



Angular核心特性

大漠穷秋 2017-05-13

内容提纲

- **第一块内容：集成开发环境@angular/cli**
- **第二块内容：Angular三大核心概念**
Component,Module,Route
- **第三块内容：Angular架构特色**
依赖注入、数据绑定
- **第四块内容：UI库**
Angular-Material,Prime-NG,ng2-bootstrap,ionic
- **第五块内容：参考资源推荐**

第一块：集成开发环境@angular/cli

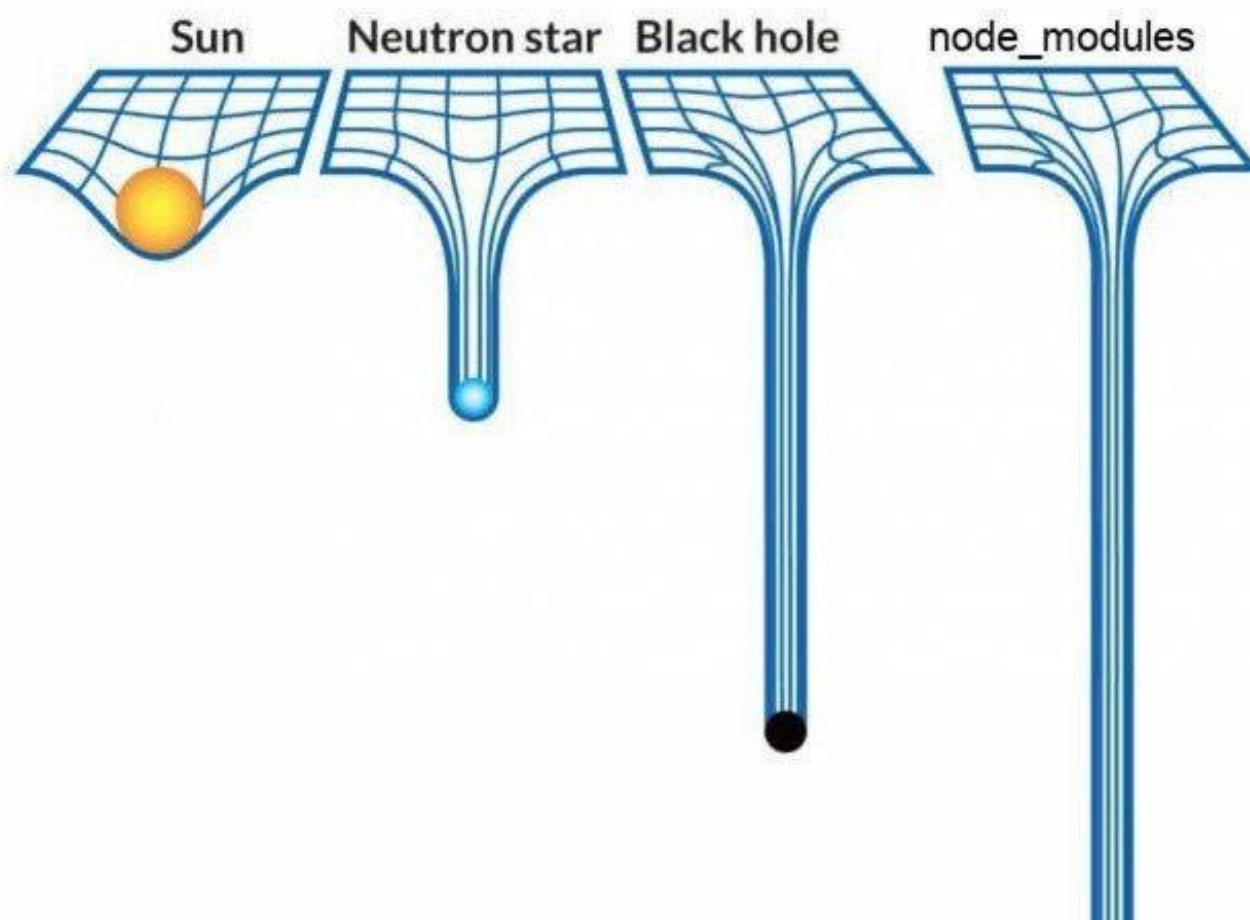


2009年，前端Big Bang!

Tool Chains based on NodeJS



npm : 世界上最糟糕的模块管理器



@angular/cli



把所有零散的Node工具都集成起来多好啊！

@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

@angular/cli

> **npm install -g @angular/cli**

> **ng --version**

> **ng help**

> **ng new my-project1**

> **ng serve**

@angular/cli

> ng generate

cl:class

c:component

d:directive

e:enum

m:module

p:pipe

s:service

命令有简化版本 : ng g c User

@angular/cli

- 在Windows下面，node-gyp这个包依赖于Visual Studio
- node-sass这个node模块被墙掉了，原因不明
- 所以强烈推荐采用cnpm安装

@angular/cli

```
angular-cli
E:\github-my\NiceFish>ng serve --prod --aot
*****
This is a simple server for use in testing or debugging Angular applications locally.
It hasn't been reviewed for security issues.

DON'T USE IT FOR PRODUCTION USE!
*****
** NG Live Development Server is running on http://localhost:4200. **
Hash: 4a9786ce6bc1fe4630d6
Time: 50871ms
chunk {0} 0.chunk.js, 0.bundle.map 1.45 MB {1} {3} [rendered]
chunk {1} 1.chunk.js, 1.bundle.map 66.9 kB {0} {3} [rendered]
chunk {2} scripts.bundle.js, scripts.bundle.map (scripts) 2.07 MB {6} [initial] [rendered]
chunk {3} main.bundle.js, main.bundle.map (main) 303 kB {5} [initial] [rendered]
chunk {4} styles.bundle.js, styles.bundle.map (styles) 10.3 kB {6} [initial] [rendered]
chunk {5} vendor.bundle.js, vendor.bundle.map (vendor) 2.01 MB [initial] [rendered]
chunk {6} inline.bundle.js, inline.bundle.map (inline) 0 bytes [entry] [rendered]
webpack: bundle is now VALID.
```

