



ManfredSteyer



# Custom Schematics and CLI: An Angular Application by the push of a Button

Manfred Steyer

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# About me...

- Manfred Steyer
- Blog: **SOFTWARE***architekt.at*
- Angular Trainings and Consultancy
- Google Developer Expert (GDE)



ANGULAR  
**COLLEGE**  
INSIDE KNOWLEDGE



*Manfred Steyer*

# Have you ever tried to ...

... setup a modern JavaScript project manually?

- Compiler/ Transpiler
- Package manager and packages
- Build chain optimized for bundle size, performance, etc.
- Testing tools including code coverage
- Linting tools



# Angular CLI

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

## Angular CLI

A command line interface for Angular

GET STARTED

# Using the CLI

```
ng new my-project
```

```
cd my-project
```

```
ng generate component my-component
```



# Vision

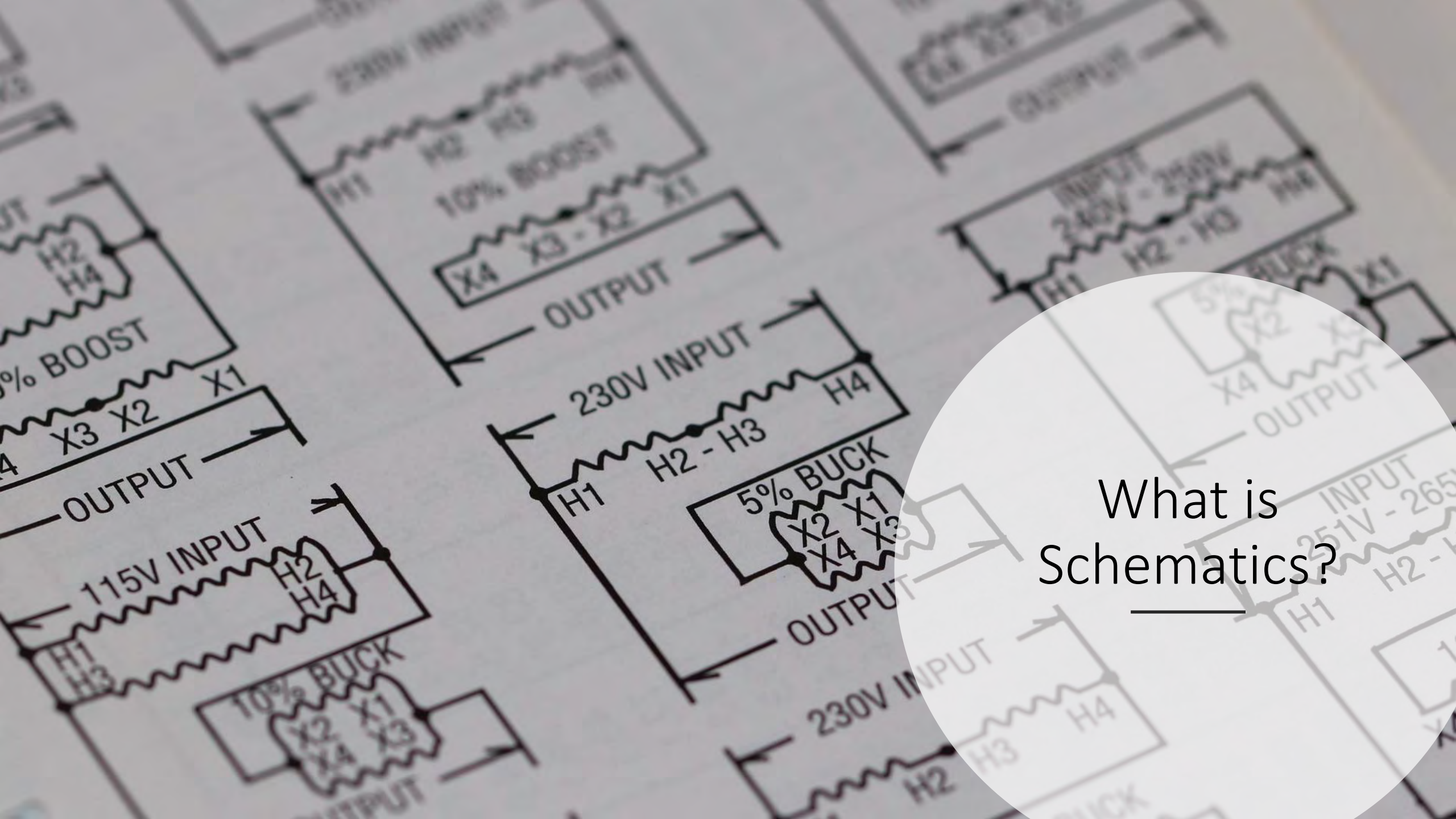
```
ng new my-project --collection my-special-templ
```

```
cd my-project
```

```
ng generate my:menu-component side-menu
```

# Contents

- What is Schematics?
- How to create custom schematics?
- How to use parameters?
- How to use templates?
- How to scaffold whole projects?



What is Schematics?



# Schematics

Scaffolding Tool used by  
Angular CLI

Schematics: The whole project

Schematic: Code Generator

Collection: Set of Schematics



Experimental :: Breaking Changes ahead



*Give it a try!*

Nrwl Nx



# Nrwl Extensions for Angular

An open source toolkit for enterprise Angular applications.



*ManfredSteyer*



@ngrx

Follow



Sign in

Get started



Brandon

Follow

Web developer, Google Developer Expert, sports fan and recovering gadget addict. My gif game is 🍷. I punch keys for the docs. #Angular #NgRx

Feb 13 · 4 min read

## NgRx 5 and Schematics

Today we are announcing the next major release of the NgRx platform of libraries. NgRx version 5 brings fixes, new features and a new library to the platform. While this may sound substantial, there are no substantial breaking changes in this release, other than removal of deprecated code in version 4 and humming the minimum version of RxJS for nineable operator support.

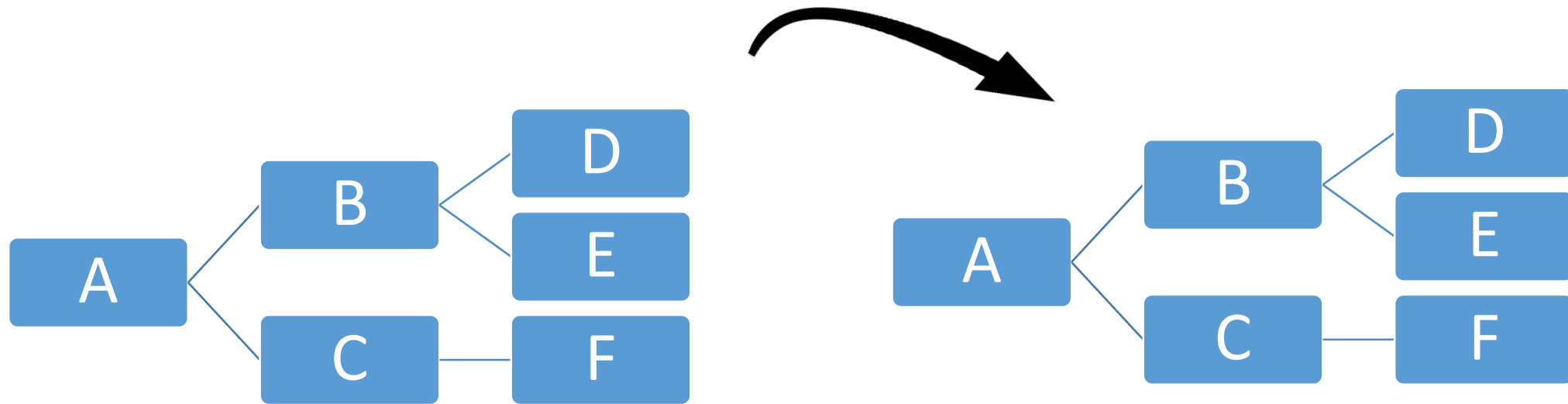


Never miss a story from @ngrx, when you sign up for Medium.

