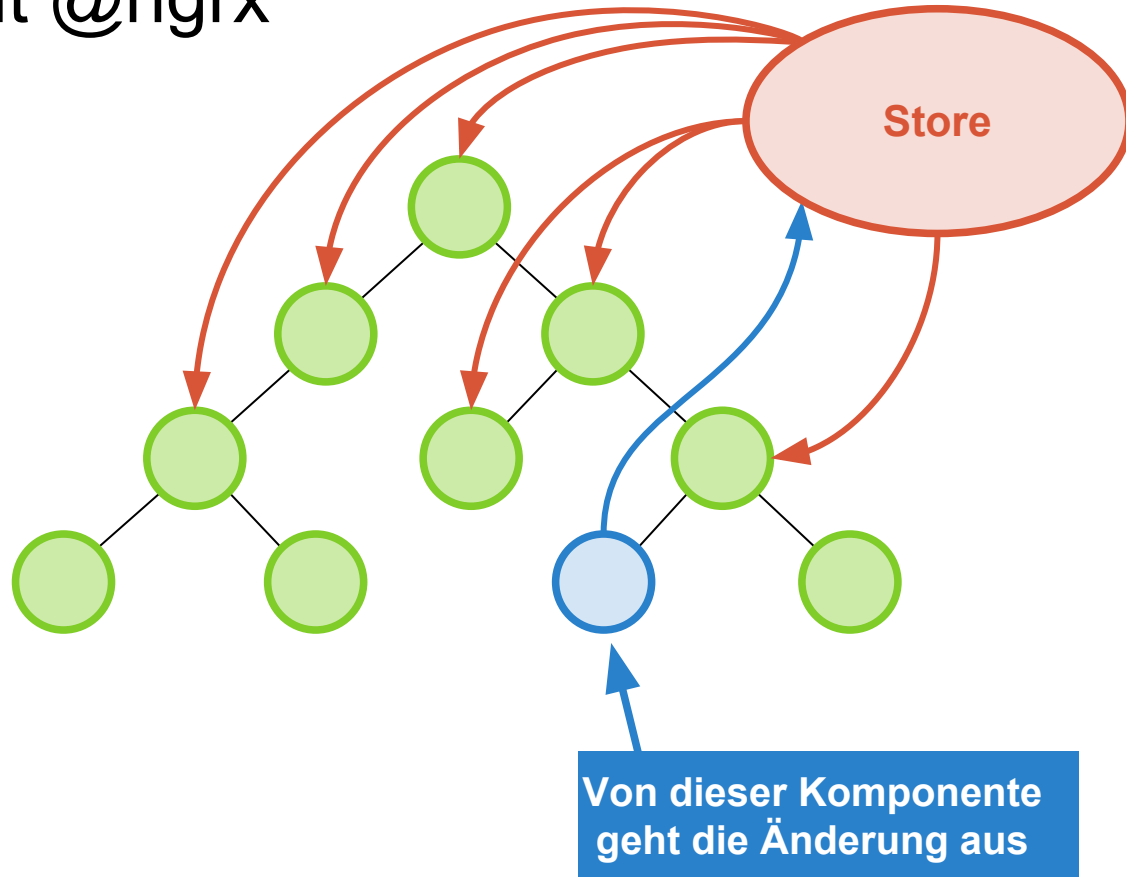
- Umsetzung mit NPM
- Artefakt Repository
- Build-Time