ng serve --prod

注意：最新版的CLI加上--prod参数就自动AOT了，官网上的那篇文档过时了！

@angular/cli

```
angular-cli
WARNING in ./~/@angular/core/src/linker/system_js_ng_module_factory_loader.js
45:15 Critical dependency: the request of a dependency is an expression

WARNING in ./~/@angular/core/src/linker/system_js_ng_module_factory_loader.js
57:15 Critical dependency: the request of a dependency is an expression

ERROR in [default] E:\github\ng2-bootstrap-demo\src\app\user\add-user\add-user.component.spec.ts:8:20
Supplied parameters do not match any signature of call target.
13 10 2016 10:58:21.772:INFO [karma]: Karma v1.2.0 server started at http://localhost:9876/
13 10 2016 10:58:21.773:INFO [launcher]: Launching browser Chrome with unlimited concurrency
13 10 2016 10:58:21.897:INFO [launcher]: Starting browser Chrome
13 10 2016 10:58:24.805:INFO [Chrome 53.0.2785 (Windows 10 0.0.0)]: Connected on socket /#i6GL146TuIVZ1kPKAAAA with id 79091848
Chrome 53.0.2785 (Windows 10 0.0.0) App: Angular2BootstrapSass should create the app FAILED
  'router-outlet' is not a known element:
  1. If 'router-outlet' is an Angular component, then verify that it is part of this module.
  2. If 'router-outlet' is a Web Component then add 'CUSTOM_ELEMENTS_SCHEMA' to the '@NgModule.schema' of this component to suppress this message.
  </div>
  <div class="main-container">
    [ERROR ->]<router-outlet></router-outlet>
  </div>
  ): AppComponent@42:4
Error: Template parse errors:
  at TemplateParser.parse (http://localhost:9876/_karma_webpack_/0.bundle.js:7333:19)
  at RuntimeCompiler._compileTemplate (http://localhost:9876/_karma_webpack_/0.bundle.js:15632:51)
  at http://localhost:9876/_karma_webpack_/0.bundle.js:15555:83
  at Set.forEach (native)
  at compile (http://localhost:9876/_karma_webpack_/0.bundle.js:15555:47)
  at RuntimeCompiler._compileComponents (http://localhost:9876/_karma_webpack_/0.bundle.js:15557:13)
  at RuntimeCompiler._compileModuleAndAllComponents (http://localhost:9876/_karma_webpack_/0.bundle.js:15474:37)
  at RuntimeCompiler.compileModuleAndAllComponentsSync (http://localhost:9876/_karma_webpack_/0.bundle.js:15462:21)
  at TestingCompilerImpl.compileModuleAndAllComponentsSync (http://localhost:9876/_karma_webpack_/0.bundle.js:20504:35)
  at TestBed._initIfNeeded (webpack:///E:/github/ng2-bootstrap-demo/@angular/core/bundles/core-testing.umd.js:1059:0 <- src/test.ts:8814:40)
Chrome 53.0.2785 (Windows 10 0.0.0): Executed 1 of 10 (0 FAILED) (0 secs / 0.101 secs)
Chrome 53.0.2785 (Windows 10 0.0.0) App: Angular2BootstrapSass should create the app FAILED
  'router-outlet' is not a known element:
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  </div>
  <div class="main-container">
    [ERROR ->]<router-outlet></router-outlet>
  </div>
  ): AppComponent@42:4
Error: Template parse errors:
  at TemplateParser.parse (http://localhost:9876/_karma_webpack_/0.bundle.js:7333:19)
```