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GET UPDATES

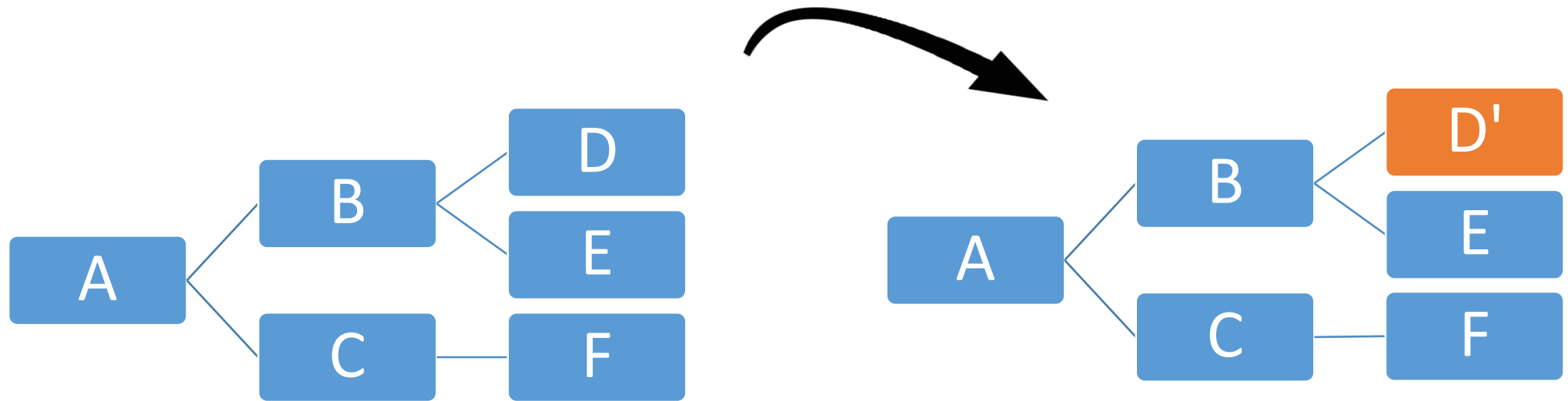
# Schematics are atomic (like db transactions)



Your Project

Staging Area  
Tree Object

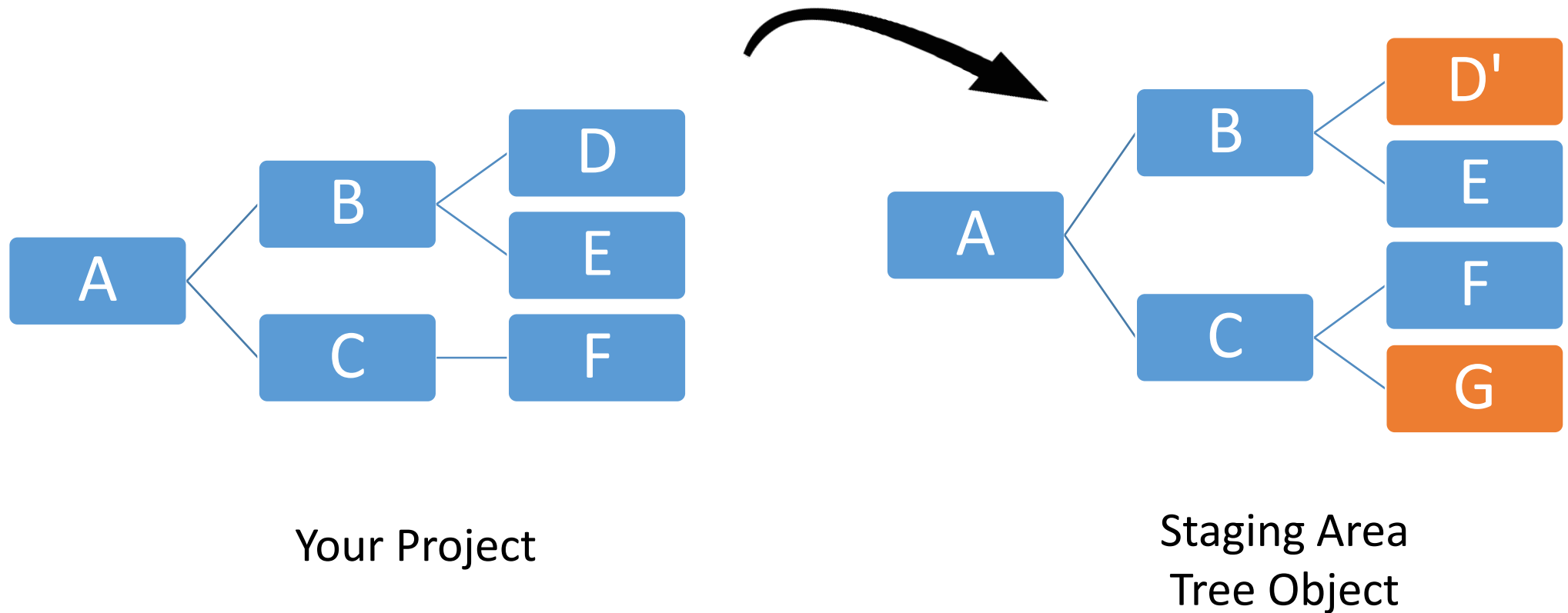
# Schematics are atomic (like db transactions)