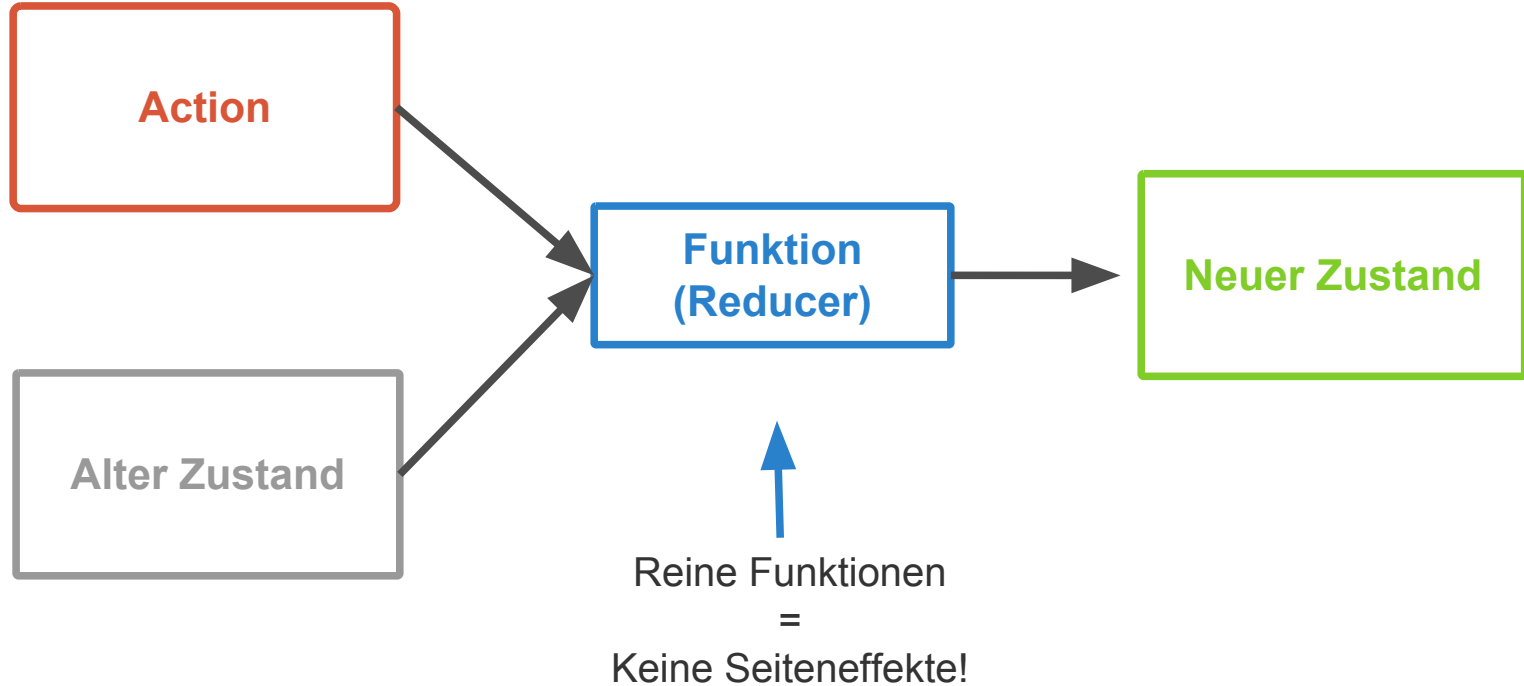
# Struktureller Aufbau Anwendung



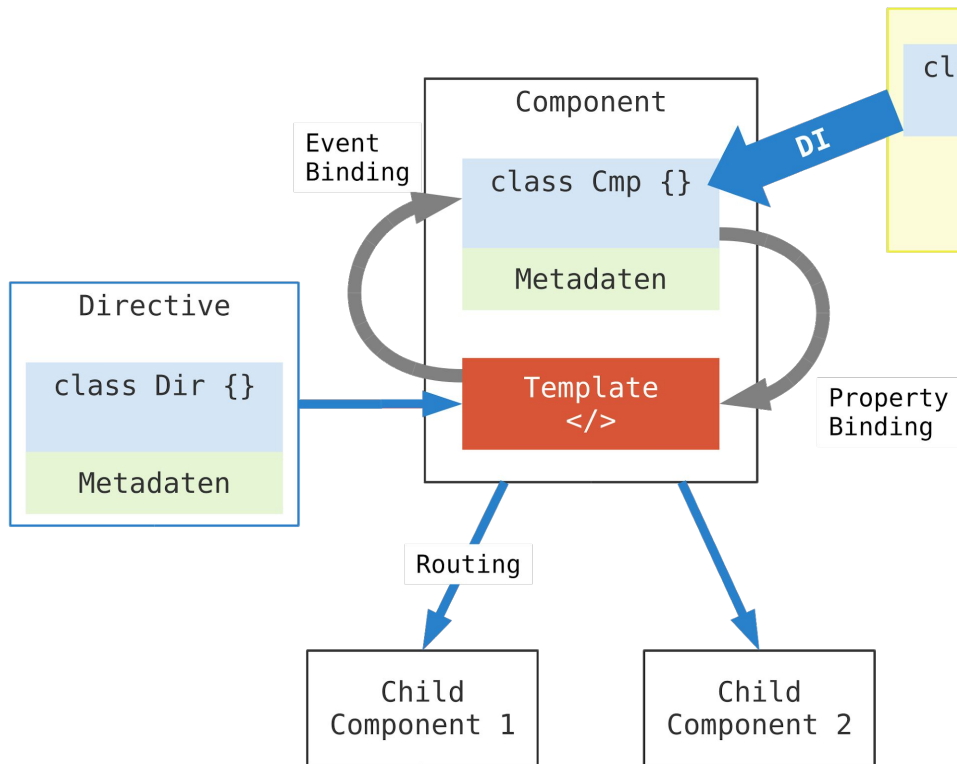
# Redux mit @ngrx



# Aktualisierung des Zustands



# Angular Komponenten



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

@Component({
  selector: 'app-demo',
  template: `<h1 class="head">
    Hello {{title}}!
  </h1>`,
  styleUrls: ['./demo.component.css']
})
export class DemoComponent implements OnInit {
  title: string;

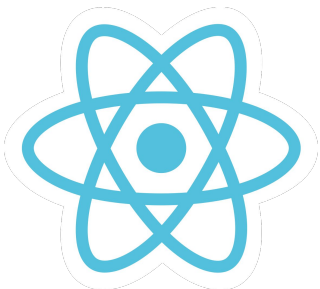
  ngOnInit() {this.title = 'World';}
}
```

# IDE vs. Editor

vi (:wq!)

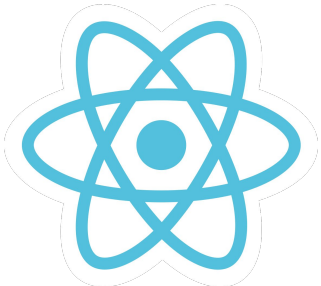
VisualStudio Code

WebStorm



# TypeScript

Genau mein Typ





# TypeScript

Code Completion

Statische Analyse

Refactoring

Lohnt vor allem für große, langfristig zu wartende Projekte

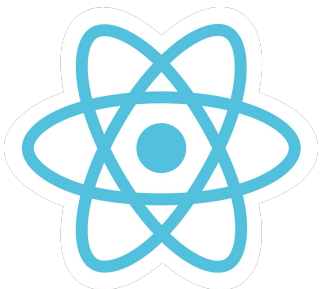
Kann initial höheren Aufwand bedeuten

Integration mit react/JSX möglich

Für react ist TypeScript Support noch nicht so ausgereift wie bei Angular

# Statische Analyse

TypeScript sei Dank



# Linters

TSLint

Statische Analyse auf typische Fehler

Codealyzer

Sprache, Frameworknutzung, CSS

ESLint

Stylelint

```
if (this.premiumCustomer()  
    this.showBonusOfferings();  
    this.reduceOfferPrice();
```