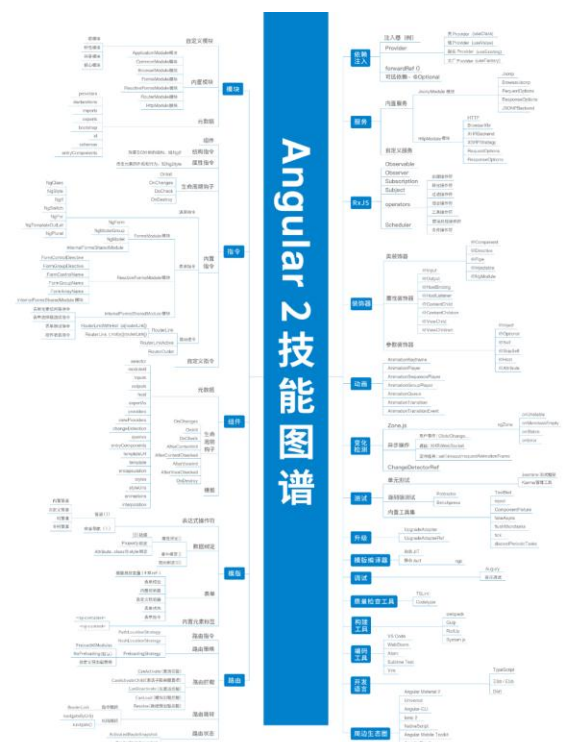
ng test

@angular/cli



第二块：Angular中的3大核心概念

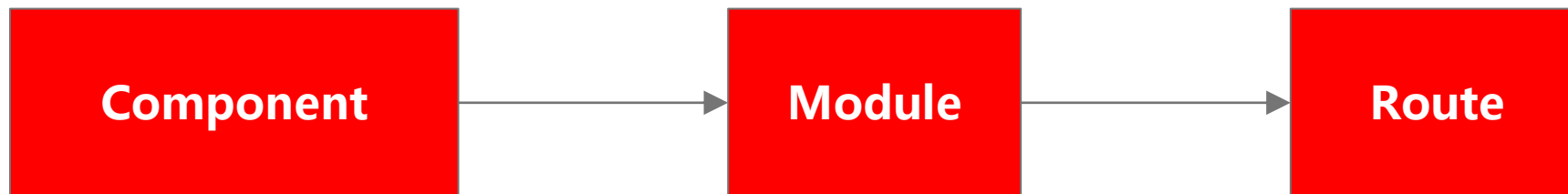
一张图覆盖Angular所有概念



StuQ IT 职业技能图谱 V1.0.0
Geekbang
InfoQ

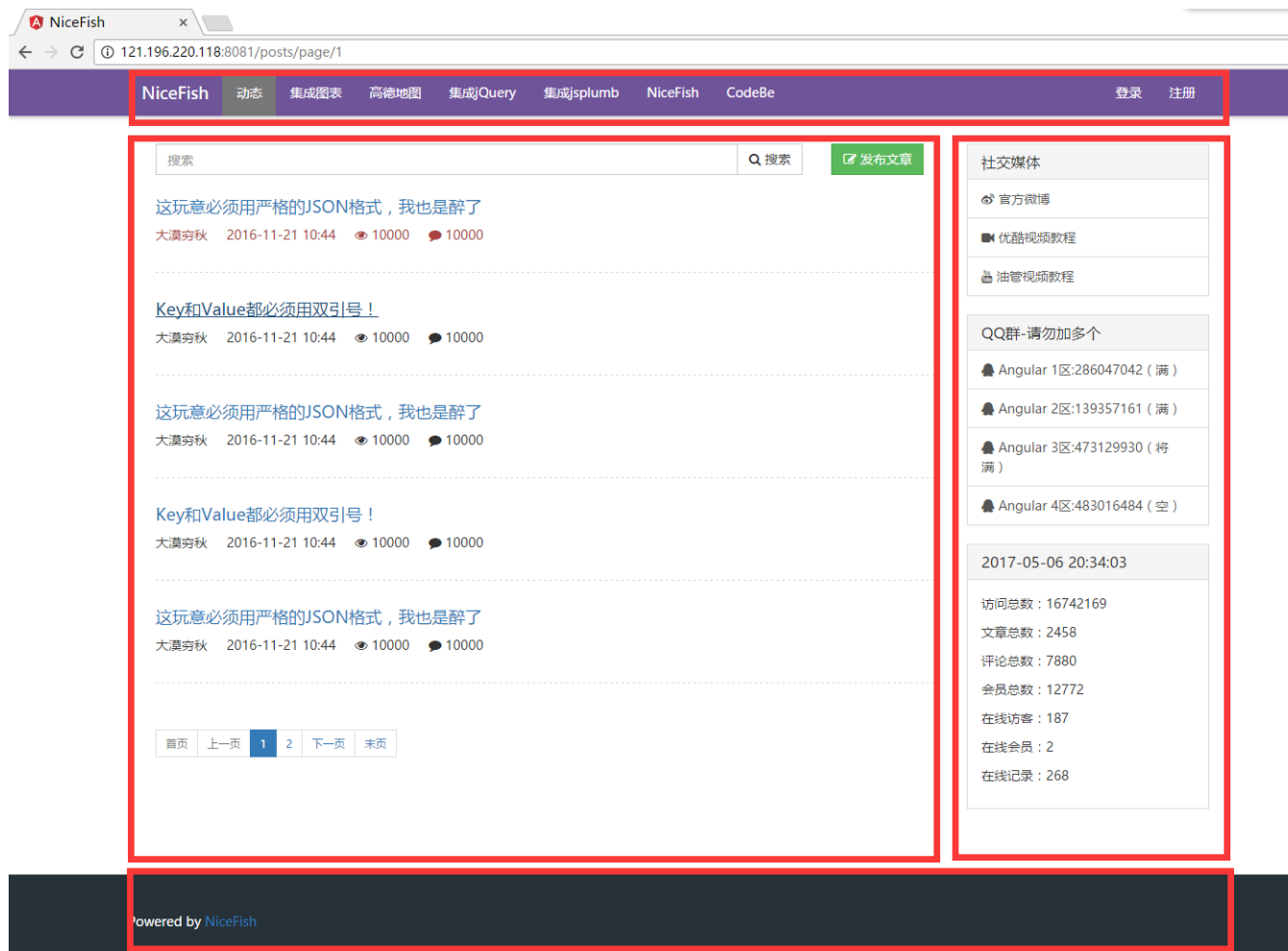
感谢《揭秘Angular2》的汤桂川老师提供如此详细的脑图！

Angular最核心的3个概念



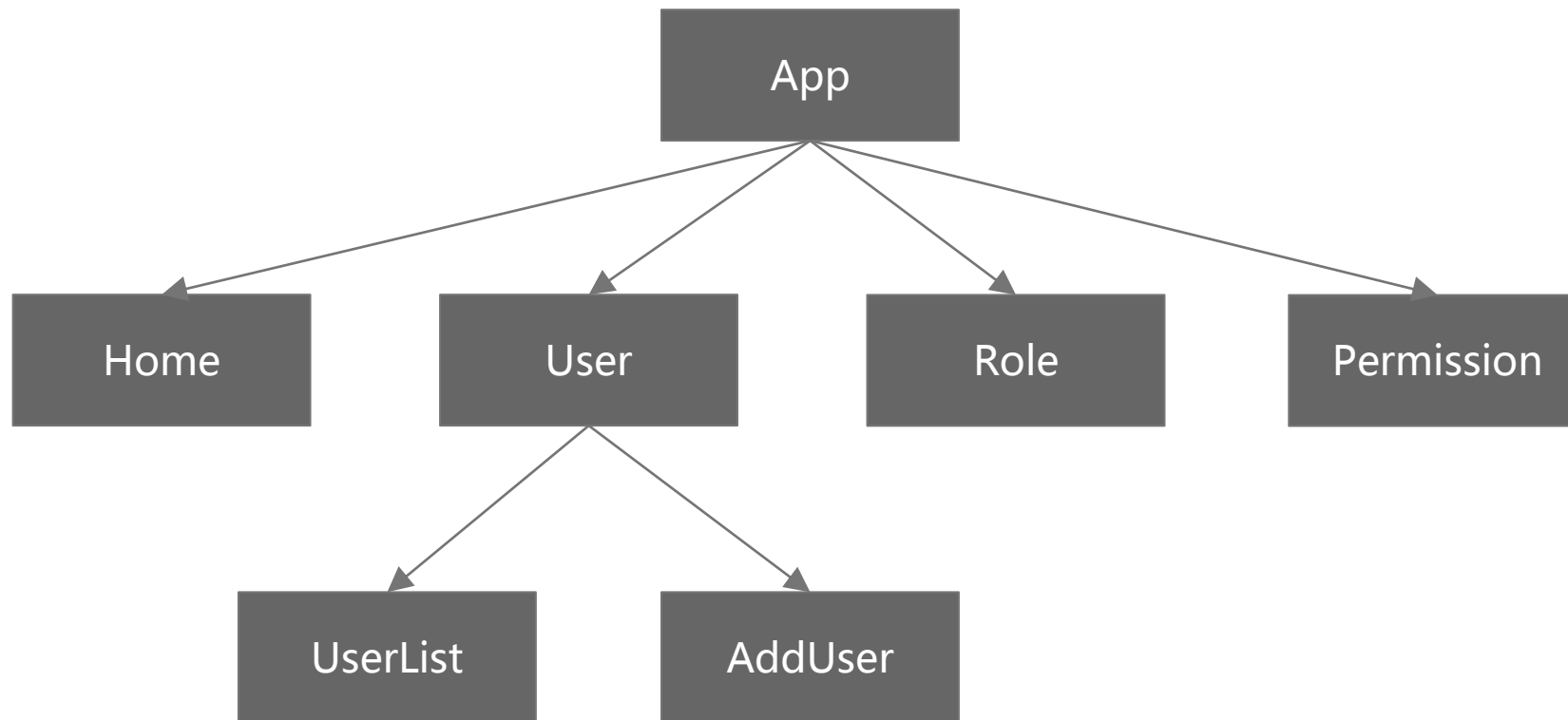
Angular最核心的概念是“组件化”