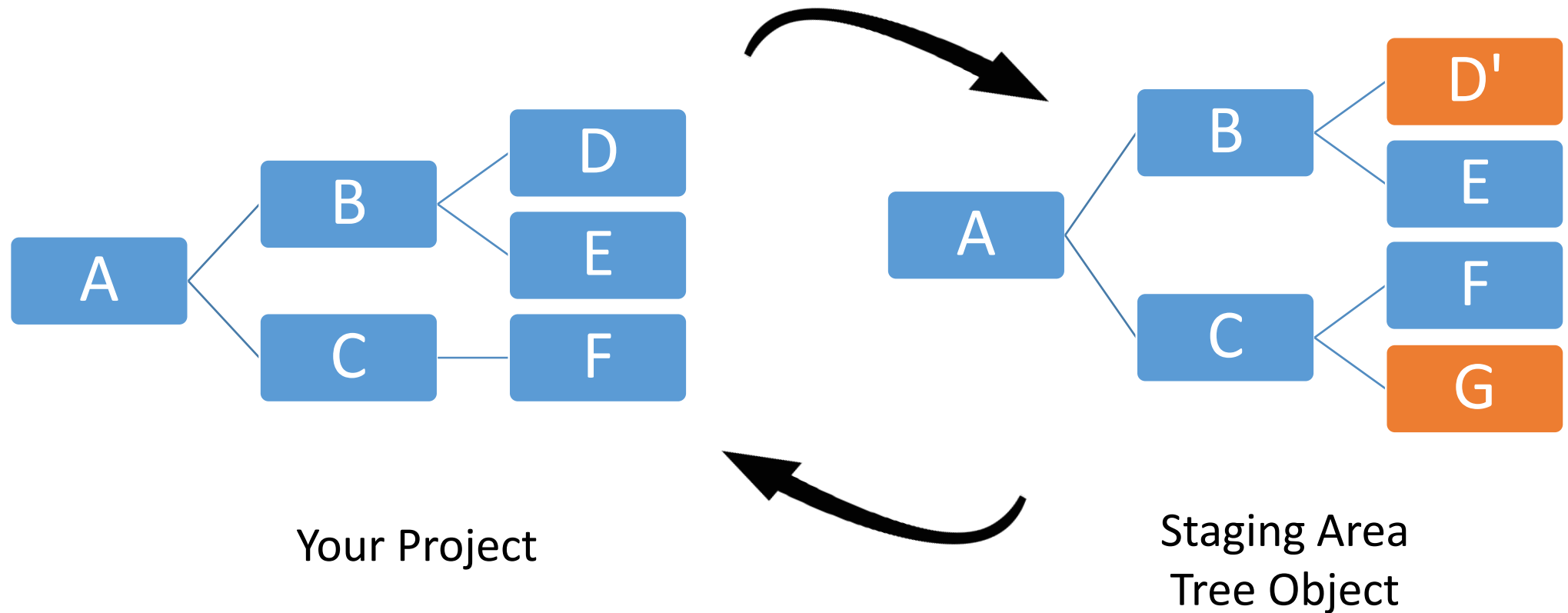
Your Project

Staging Area  
Tree Object

# Schematics are atomic (like db transactions)

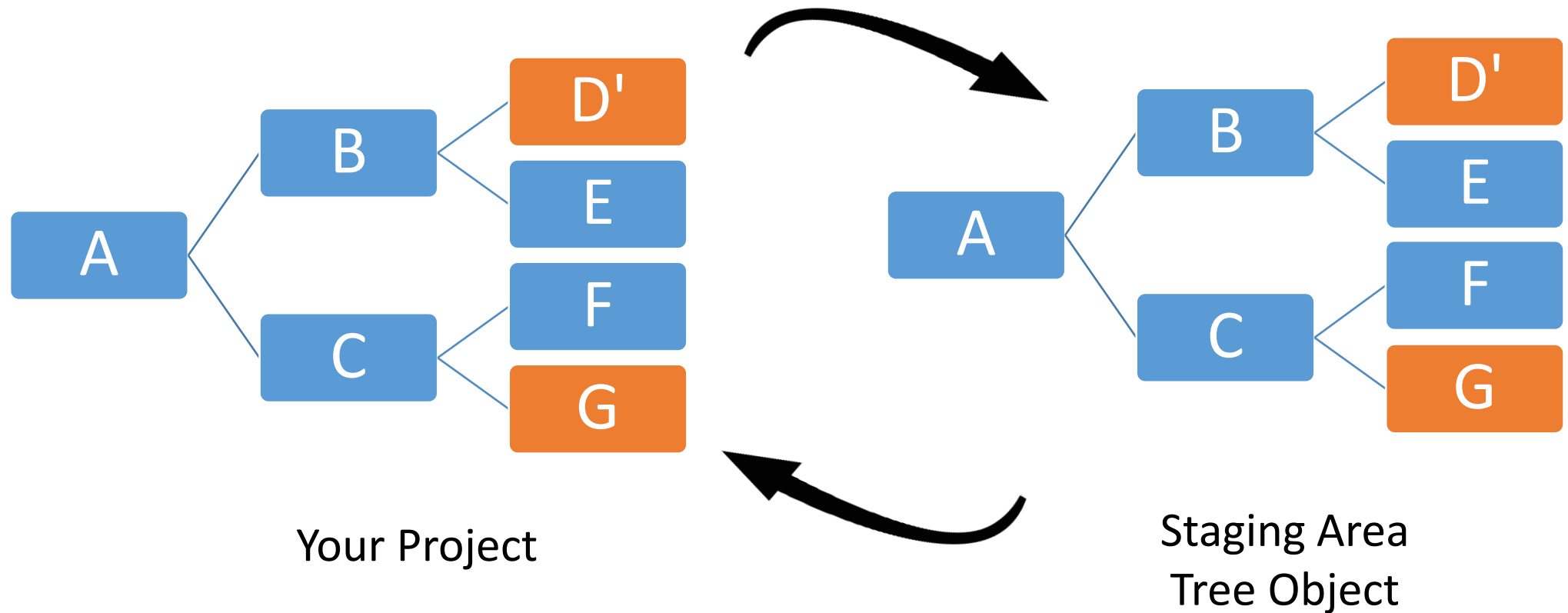


# Schematics are atomic (like db transactions)





# Schematics are atomic (like db transactions)





How to  
Create  
Custom  
Schematics?

You can create a schematic ...

... with a schematic!

# Scaffold Collection

```
npm install -g @angular-devkit/schematics-cli
```

```
schematics blank --name=hello-world
```

```
schematics schematic --name=hello-world
```

*Contains sample schematics*



```
ca. npm
> schematics blank --name hello-world
CREATE /hello-world/package.json (534 bytes)
CREATE /hello-world/README.md (635 bytes)
CREATE /hello-world/src/collection.json (228 bytes)
CREATE /hello-world/tsconfig.json (631 bytes)
CREATE /hello-world/.gitignore (191 bytes)
CREATE /hello-world/src/hello-world/index.ts (316 bytes)
CREATE /hello-world/src/hello-world/index_spec.ts (473 bytes)
npm WARN registry Unexpected warning for https://registry.npmjs.org/: Miscellaneous Warning ENOENT: request to https://registry.npmjs.org/@angular-devkit%2fcore failed, reason: getaddrinfo ENOENT registry.npmjs.org:443
npm WARN registry Using stale package data from https://registry.npmjs.org/ due to a request error during revalidation.
[█.....] | fetchMetadata: sill pacote range manifest for combi
```