```
this.displayOffers();
```

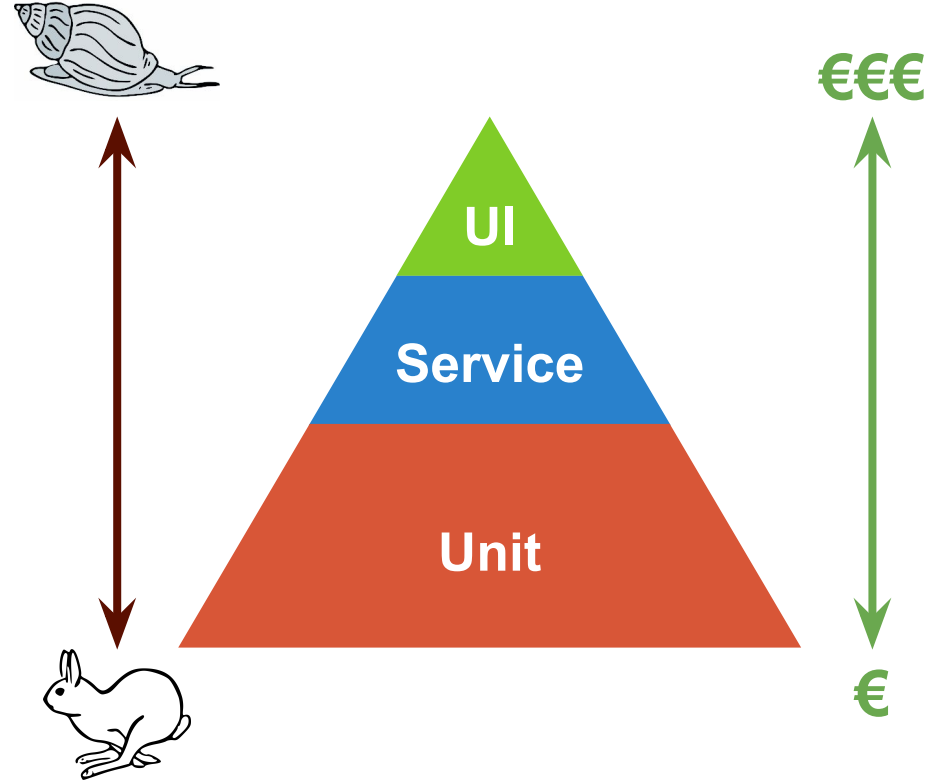
Missing braces

# Tests

Teil der Codebasis

Teil der **Dokumentation**

Erster Code Re-Use !

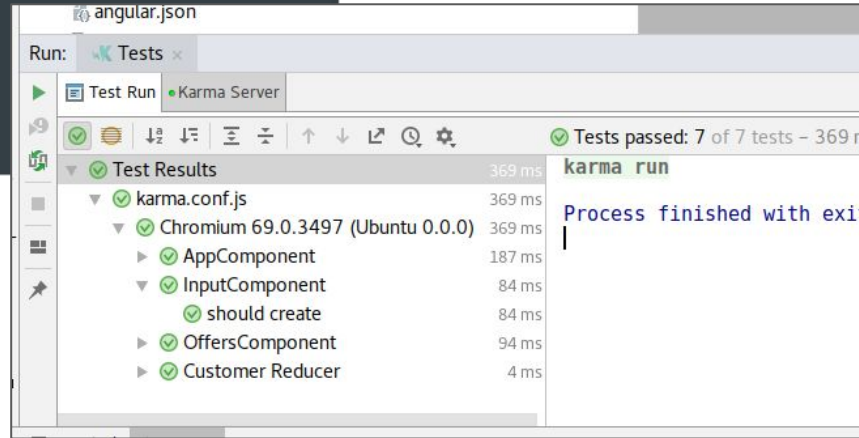


# Karma & Jasmine

Unit Tests



```
it('should have as title 'angular-quality'', async(() => {
  const fixture = TestBed.createComponent(AppComponent);
  const app = fixture.debugElement.componentInstance;
  expect(app.title).toEqual('angular-quality');
}));
```



The screenshot shows a test runner interface for 'angular.json'. The 'Run' tab is active, displaying 'Tests' and 'Karma Server'. The 'Test Results' section shows a tree view of test results:

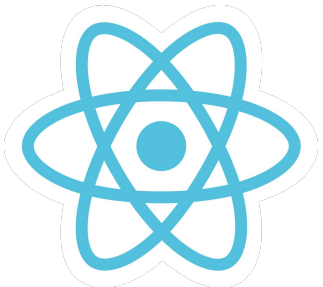
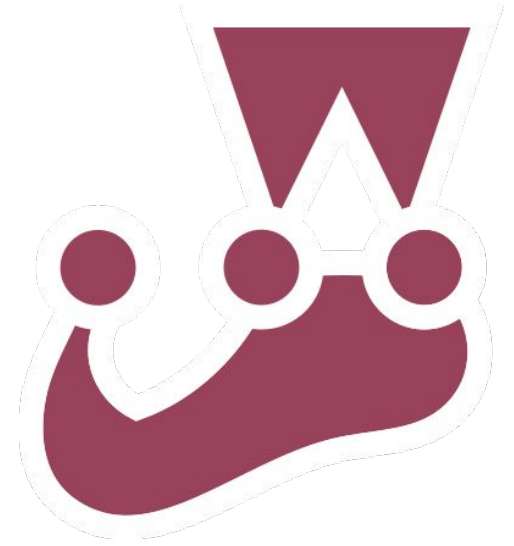
- Test Results (369 ms)
  - karma.conf.js (369 ms)
    - Chromium 69.0.3497 (Ubuntu 0.0.0) (369 ms)
      - AppComponent (187 ms)
        - InputComponent (84 ms)
          - should create (84 ms)
        - OffersComponent (94 ms)
        - Customer Reducer (4 ms)

The status bar indicates 'Tests passed: 7 of 7 tests - 369 ms'. A terminal window on the right shows the command 'karma run' and the output 'Process finished with exit code 0'.