第一个核心概念：Component



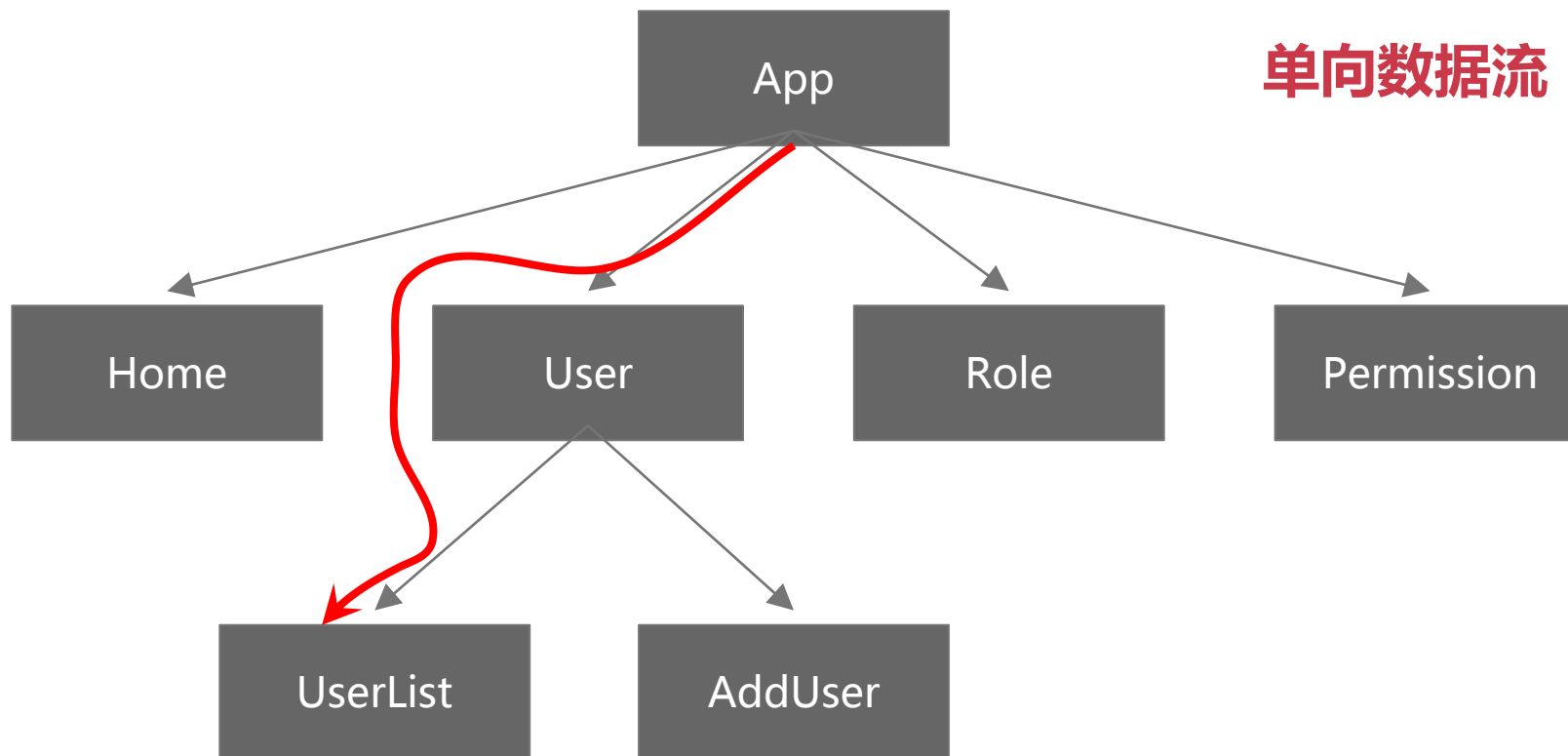
<http://git.oschina.net/mumu-osc/NiceFish>