# Surviving Schematics: Rule 1 ;-)

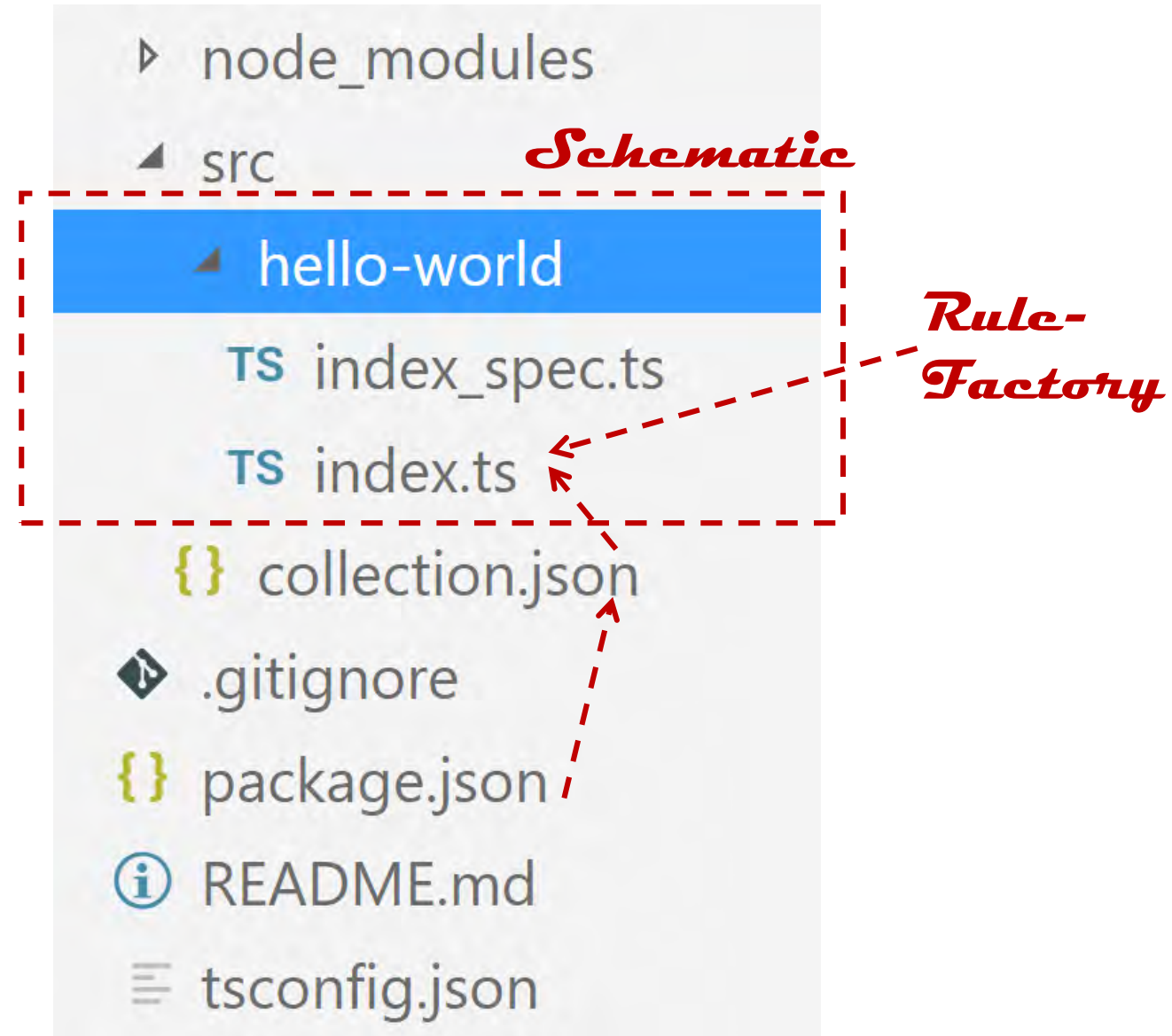
**Use the same versions as your CLI-generated project!**

```
"devDependencies": {  
  "@angular-devkit/core": "0.0.29",  
  "@angular-devkit/schematics": "0.0.52",  
  "@schematics/angular": "0.1.17",  
  [...]  
}
```

***Versions used in CLI 1.6.8***

***+ npm install***

# Project Structure



# Rule Factory

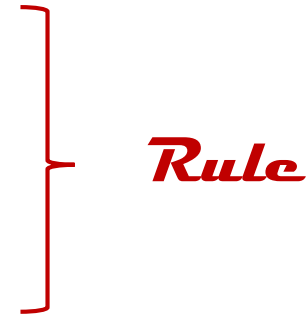
```
export function helloWorld(options: any): Rule {  
    [...]  
}
```



# Rule Factory

```
export function helloWorld(options: any): Rule {
```

```
  return (tree: Tree, _context: SchematicContext) => {  
    _context.logger.debug('Manfred was here!');  
    tree.create('hello.txt', 'Hello World!');  
    return tree;  
  };
```



```
}
```

# Testing

```
npm run build
```

```
schematics .:hello-world
```

# Testing in Demo App

```
npm install hello-world
```

or

```
npm link ../hello-world
```

```
schematics hello-world:hello-world
```

# Testing in Demo App

```
npm install hello-world
```

or

```
npm link ../hello-world
```

```
ng generate hello-world:hello-world
```

DEMO



How to use  
Parameters?

APPTITLE



HOME



OTHER MENU ITEM



FURTHER MENU ITEM



YET ANOTHER ONE

# Hello World

Lorem ipsum dolor, sit amet consectetur adipisicing elit. Reiciendis consectetur, autem atque totam illum delectus! Nemo eius voluptatibus ab magnam, itaque voluptates soluta rerum a facilis quis perferendis at consectetur? Ipsam consequuntur nobis vel dicta nulla. Nemo, hic pariatur beatae possimus et cupiditate facilis qui eius aperiam similique corrupti aliquid! Iure voluptas nulla fuga. Eveniet commodi temporibus dolorum unde facilis? Praesentium quasi totam pariatur saepe labore est quaerat atque earum aliquid impedit consequuntur ullam provident expedita tempore eum iure itaque, eveniet iste ut nihil ipsum modi. Natus aut perspiciatis maiores. Repellat, harum. Enim aliquam inventore ut quos aliquid! Accusamus labore possimus eius iusto earum sunt aliquam numquam facilis ratione quibusdam, veniam eveniet? Cupiditate vitae itaque blanditiis soluta deleniti illum ab. Totam ipsam culpa quos? Magni quod deleniti labore enim natus dignissimos aliquid quas similique voluptate illo sit rerum consequatur blanditiis obcaecati nemo iusto, itaque voluptatibus perferendis eligendi perspiciatis quasi facilis? Consequatur magnam assumenda vitae, beatae esse doloremque itaque rem labore, ad aliquid quis nesciunt? Cum, sit eum deleniti iusto corporis maxime repudiandae numquam veniam nesciunt vitae, quaerat quas ab quam? Et error velit quia quam harum quo cumque possimus eum beatae optio, temporibus amet, ipsum facilis unde nesciunt reiciendis facere voluptate tenetur commodi maiores architecto similique accusamus. Architecto, similique commodi. Eum consequuntur vel aliquam ab voluptas similique iusto repudiandae adipisci ipsam culpa, in ut, dolores praesentium quidem. Maxime, facere sed, nostrum explicabo asperiores provident autem possimus quasi eligendi, impedit aliquam. Repudiandae voluptas voluptatibus voluptate, suscipit accusantium placeat, odio officia explicabo aliquam fugit doloribus nesciunt amet aperiam veritatis culpa! Possimus expedita assumenda eveniet atque consequuntur tempore? Quia nostrum quisquam adipisci ullam. Laborum saepe tenetur esse voluptas sunt velit, molestias eum qui quibusdam modi iure non perferendis nulla quod reprehenderit debitis tempora fugit ipsam possimus eaque! Perferendis similique accusantium nulla quibusdam expedita.