```
+ angular-quality git:(master) ng test --watch false --progress false
19 09 2018 21:37:17.723:INFO [karma]: Karma v1.7.1 server started at http://0.0.0.0:9876/
19 09 2018 21:37:17.727:INFO [launcher]: Launching browser Chrome with unlimited concurrency
19 09 2018 21:37:17.767:INFO [launcher]: Starting browser Chrome
19 09 2018 21:37:21.185:INFO [Chromium 69.0.3497 (Ubuntu 0.0.0)]: Connected on socket K4CYxak0M2Ha11GpAAAA with id 89934482
Chromium 69.0.3497 (Ubuntu 0.0.0): Executed 7 of 7 SUCCESS (0.323 secs / 0.304 secs)
+ angular-quality git:(master) █
```

# Jest

Geteilt von Facebook



# Jest

Für react entwickelt

Kein Browser nötig

Nutzbar mit Angular

Snapshot-Tests

```
> jest -c jest.config.js
PASS src/app/input/input.component.spec-jest.ts
  InputComponent
    ✓ should create (141ms)

Test Suites: 1 passed, 1 total
Tests:       1 passed, 1 total
Snapshots:  1 passed, 1 total
Time:        1.401s, estimated 2s
Ran all test suites.
→ angular-quality git:(master) x █
```

```
it('should create', () => {
  expect(component).toBeTruthy();
  expect(fixture.debugElement.nativeElement).toMatchSnapshot();
});
```



# Jest Snapshots

- Werden beim ersten Testlauf erzeugt
- Sollten mit eingechecked werden
- Update mit ``-u``

```
it('should create', () => {  
  expect(component).toBeTruthy();  
  expect(fixture.debugElement.nativeElement).toMatchSnapshot();  
});
```

```
input.component.spec-jest.ts.snap ×  
1 // Jest Snapshot v1, https://goo.gl/fbAQLP  
2  
3 exports[`InputComponent should create 1`] = `  
4 <div  
5   id="root0"  
6   ng-version="6.1.7"  
7 >  
8   <section>  
9     <form  
10       class="ng-untouched ng-pristine ng-invalid"  
11       ng-reflect-form="[object Object]"  
12       novalidate=""  
13     >  
14       <div  
15         class="form-group"  
16       >  
17         <label  
18           for="customerName"  
19         >  
20           Name  
21         </label>  
22         <input  
23           class="form-control ng-untouched ng-pristine ng-invalid"  
24           formcontrolname="name"  
25           id="customerName"
```

# Code Coverage

# Code Coverage

## Mit Jest und Karma

```
→ angular-quality git:(master) ng test --watch false --code-coverage
10% building modules 4/4 modules 0 active19 09 2018 21:24:38.885:INFO [karma]: Karma v1.7.1 server started at http://0.0.0.0:9876/
19 09 2018 21:24:38.889:INFO [launcher]: Launching browser Chrome with unlimited concurrency
19 09 2018 21:24:38.993:INFO [launcher]: Starting browser Chrome
0.3497 (Ubuntu 0.0.0)]: Connected on socket yEs63v7qWvl-zANwAAAA with id 35954550
Chromium 69.0.3497 (Ubuntu 0.0.0): Executed 7 of 7 SUCCESS (0.357 secs / 0.333 secs)
```

```
===== Coverage summary =====
Statements : 90.18% ( 101/112 )
Branches   : 58% ( 58/100 )
Functions  : 68.42% ( 13/19 )
Lines      : 94.74% ( 90/95 )
```

```
→ angular-quality git:(master)
```

```
> jest -c jest.config.js --coverage
```

```
PASS src/app/input/input.component.spec-jest.ts
  InputComponent
    ✓ should create (219ms)
```

File	% Stmts	% Branch	% Funcs	% Lines	Uncovered Line #s
All files	73.81	45	30	77.78	
app/input	83.33	75	50	80	
input.component.html	100	100	100	100	
input.component.ts	82.35	75	50	78.57	28,32,33
app/store	65.22	25	16.67	75	
customer.actions.ts	60	100	50	60	9,11
customer.reducer.ts	50	0	0	57.14	15,18,22
index.ts	80	20	0	100	14,17
environments	100	100	100	100	
environment.ts	100	100	100	100	

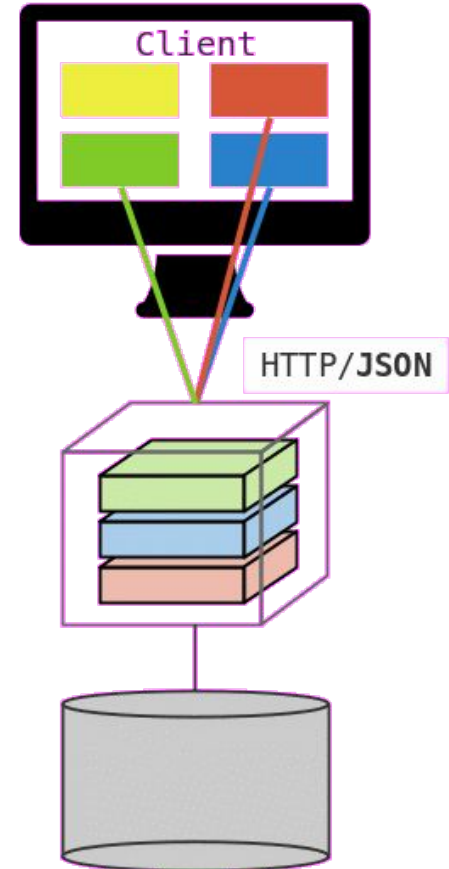
```
Test Suites: 1 passed, 1 total
Tests:       1 passed, 1 total
Snapshots:  1 passed, 1 total
Time:        2.081s
```