Component Tree



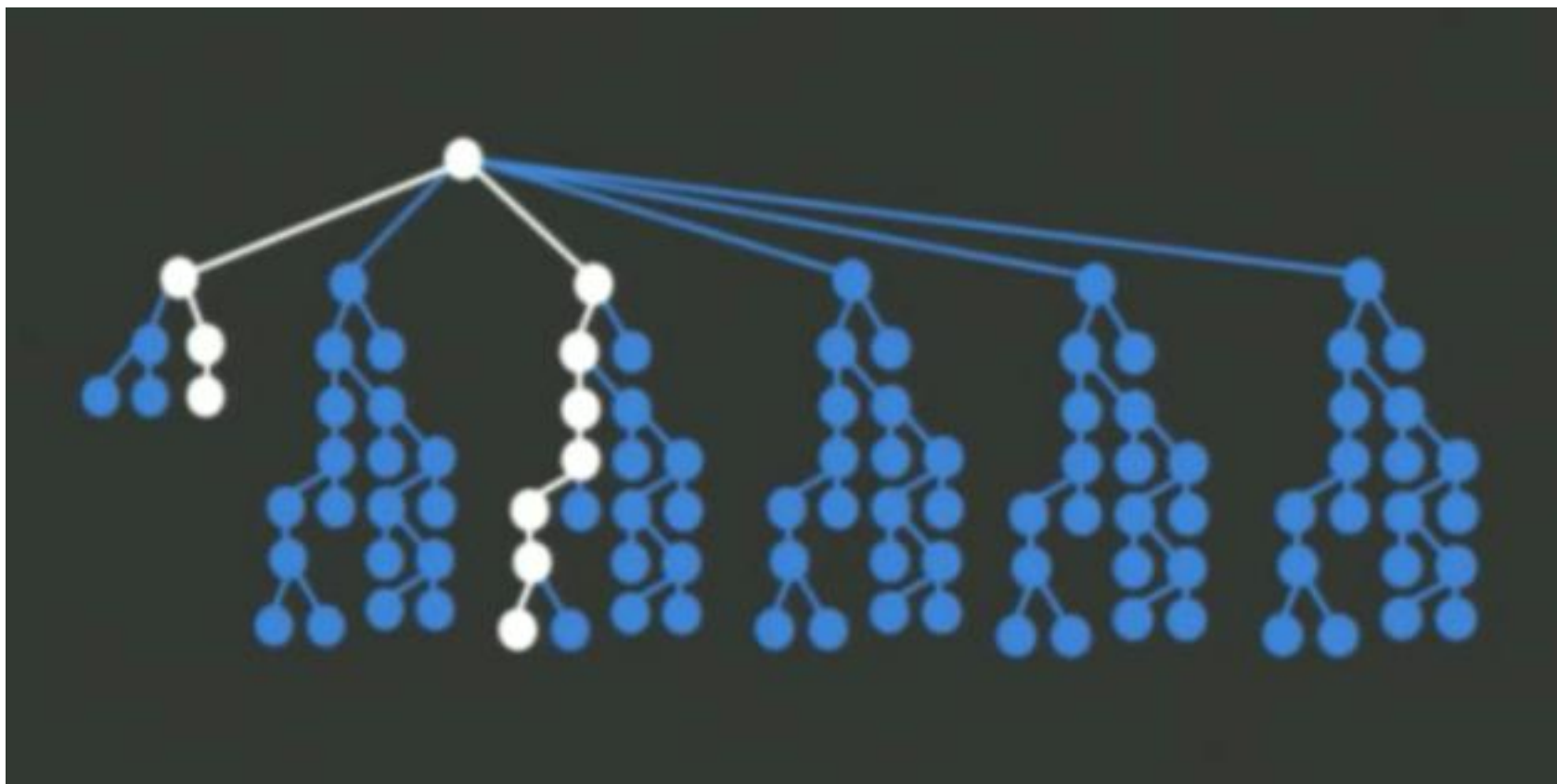
NiceFish实例项目的组件树结构

单向数据流



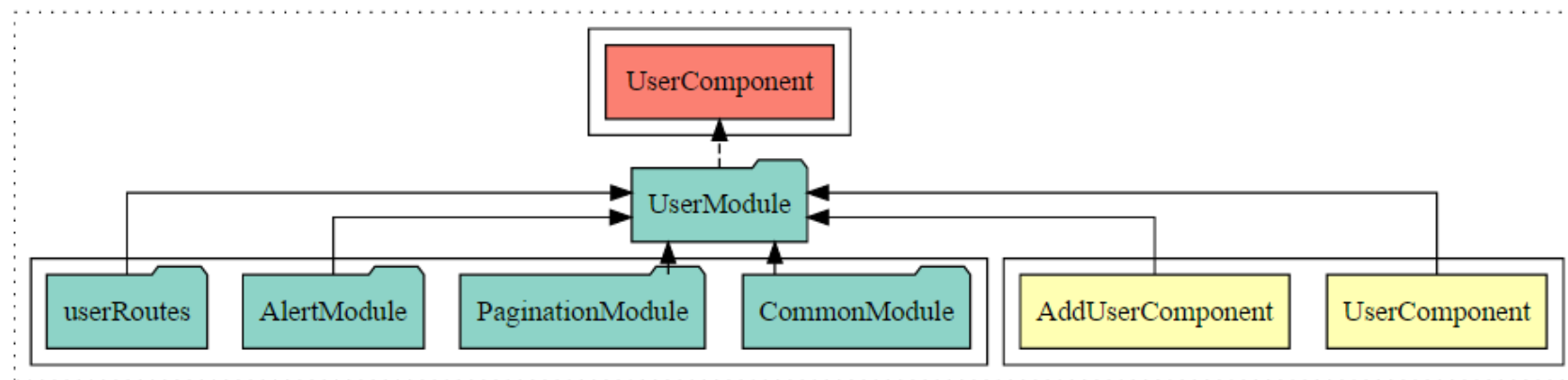
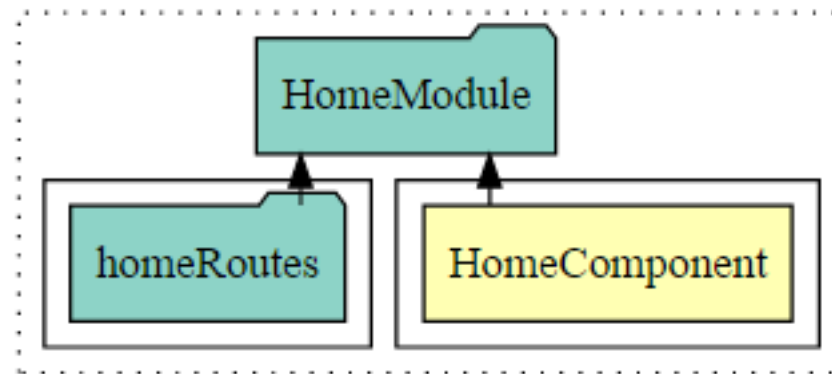
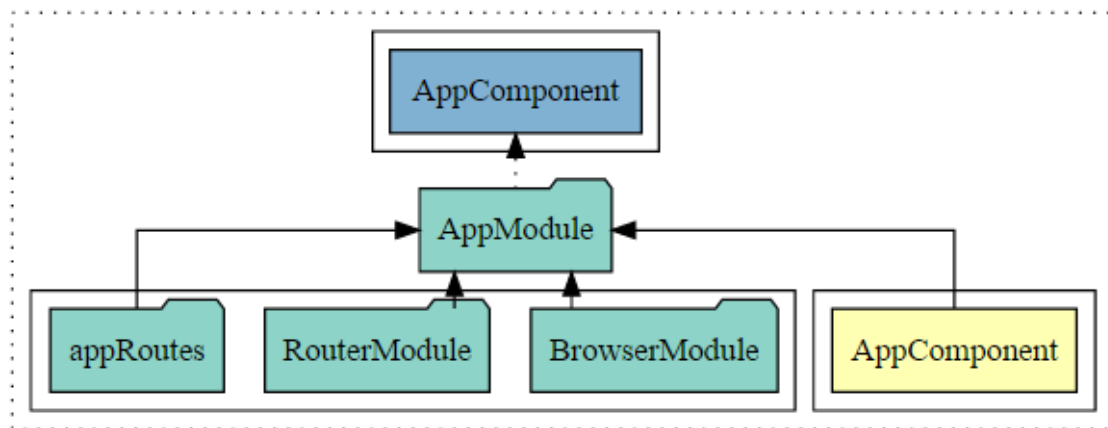
<https://github.com/modern-javascript/angular2-data-flow>