Case Study

Result

▲ side-menu

TS side-menu-item.ts

<> side-menu.component.html

TS side-menu.component.ts

TS side-menu.service.ts

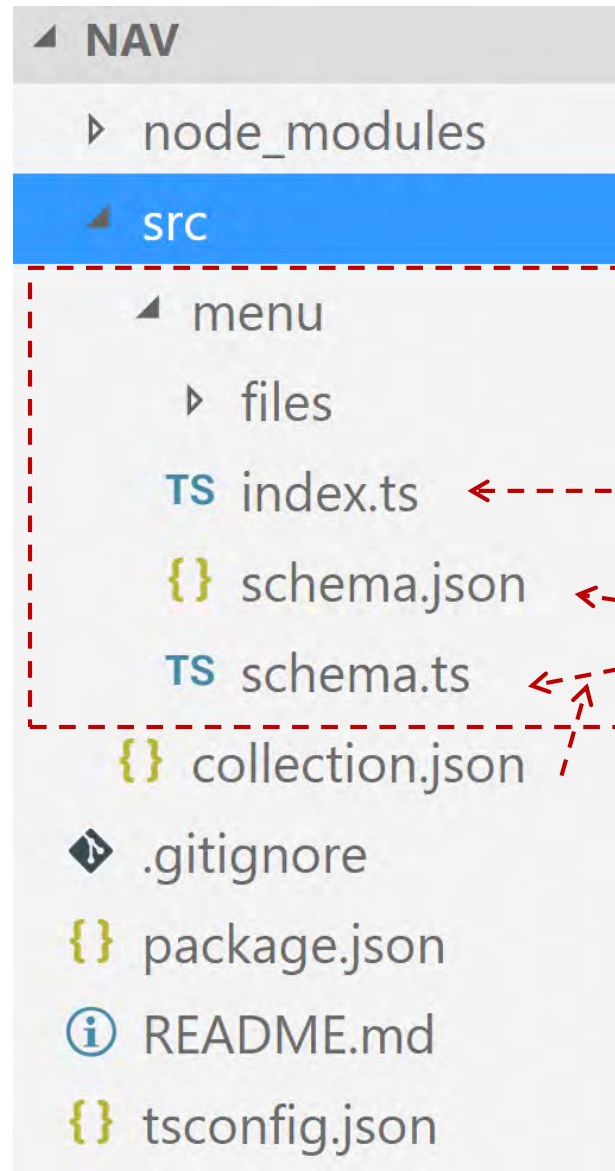
*Optional*



# Execution

```
ng g nav:menu side-menu --menu-service
```

# Project Structure



*Rule-Factory*

*Parameters*

# Option Class in schema.ts

```
export interface MenuOptions {
```

```
  name: string;  
  appRoot: string;  
  path: string;  
  sourceDir: string;
```

*provided by the CLI*

```
  menuService: boolean;
```

*custom stuff*

```
  [...]
```

```
}
```



# Rule Factory gets Parameter Object

```
export default function (options: MenuOptions): Rule {  
    return (host: Tree, context: SchematicContext) => {  
        [...]  
    }  
}
```



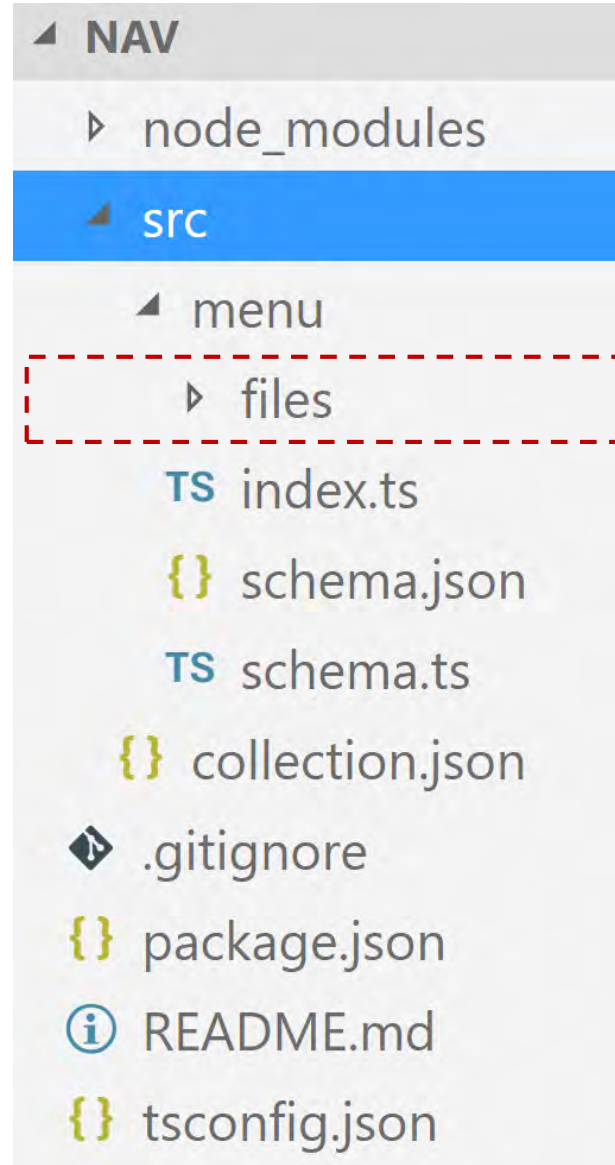
# Rule Factory gets Parameter Object

```
export default function (options: MenuOptions): Rule {  
    return (host: Tree, context: SchematicContext) => {  
        [...]  
    }  
}
```



How to use  
Templates?

# Project Structure



# Template

```
export interface <%= classify(name) %>Item {  
  title: string;  
  iconClass: string;  
}
```

*passed function*

*passed property*



Template names are templates!

*passed property*

```
└─ files
  └─ __path__
    └─ __name@dasherize__
      TS __name@dasherize__-item.ts
      <> __name@dasherize__.component.html
      TS __name@dasherize__.component.ts
      TS __name@dasherize__.service.ts
```

*passed property*

*passed function*



# Rule calling Templates

```
export default function (options: MenuOptions): Rule {  
  [...]  
}
```

# Rule calling Templates

```
export default function (options: MenuOptions): Rule {  
  return (host: Tree, context: SchematicContext) => {  
    [...]  
  }  
}
```

# Rule calling Templates

```
export default function (options: MenuOptions): Rule {  
  return (host: Tree, context: SchematicContext) => {
```

```
    const templateSource = apply(url('./files'), [  
      filterTemplates(options),  
      template({...stringUtils, ...options}),  
      move(options.sourceDir)  
    ]);
```

```
    [...]
```

*passed functions*

*passed properties*

```
  }
```



# Rule calling Templates

```
export default function (options: MenuOptions): Rule {
  return (host: Tree, context: SchematicContext) => {

    const templateSource = apply(url('./files'), [
      filterTemplates(options),
      template({...stringUtils, ...options}),
      move(options.sourceDir)
    ]);

    const rule = chain([
      branchAndMerge(chain([
        mergeWith(templateSource),
        [...]
      ]))
    ]);
    return rule(host, context);
  }
}
```



DEMO



# Modifying existing Code

# Declaring generated Components

```
import { NgModule } from '@angular/core';  
import { CommonModule } from '@angular/common';  
import { SideMenuComponent } from './side-menu/side-menu.component';
```

```
@NgModule({  
  imports: [  
    CommonModule  
  ],  
  declarations: [  
    SideMenuComponent  
  ],  
  exports: [  
    SideMenuComponent  
  ]  
})  
export class CoreModule { }
```





# Injecting Service into Component

```
[...]  
import { SideMenuService } from './core/side-menu/side-menu.service';  
  
@Component({  
  [...]  
})  
export class AppComponent {  
  
  constructor(private sideMenuService: SideMenuService) {  
    // sideMenuService.show = true;  
  }  
  
}
```

# Existing Rules

- addDeclarationToModule
- addExportToModule
- ...