```
Ran all test suites.
```

```
→ angular-quality git:(master)
```

# End-2-End Tests

- Oberfläche mit Integration von Backend
- Typischerweise mit Fake/Mock Backend
- Tipp: Eher wenige Tests



# Protractor

Und Selenium



# Protractor E2E Tests

```
chunk {vendor} vendor.js, vendor.js.map (vendor) 3.83 MB [initial] [re
[22:04:11] I/config_source - curl -o/home/karsten/job/projects/fronten
age.googleapis.com/
i 「wdm」: Compiled successfully.
[22:04:12] I/update - chromedriver: file exists /home/karsten/job/proj
[22:04:12] I/update - chromedriver: unzipping chromedriver_2.42.zip
[22:04:12] I/update - chromedriver: setting permissions to 0755 for /h
2.42
[22:04:12] I/update - chromedriver: chromedriver_2.42 up to date
[22:04:12] I/launcher - Running 1 instances of WebDriver
[22:04:12] I/direct - Using ChromeDriver directly...
Jasmine started

workspace-project App
  ✓ should display welcome message, submit button disabled
  ✓ should enable welcome button, if data is entered
  ✓ should show alert if customerNumber is bigger 10000
  ✓ should show Premium-Angebote if Premium-Customer
  ✓ should show only standard offers if normal customer

Executed 5 of 5 specs SUCCESS in 4 secs.
[22:04:17] I/launcher - 0 instance(s) of WebDriver still running
[22:04:17] I/launcher - chrome #01 passed
+ angular-quality git:(master) █
```

```
Run: E2E Tests x
Tests passed: 5 of 5 tests - 3 s 608 ms
protractor.conf.js (chrome 69.0.3497.81) 3 s 608 ms
  workspace-project App 3 s 608 ms
    ✓ should display welcome message, submit button disabled
    ✓ should enable welcome button, if data is entered 681 ms
    ✓ should show alert if customerNumber is bigger 10000 418 ms
    ✓ should show Premium-Angebote if Premium-Customer 753 ms
    ✓ should show only standard offers if normal customer 728 ms

protractor protractor.conf.js
[22:07:41] I/launcher - Running 1 instances of WebDriver
[22:07:41] I/direct - Using ChromeDriver directly...
Jasmine started

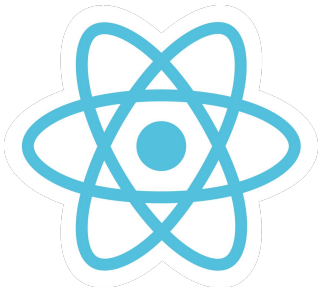
workspace-project App
  ✓ should display welcome message, submit button disabled
  ✓ should enable welcome button, if data is entered
  ✓ should show alert if customerNumber is bigger 10000
  ✓ should show Premium-Angebote if Premium-Customer
  ✓ should show only standard offers if normal customer

Executed 5 of 5 specs SUCCESS in 4 secs.
[22:07:46] I/launcher - 0 instance(s) of WebDriver still running
[22:07:46] I/launcher - chrome #01 passed