实际项目中的组件树



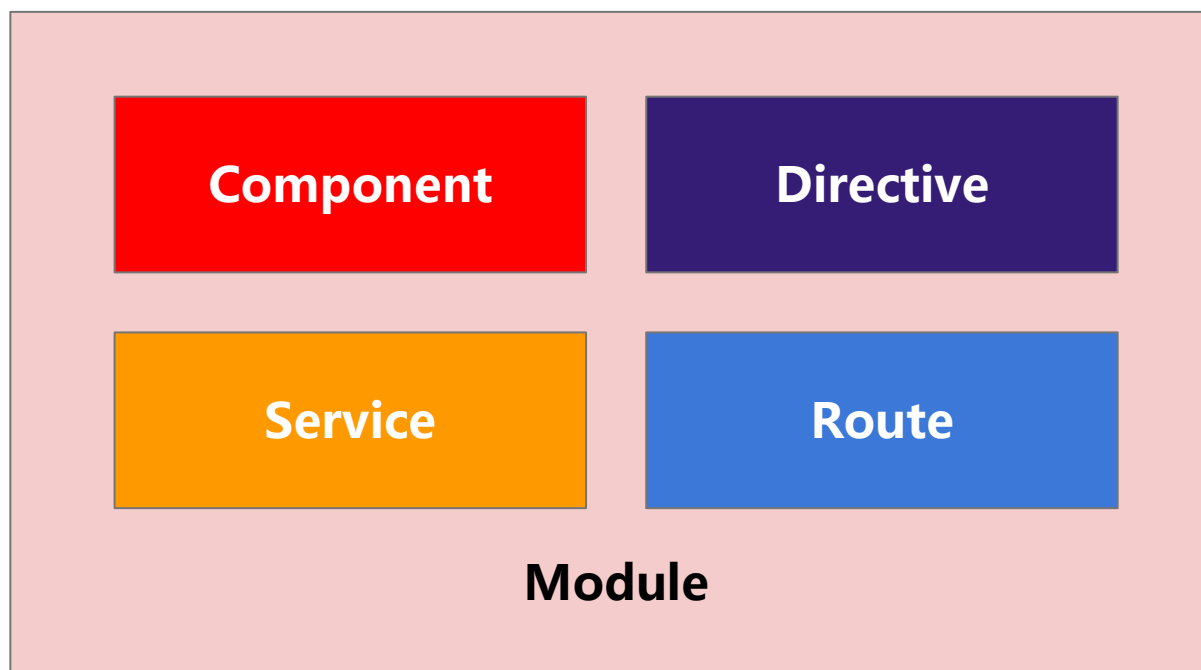
不可变数据类型

组件树生成器



<https://github.com/manekinekkko/angular2-dependencies-graph>

第二个核心概念：NgModule



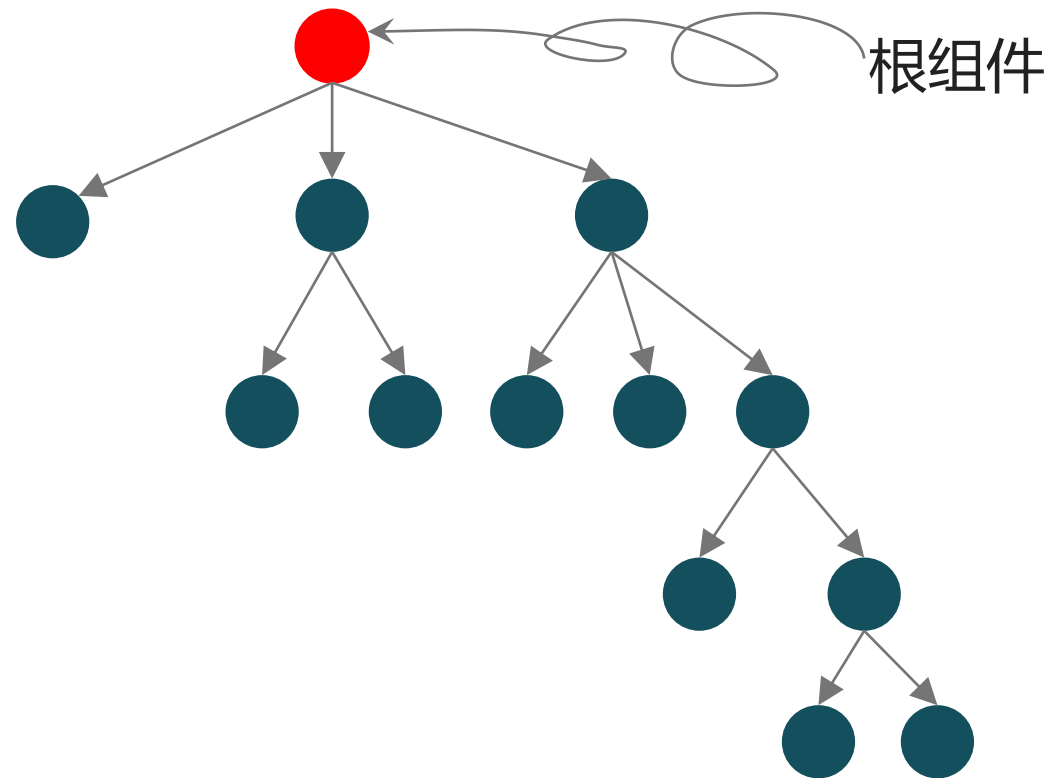
什么是模块？

第二个核心概念：NgModule

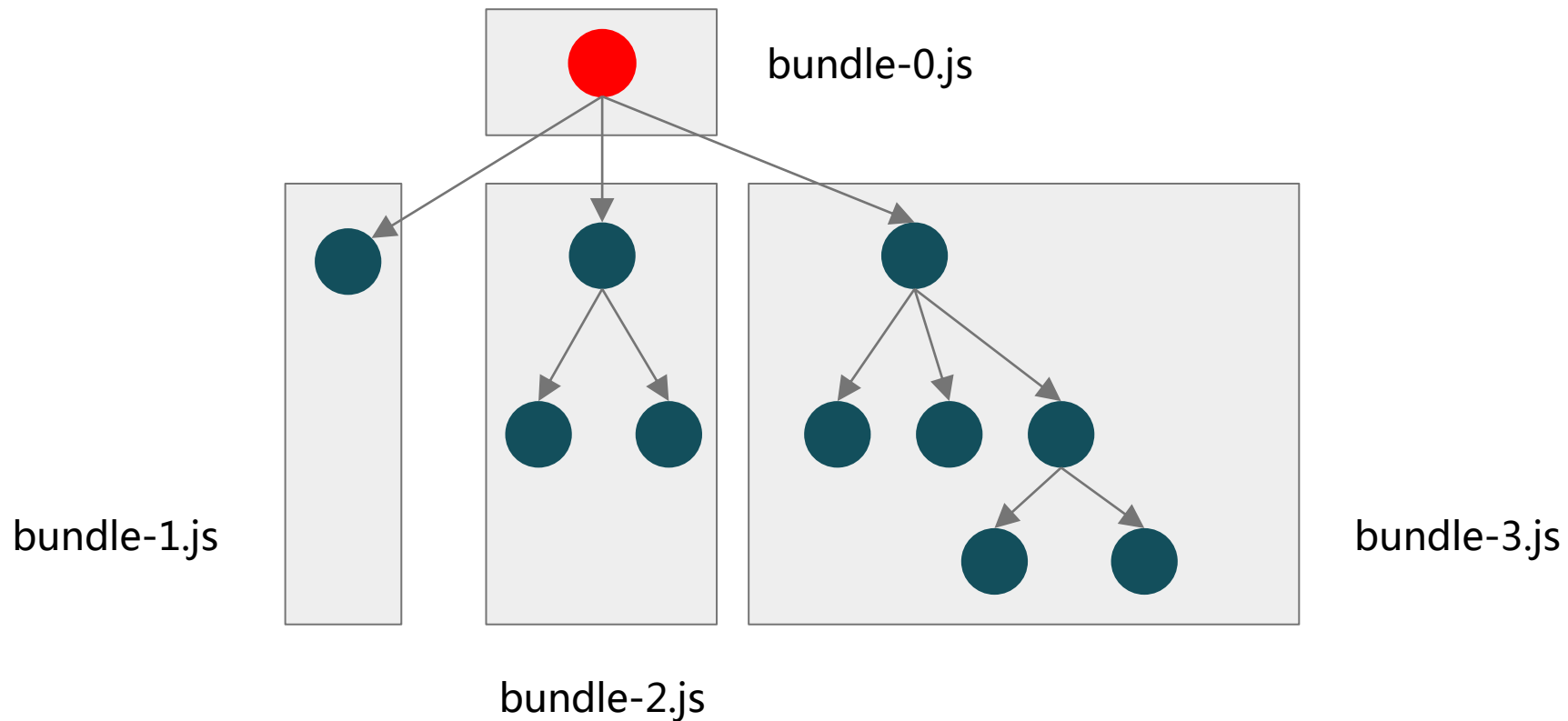
问题：为什么需要NgModule？

<https://angular.cn/docs/ts/latest/cookbook/ngmodule-faq.html>

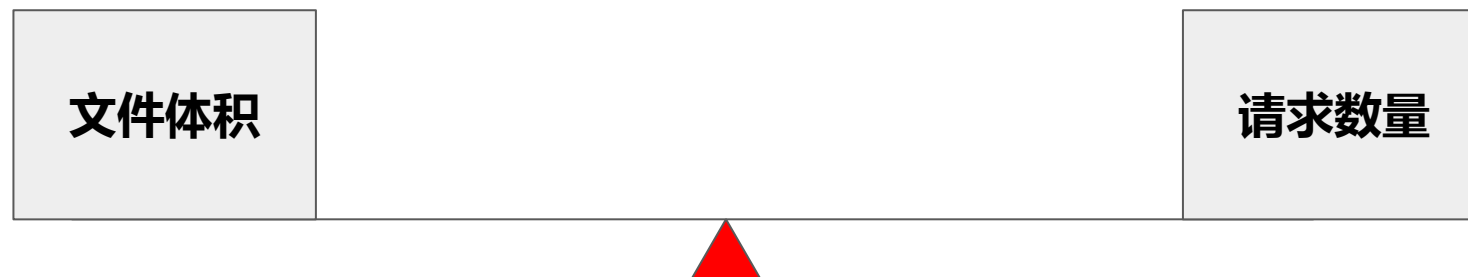
NgModule



NgModule



NgModule



这里需要取得一个平衡

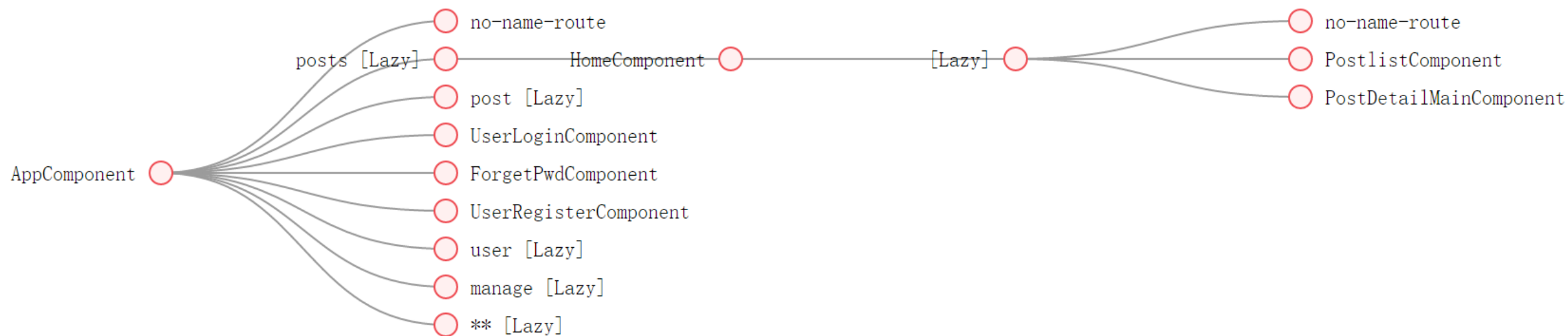
第三个核心概念：Router

问题：前端为什么需要Router？

前端为什么需要Router ?

- 如果没有Router , 浏览器的前进后退按钮没法用
- 如果没有Router , 你将无法把URL拷贝并分享给你的朋友

Angular应用中路由形成的Tree形结构



Angular路由用法：静态路由

```
home.routes.ts
1 import {RouterModule} from "@angular/router";
2 import {HomeComponent} from "../home.component";
3
4 const homeRoutes= [
5   {path: '', component: HomeComponent}
6 ];
7
8 export default RouterModule.forChild(homeRoutes);
```

Angular路由用法：异步路由

```
app.routes.ts
1 import { RouterModule } from '@angular/router';
2
3 const appRoutes=[
4   {
5     path: '',
6     loadChildren: 'app/home/home.module'
7   }, {
8     path: 'home',
9     loadChildren: 'app/home/home.module'
10  }, {
11   path: 'user',
12   loadChildren: 'app/user/user.module'
13  }, {
14   path: 'role',
15   loadChildren: 'app/role/role.module'
16  }, {
17   path: '**', //fallback router must in the last
18   loadChildren: 'app/home/home.module'
19  }
20 ];