# Custom Rule for modifying existing Code

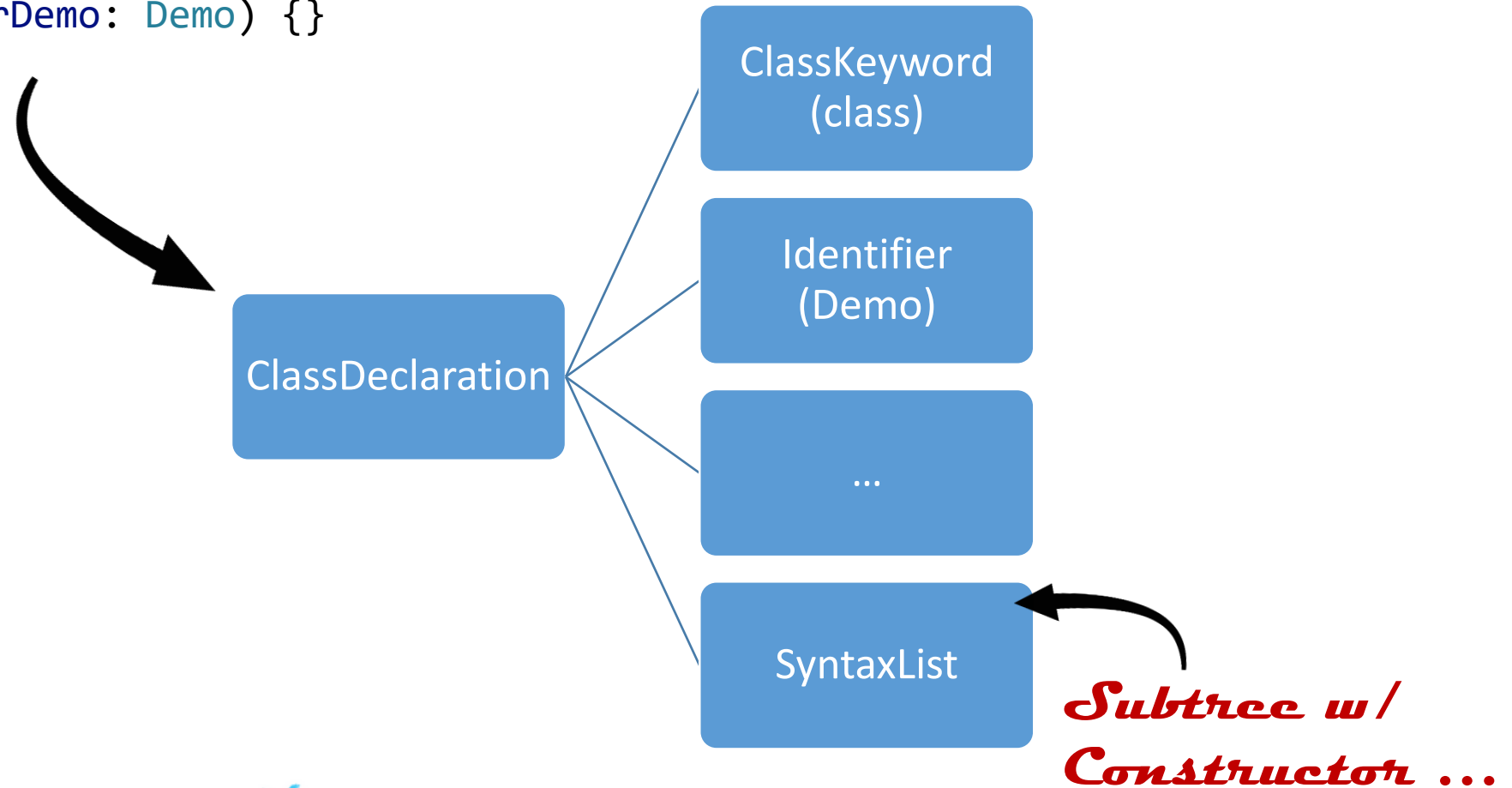
- String Operations
- RegExp
- TypeScript Compiler API

# Custom Rule for modifying existing Code

- ~~String Operations~~
- ~~RegExp~~
- TypeScript Compiler API

# Code File as Syntax Tree (simplified)

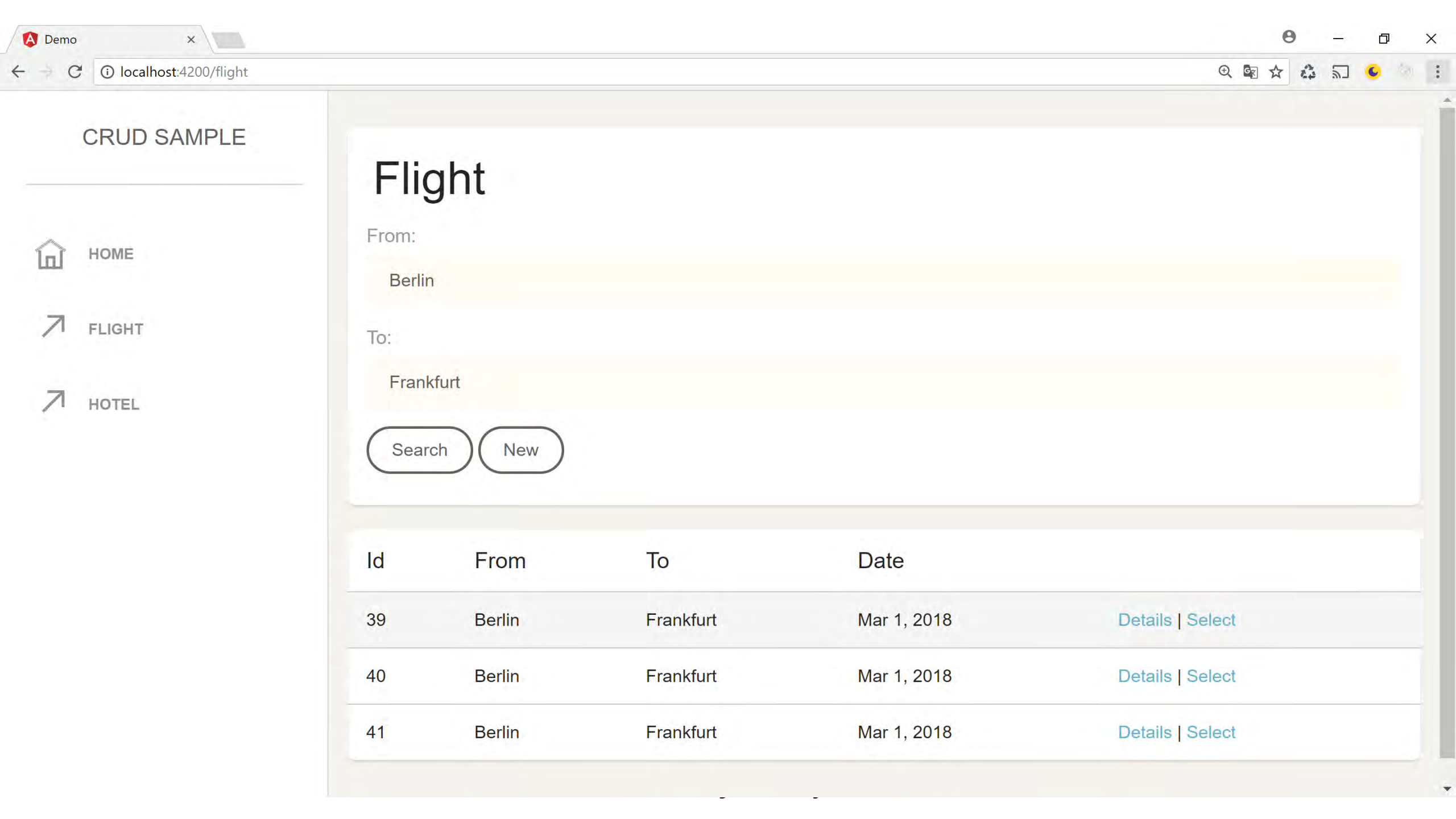
```
class Demo {  
    constructor(otherDemo: Demo) {}  
}
```



DEMO



Scaffolding  
whole  
Angular  
Applications?