Process finished with exit code 0
```

# SonarQube

Gesammelte Qualität

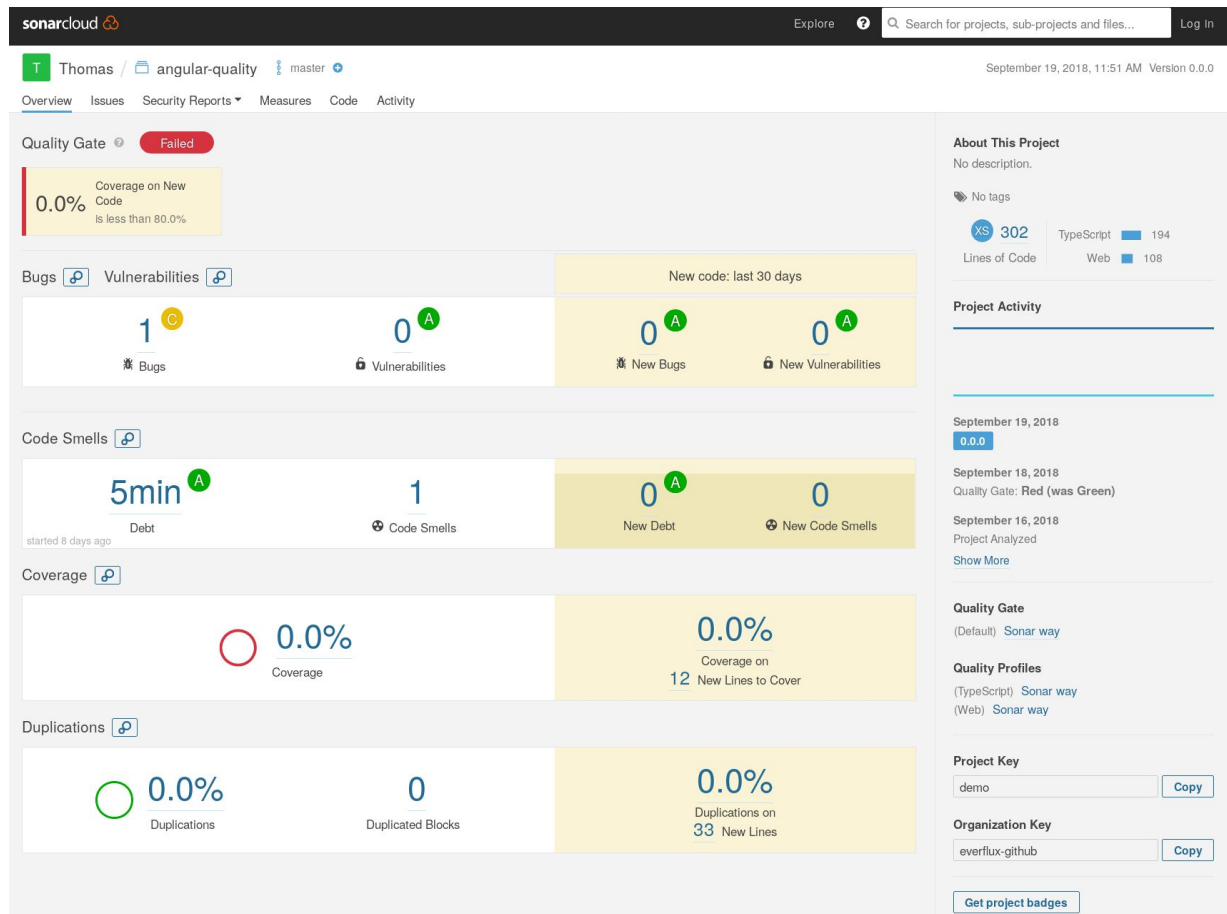


# SonarQube

Metrikdaten zur Qualität  
im Projektverlauf

Dashboard für Projektleiter

Qualitygate





# SonarQube

Anzeige am Source

Bugs / Code Smells

Code Coverage

Komplexität

Kommentare

Code Duplication

The screenshot displays the SonarQube web interface for a project named 'angular-quality'. The left sidebar shows a 'Project Overview' with various quality metrics. The main area shows the source code for 'src/app/store/index.ts'. A bug is highlighted on line 14, with a tooltip explaining that a conditional operation returns the same value regardless of the condition's truth value. The bug is categorized as 'Major' and has a remediation effort of 15 minutes. The interface also shows code coverage statistics (19 lines, 1 issue, 0.0% coverage) and a footer with copyright information and navigation links.

Thomas / angular-quality master

September 19, 2018, 11:51 AM Version 0.0.0

Overview Issues Security Reports Measures Code Activity

Project Overview

- Reliability **Bugs**
  - Overview
  - On new code
  - Bugs 0
  - Rating A
  - Remediation Effort 0
  - Overall
  - Bugs 1**
  - Rating C
  - Remediation Effort 15min
- Security **0**
  - Overview
  - On new code
  - Vulnerabilities 0
  - Rating A
  - Overall
  - Vulnerabilities 0
  - Rating A
  - Remediation Effort 0
- Maintainability **0**
  - Overview
  - On new code
  - Code Smells 0
  - Debt 0
  - Debt Ratio 0.0%
  - Rating A
  - Overall
  - Code Smells 1
  - Debt 5min
  - Debt Ratio 0.1%
  - Rating A
  - Effort to Reach A 0
- Coverage

angular-quality / src/app/store / index.ts

19 Lines 1 Issues 0.0% Coverage

1 Bug 1

New code: last 30 days

```
1 import { ActionReducerMap, createSelector, MetaReducer } from '@ngrx/store';
2 import { environment } from '../../environments/environment';
3 import * as fromCustomer from './customer.reducer';
4
5 export interface State {
6   customer: fromCustomer.Customer;
7 }
8
9 export const reducers: ActionReducerMap<State> = {
10   customer: fromCustomer.reducer
11 };
12
13
14 export const metaReducers: MetaReducer<State>[] = !environment.production ? [] : [];
15
16 export const getCustomerState = (state: State) => state.customer;
17
18 export const fromCustomerPremium = createSelector(getCustomerState, customer => !!customer.name && customer.name.length > 0 && !!customer.isPremium);
19
```

This conditional operation returns the same value whether the condition is "true" or "false". 12 days ago L14

Bug Major Open Not assigned 15min effort No tags

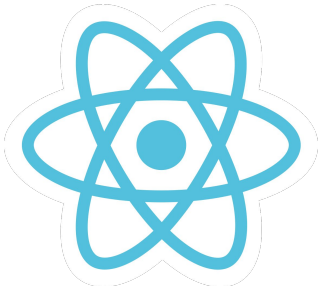
Not covered by tests.

© 2008-2018, SonarCloud by SonarSource SA. All rights reserved.  
News - Twitter - Terms - Privacy - Security - Help - Contact us - Status - About

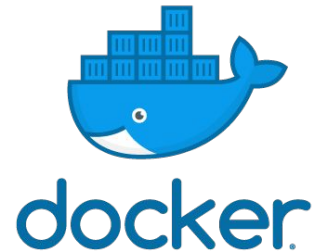
# Docker / Container

Lokale Umgebung  
(DB, Backend,  
Umsysteme)

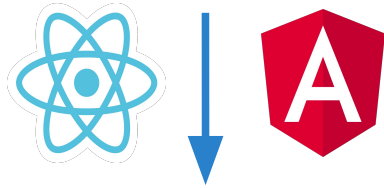
CI Server



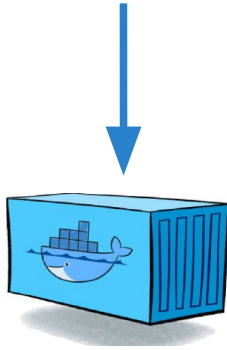
Auslieferung als  
Image



# Docker Deployment