21 export default RouterModule.forRoot(appRoutes);
```

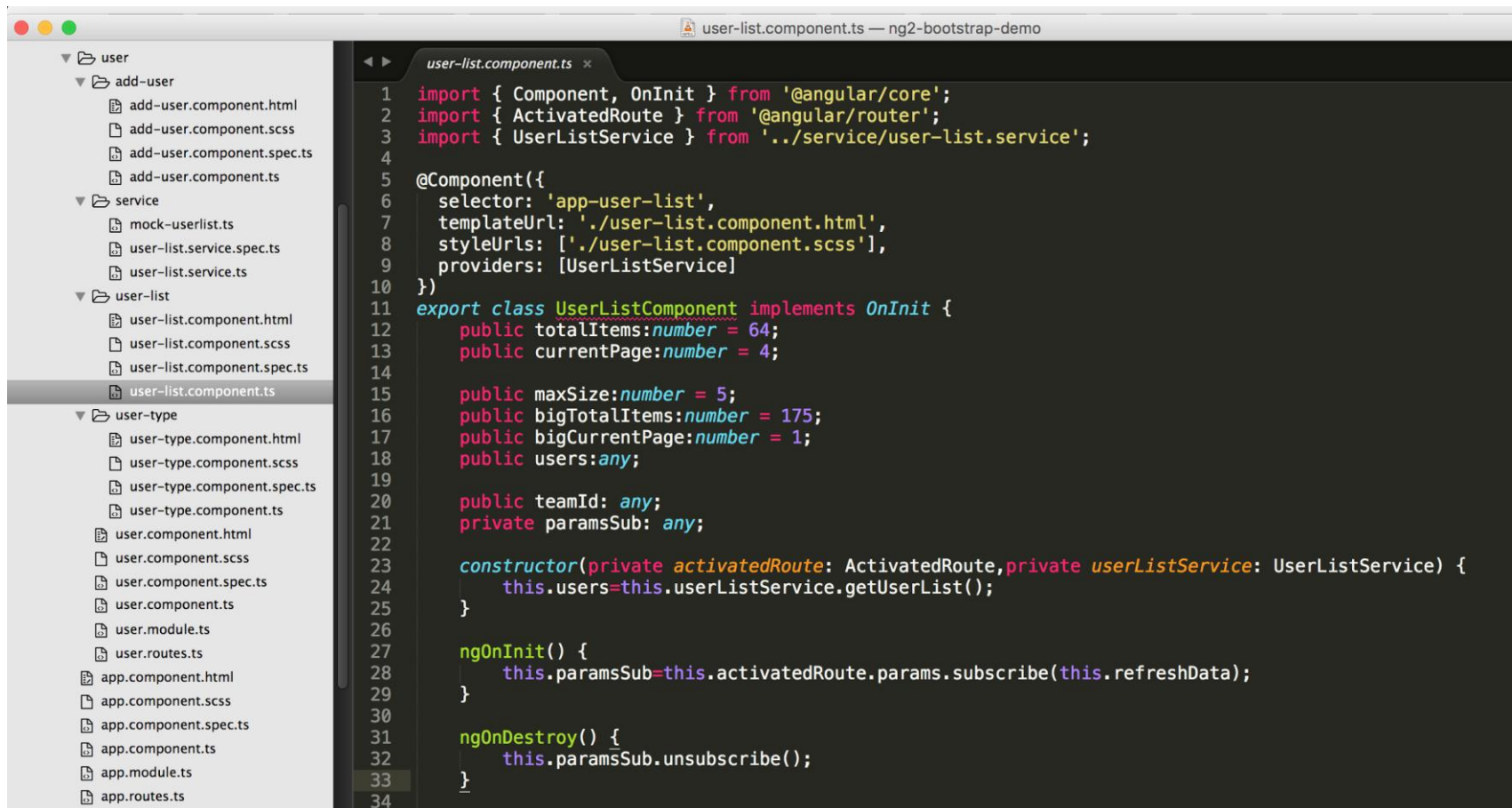
Angular路由用法：路由守卫

```
manage.routes.ts
1 import { ManageMainComponent } from './manage-main/manage-main.component';
2 import { PostTableComponent } from './post-table/post-table.component';
3 import { CommentTableComponent } from './comment-table/comment-table.component';
4 import { UserTableComponent } from './user-table/user-table.component';
5 import { UserProfileComponent } from './user/user-profile/user-profile.component';
6 import { SysParamComponent } from './sys-param/sys-param.component';
7 import { AuthGuard } from './auth-guard';
8
9 export const manageRoutes = [
10   {
11     path: '',
12     component: ManageMainComponent,
13     canActivate: [AuthGuard],
14     children: [
15       { path: '', redirectTo: 'posttable/page/1', pathMatch: 'full' },
16       { path: 'posttable/page/:page', component: PostTableComponent },
17       { path: 'commenttable/page/:page', component: CommentTableComponent },
18       { path: 'usertable/page/:page', component: UserTableComponent },
19       { path: 'usertable/edituser/:userId', component: UserProfileComponent },
20       { path: 'usertable/newuser', component: UserProfileComponent },
21       { path: 'sysparam', component: SysParamComponent },
22       { path: '**', redirectTo: 'posttable/page/1' }
23     ]
24   }
25 ];
```