# CRUD SAMPLE

 HOME

 FLIGHT

 HOTEL

## Flight

From:

Berlin

To:

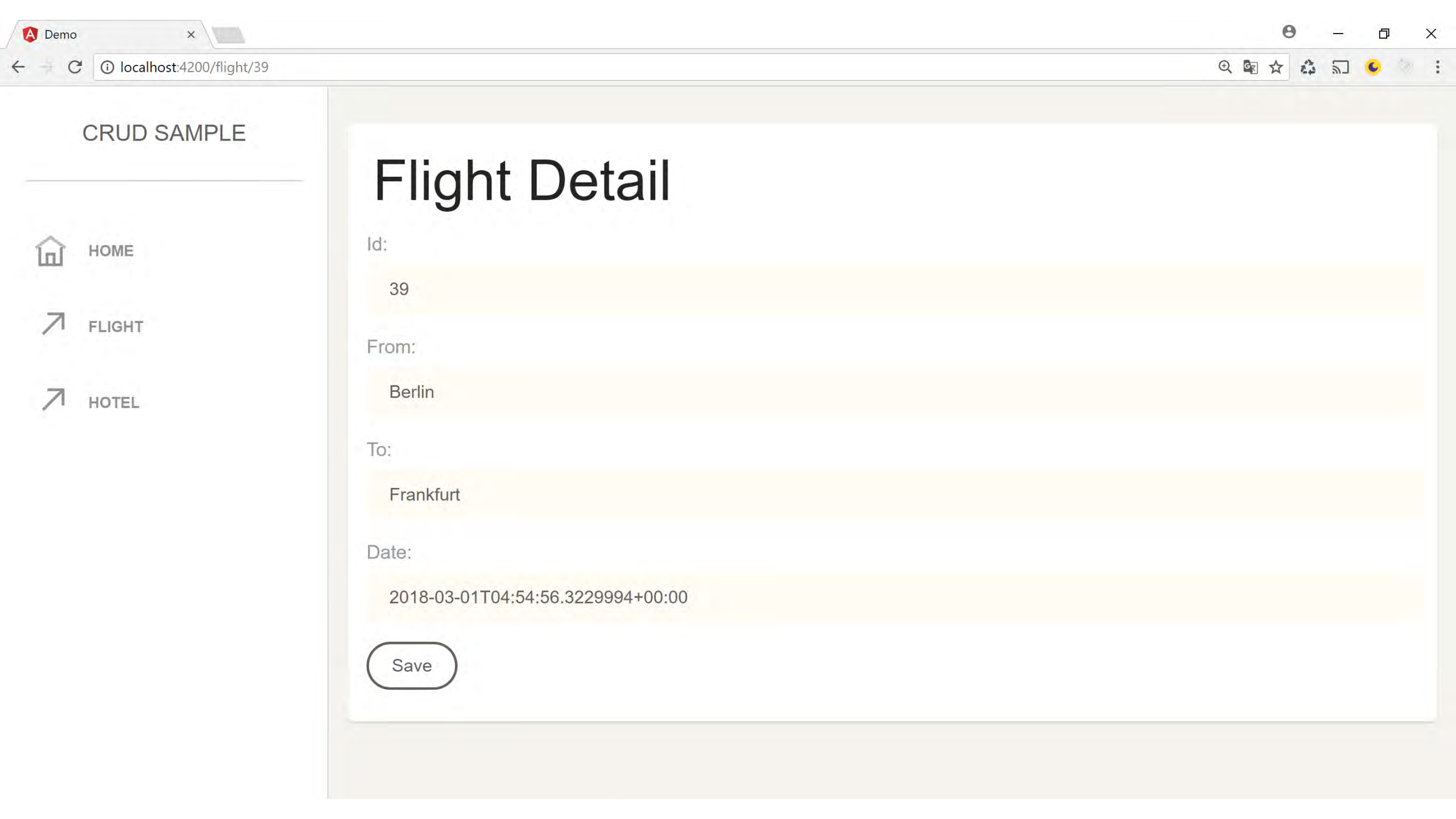
Frankfurt

Search




New

Id	From	To	Date	
39	Berlin	Frankfurt	Mar 1, 2018	<a href="#">Details</a>   <a href="#">Select</a>
40	Berlin	Frankfurt	Mar 1, 2018	<a href="#">Details</a>   <a href="#">Select</a>
41	Berlin	Frankfurt	Mar 1, 2018	<a href="#">Details</a>   <a href="#">Select</a>





## CRUD SAMPLE

-  HOME
-  FLIGHT
-  HOTEL

# Flight Detail

Id:  
39

From:  
Berlin

To:  
Frankfurt

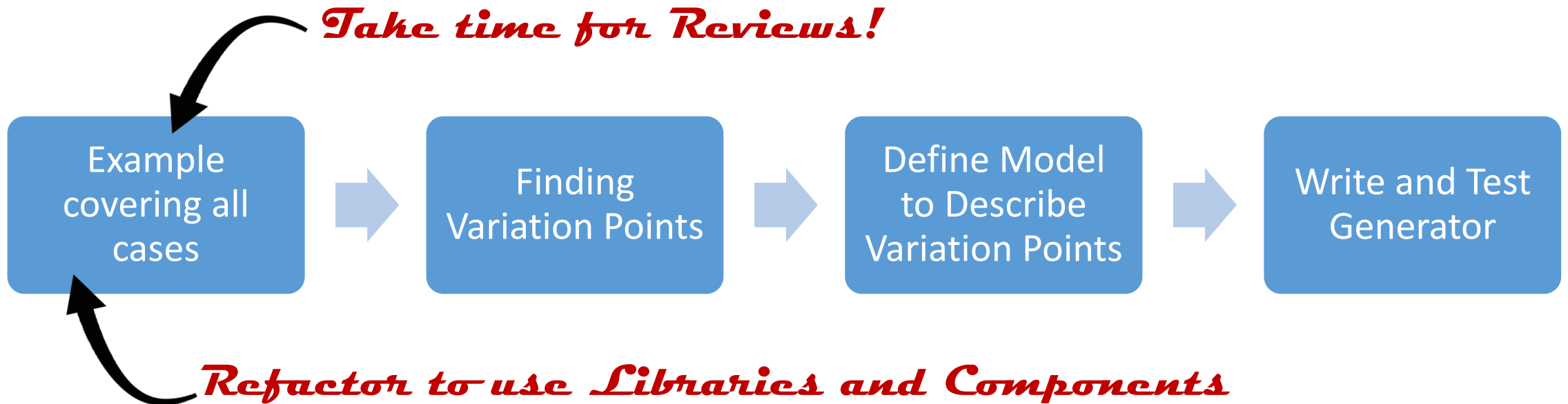
Date:  
2018-03-01T04:54:56.3229994+00:00