```
FROM trion/nginx-angular  
COPY dist/angular-quality /usr/share/nginx/html/
```



NGINX

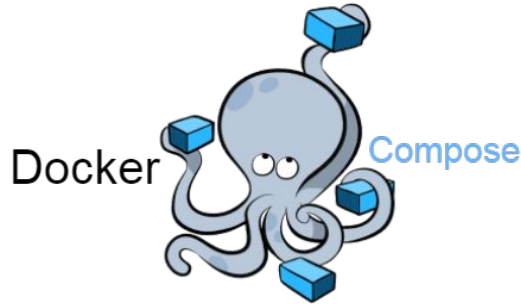
Handhabung einfach

Rollout/-back einfach

Reproduzierbare

Ergebnisse

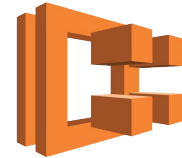
# Container Deployment



Canary Release



OPENSIFT



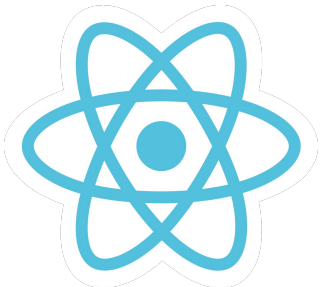
AWS ECS

Rolling Update

Automatisierung

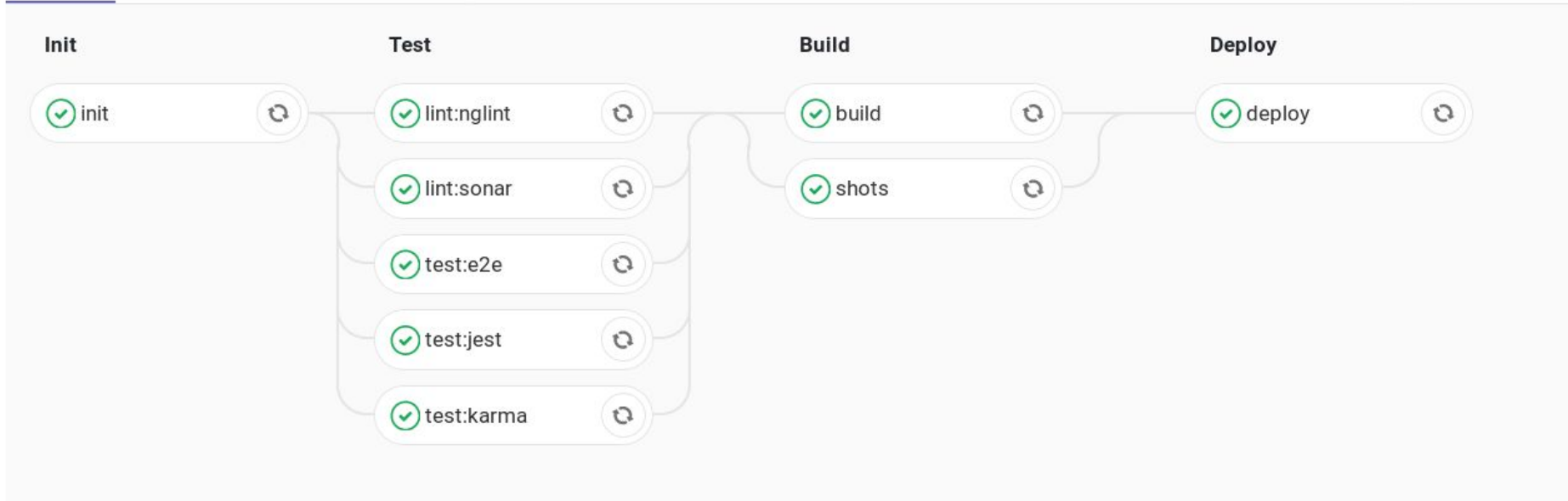
# CI Server

Beispiel GitLab-CI





# Build / Deployment Pipeline

Pipeline Jobs 9



# GitLab CI: Test-Job

```
test:karma:  
  stage: test  
  image: trion/ng-cli-karma:${CLI_VERSION}  
  allow_failure: false  
  script:  
  - ng test --code-coverage --progress false --watch false  
  coverage: '/Lines \W+: (\d+\.\d+)%.*/'  
  artifacts:  
    paths:  
    - angular-quality/coverage/  
  tags:  
  - docker  
  - gce
```

 passed	#405 x86_64 docker	lint	🕒 01:21 📅 5 minutes ago	
 passed	#406 x86_64 docker	test:karma	🕒 01:27 📅 5 minutes ago	92.86%



# GitLab CI: Sonar-Job

## **lint:sonar:**

**stage:** test

**image:** trion/ng-cli:\${CLI\_VERSION}

## **script:**

- npm install -g sonarqube-scanner

- >

sonar-scanner

-Dsonar.projectKey=demo

-Dsonar.organization=everflux-github

-Dsonar.host.url=https://sonarcloud.io

-Dsonar.login=covfefe

-Dsonar.typescript.lcov.reportPaths=coverage/lcov/lcov.info

-Dsonar.sourceEncoding=UTF-8

-Dsonar.sources=src/app

-Dsonar.exclusions=\*\*/node\_modules/\*\*, \*\*/\*.spec.ts

-Dsonar.tests=src/app

-Dsonar.test.inclusions=\*\*/\*.spec.ts



# GitLab CI: Build-Job mit Version

```
build:  
  stage: build  
  image: trion/ng-cli-karma:${CLI_VERSION}  
  script:  
  - ng build --prod  
  - sed -i "s/commit_hash = ''/commit_hash = '${CI_COMMIT_SHA}'/" $DIST_DIR/index.html  
  - sed -i "s/build_date = ''/build_date = '$(date)'" $DIST_DIR/index.html  
  artifacts:  
    expire_in: 1 day  
    paths:  
    - angular-quality/$DIST_DIR  
  tags:  
  - docker  
  - gce
```

# Version

ne to angular-quality!

Commit: 7567cc2d3029a84ad2eb65141bab7913e20378db

Build: Wed Sep 19 09:54:37 UTC 2018

Korrekte Zuordnung von Stand

Reproduktion von Fehlern



```
ng build --prod
```

```
sed -i "s/ch = "/ch = '${CI_COMMIT_SHA}/'" $DIST_DIR/index.html
```

```
sed -i "s/build_date = "/build_date = '$(date)/'" $DIST_DIR/index.html
```

# GitLab CI: Docker Heroku-Deployment

```
deploy:
  stage: deploy
  image: docker:stable
  services:
    - docker:dind
  variables:
    DOCKER_HOST: tcp://docker:2375/
    DOCKER_DRIVER: overlay
  before_script: ['cd angular-quality']
  script:
    - docker build -t $IMAGE .
    - docker login --username=_ --password=$HEROKU_API_KEY registry.heroku.com
    - docker push $IMAGE
    - IMAGE_ID=$(docker inspect ${IMAGE} --format={{.Id}})
    - 'echo deploying: ..${IMAGE_ID}.. for ..${IMAGE}..'
```

# Secrets

**Tipp: Keine  
Umgebungsdetails im Source**

## Variables

Collapse

Variables are applied to environments via the runner. They can be protected by only exposing them to protected branches or tags. You can use variables for passwords, secret keys, or whatever you want.

HEROKU\_API\_KEY

\*\*\*\*\*

Protected



# GitLab CI: Docker Heroku-Deployment

```
- apk add curl
- >
  curl -Ssl -X PATCH https://api.heroku.com/apps/angular-quality/formation
  -d "{
  \"updates\": [{
    \"type\": \"web\",
    \"docker_image\": \"${IMAGE_ID}\"
  }]
  }"
  -H "Content-Type: application/json"
  -H "Authorization: Bearer ${HEROKU_API_KEY}"
  -H "Accept: application/vnd.heroku+json; version=3.docker-releases"
tags:
- docker
- gce
```

# Selfie

Screenshots der App

# Protractor Screenshots

- Protractor besitzt API für Screenshots
- Manuell getriggert
- Einfach zu erweitern
  - Bei jedem Testfall
  - Im Fehlerfall

```
const fname = `${testDescription.replace(/s/g, '_')}.png`;
browser.takeScreenshot().then((png) => {
  const stream = fs.createWriteStream(path.join(dir, fname));
  stream.write(new Buffer(png, 'base64'));
  stream.end();
});
```

# puppeteer

- Verwendet Chrome API
- Default: headless-mode
- Kann zur Umsetzung von e2e-Tests und Screenshots genutzt werden

```
const puppeteer = require('puppeteer');

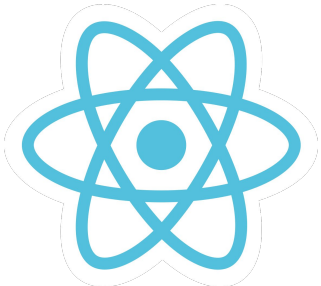
(async () => {
  const browser = await puppeteer.launch();
  const page = await browser.newPage();
  page.setViewport({width: 1280, height: 768});
  await page.goto('http://angular-quality.herokuapp.com/',
    {waitFor: 'networkidle2'});
  await page.screenshot({path: 'shots/startpage.png'});
  await page.pdf({path: 'shots/startpage.pdf', format: 'A4'});
  await browser.close();
})();
```



Auch vor Produktion!

# Blue Screen

Crash Reporting



# Sentry

100% OpenSource, hosted Cloud-SaaS

The screenshot shows the Sentry web interface for a project named "Angular". The top navigation bar includes "Issues", "Overview", "User Feedback", and "Releases". There are buttons for "Star Project" and "Project Settings". The main heading is "Unresolved Issues (4)" with a "Sort by: Last Seen" dropdown and a search bar containing "is:unresolved". Below this is a table of issues with columns for "Resolve", "Ignore", "Star", "More", "Play", "GRAPH" (with sub-selects for 24H, 14D, EVENTS, and USERS), and "USERS".

Issue	Resolve	Ignore	Star	More	Play	GRAPH	USERS
<b>Error</b> raven-js/src/raven in this Non-Error exception captured with keys: error, headers, message, name, ok... ANGULAR-2   36 minutes ago - 3 hours old   javascript	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	16	1
<b>Error</b> <unknown module> in _v Test ANGULAR-8   36 minutes ago - 36 minutes old   javascript	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	1
<b>Error</b> /polyfills.ac45929ae3d03540decf.bundle.js in E Uncaught (in promise): Error: Cannot match any routes. URL Segment: 'error...' ANGULAR-7   an hour ago - an hour old   javascript	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	1
<b>Error</b> /main.f2ed04be7490f8434571.bundle.js in x35b/a</t.prototype.sim... Test ANGULAR-6   an hour ago - an hour old   javascript	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	1

The screenshot shows the details for a specific error event. The title is "Error <unknown module> in \_v" with a red dot icon. The issue is "Test" in the "javascript" category, associated with "ANGULAR-8". There are 1 event and 1 user. Action buttons include "Resolve", "Ignore", "Star", "Share", and "Link Issue Tracker".

Details | Comments (0) | User Feedback (0) | Tags | Events

**Event** 0abfc64674cb4277aae7095a983108f8  
Mar 30, 2018 3:31:31 PM UTC | JSON (21.5 KB)

Environment: (Default Environment) | LAST 24 HOURS | LAST 30 DAYS | FIRST SEEN

When: an hour ago  
Mar 30, 2018 3:31:31 PM UTC

Release: 1.0.0

LAST SEEN  
When: an hour ago  
Mar 30, 2018 3:31:31 PM UTC

Tags:

- browser: Firefox 59.0
- browser.name: Firefox
- git\_hash: abc123
- level: error
- logger: javascript
- os.name: Ubuntu
- release: 1.0.0
- transaction: <unknown module> in \_v
- url: http://172.18.0.10:8080/
- user: ip:172.18.0.1

# Danke.

Fragen?

@kakulty

@everflux

[sitterberg.com](https://sitterberg.com)

[trion.de](https://trion.de)

Slides, Demo Repo