Save

```
C:\WINDOWS\system32\cmd.exe
>ng g crud-module flight --collection angular-crud -f
  create src/app/flight/flight-edit/flight-edit.component.html (1223 bytes)
  create src/app/flight/flight-edit/flight-edit.component.ts (1534 bytes)
  create src/app/flight/flight-filter.ts (76 bytes)
  create src/app/flight/flight-list/flight-list.component.html (1677 bytes)
  create src/app/flight/flight-list/flight-list.component.ts (815 bytes)
  create src/app/flight/flight.module.ts (726 bytes)
  create src/app/flight/flight.routes.ts (379 bytes)
  create src/app/flight/flight.service.ts (1656 bytes)
  create src/app/flight/flight.ts (100 bytes)
>
```

# Scaffolding a CRUD Module

# Needed Steps



# DEMO

# Current State

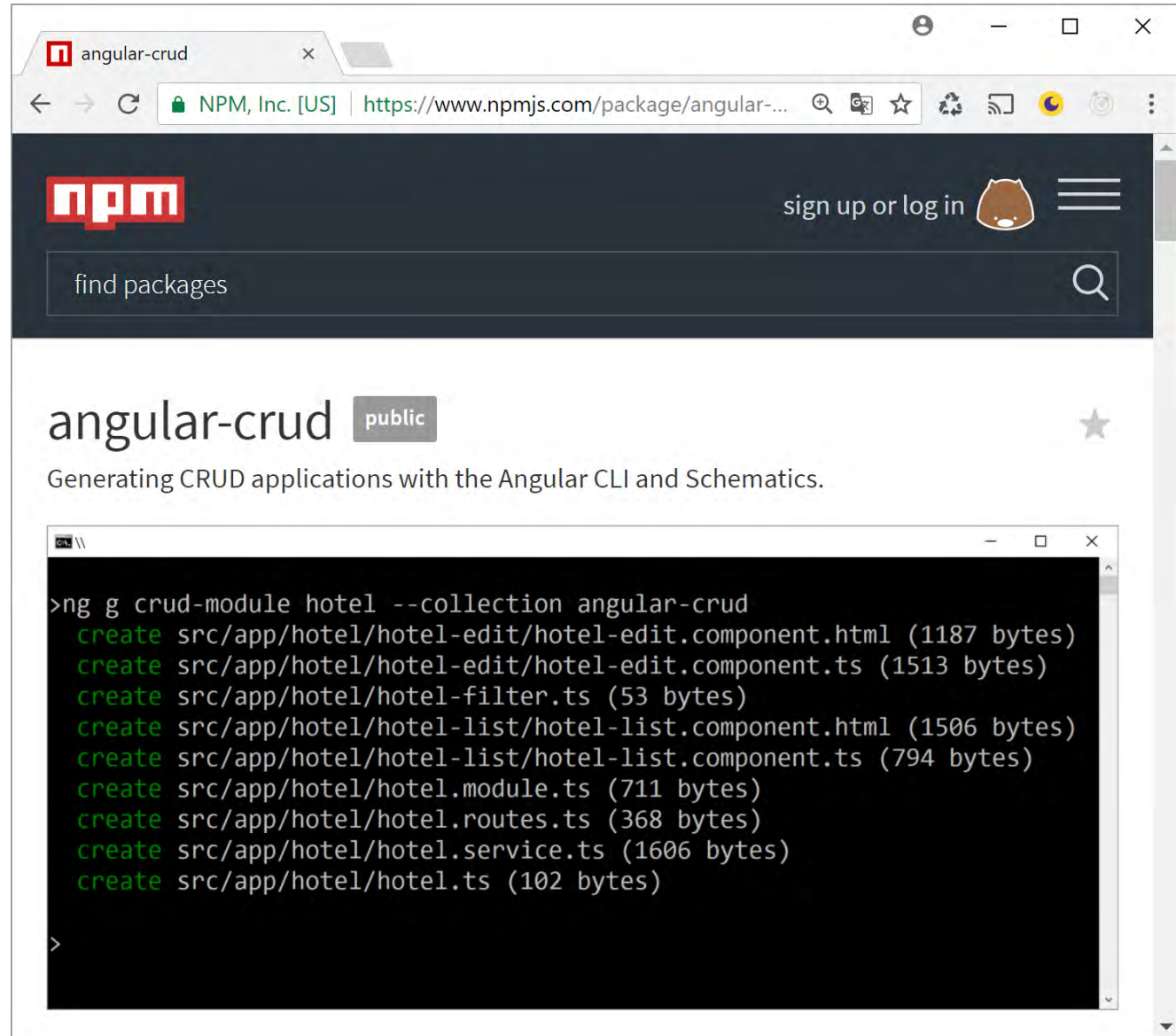
*Use it as is*

*or*

*Fork it*

*or*

*Contribute!*



angular-crud

NPM, Inc. [US] <https://www.npmjs.com/package/angular-crud>

npm sign up or log in

find packages

angular-crud public

Generating CRUD applications with the Angular CLI and Schematics.

```
>ng g crud-module hotel --collection angular-crud
create src/app/hotel/hotel-edit/hotel-edit.component.html (1187 bytes)
create src/app/hotel/hotel-edit/hotel-edit.component.ts (1513 bytes)
create src/app/hotel/hotel-filter.ts (53 bytes)
create src/app/hotel/hotel-list/hotel-list.component.html (1506 bytes)
create src/app/hotel/hotel-list/hotel-list.component.ts (794 bytes)
create src/app/hotel/hotel.module.ts (711 bytes)
create src/app/hotel/hotel.routes.ts (368 bytes)
create src/app/hotel/hotel.service.ts (1606 bytes)
create src/app/hotel/hotel.ts (102 bytes)
```



ManfredSteyer

# More Features in CLI 6

# Installing and Updating Angular Packages

`ng add @cool/library`

- `npm i @cool/library`
- execute ng-add Schematic

`ng update @cool/library`

- `npm update @cool/library`
- execute update Schematics



# ng add

```
{
  "schematics": {
    "ng-add": {
      "description": "Initialize Library",
      "factory": "./ng-add/index#ngAdd"
    },
  }
}
```



# ng update

*Choose any name ...*

```
{
  "schemas": {
    "update": {
      "version": "2.0.0",
      "description": "updates to version 2.0.0",
      "factory": "./update/index#update"
    }
  }
}
```

# ng update

```
{
  "schematics": {
    "update": {
      "version": "2.0.0",
      "description": "updates to version 2.0.0",
      "factory": "./update/index#update"
    },
    "update": {
      "version": "2.1.0",
      "description": "updates to version 2.1.0",
      "factory": "./update21/index#update"
    }
  }
}
```



**Stephen Fluin**

@stephenfluin



Adding Schematics to your [#angular](#) library or projects? Add npm keywords for the npm schematics you provide such as ``ng-add`` or ``ng-update``. This will make it possible for us to build a searchable index of public schematics in the future!

12:39 - 5. Apr. 2018

**41** Retweets **68** „Gefällt mir“-Angaben



# Further Information

- Great introduction in Angular Blog
  - <https://blog.angular.io/schematics-an-introduction-dc1dfbc2a2b2>
- My Tutorial/ Case Study (4 articles so far)
  - <https://goo.gl/kGS6L5>
- Angular-Crud (Generator)
  - <https://www.npmjs.com/package/angular-crud>



# Conclusion

Automate  
boring tasks!

Official  
Solution in ng  
world

CLI, Nx, Ngrx,  
...

Staging Area,  
Templates,  
Rules

Create own or  
tweak existing  
ones

Try it out!

# Contact and Downloads

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