防止未授权访问

第三块：Angular架构特色

依赖注入

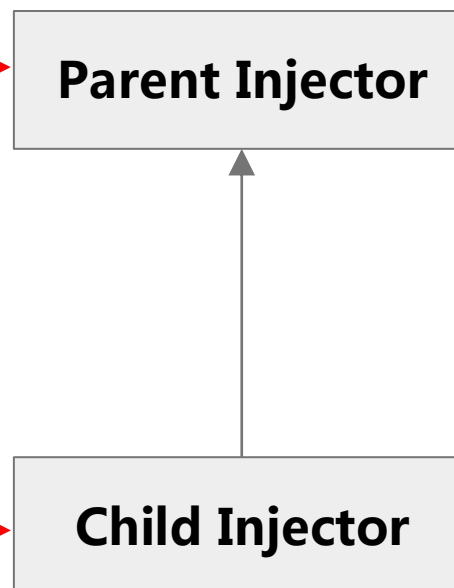


```
user-list.component.ts — ng2-bootstrap-demo

1 import { Component, OnInit } from '@angular/core';
2 import { ActivatedRoute } from '@angular/router';
3 import { UserListService } from '../service/user-list.service';
4
5 @Component({
6   selector: 'app-user-list',
7   templateUrl: './user-list.component.html',
8   styleUrls: ['./user-list.component.scss'],
9   providers: [UserListService]
10 })
11 export class UserListComponent implements OnInit {
12   public totalItems:number = 64;
13   public currentPage:number = 4;
14
15   public maxSize:number = 5;
16   public bigTotalItems:number = 175;
17   public bigCurrentPage:number = 1;
18   public users:any;
19
20   public teamId: any;
21   private paramsSub: any;
22
23   constructor(private activatedRoute: ActivatedRoute, private userListService: UserListService) {
24     this.users=this.userListService.getUserList();
25   }
26
27   ngOnInit() {
28     this.paramsSub=this.activatedRoute.params.subscribe(this.refreshData);
29   }
30
31   ngOnDestroy() {
32     this.paramsSub.unsubscribe();
33   }
34
```

依赖注入

```
1 <tab>  
2     <pane title="one"></pane>  
3     <pane title="two"></pane>  
4 </tab>
```



注射器 (Injector) 也是一个树型结构

依赖注入

```
<img alt="Chrome DevTools console screenshot showing a 'No provider for NgForm' error. The error message is 'EXCEPTION: No provider for NgForm (ShowError -> NgForm)'. The stack trace shows the error originates from the injector's execute method. The error context shows the element is 'show-error.ng-binding' and the injector is 'Injector'. A red arrow points to the 'injector' property in the error context, with a text box stating 'The injector of the element where Angular failed to instantiate a directive'." data-bbox="131 246 853 862"/>

<top frame>  Preserve log



▼ EXCEPTION: No provider for NgForm (ShowError -> NgForm) browser adapter.js:110



STACKTRACE: browser adapter.js:106



Error: DI Exception browser adapter.js:106



- at NoBindingError.BaseException (lang.js:163)
- at NoBindingError.AbstractBindingError (exceptions.js:48)
- at new NoBindingError (exceptions.js:70)
- at Injector.execute.$__export._throwOrNull (injector.js:640)
- at Injector.execute.$__export._getByKeySelf (injector.js:645)
- at Injector.execute.$__export._getByKey (injector.js:629)
- at Injector.execute.$__export._getByDependency (injector.js:621)
- at Injector.execute.$__export._instantiate (injector.js:518)
- at Injector.execute.$__export._new (injector.js:491)
- at InjectorInlineStrategy.execute.$__export.instantiateBinding (injector.js:283)



ERROR CONTEXT: browser adapter.js:106



▼ _Context {element: show-error.ng-binding, componentElement: template-driven-forms, injector: Injector} browser adapter.js:106



- ▶ componentElement: template-driven-forms
- ▶ element: show-error.ng-binding
- ▶ injector: Injector
- ▶ __proto__: _Context



The injector of the element where Angular failed to instantiate a directive



> |


```

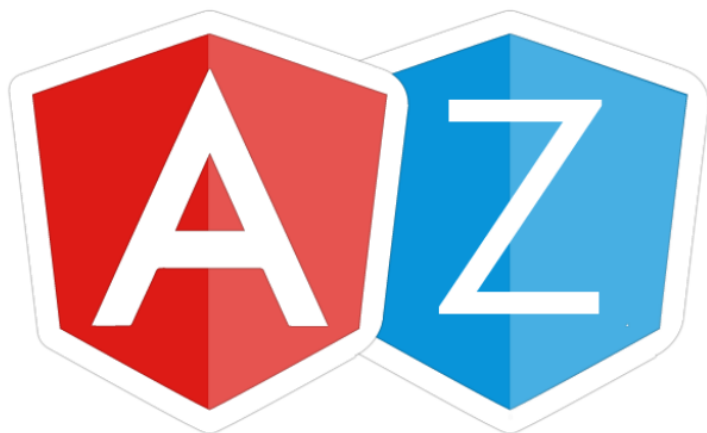

依赖注入

- 每一个HTML标签上面都会有一个注射器实例
- 注射是通过constructor进行的
- @Injectable是@Component的子类

<https://vsavkin.com/dependency-injection-in-angular-1-and-angular-2-d69589979c18#.3ptlx48zf>

<https://my.oschina.net/mumu/blog/775695>

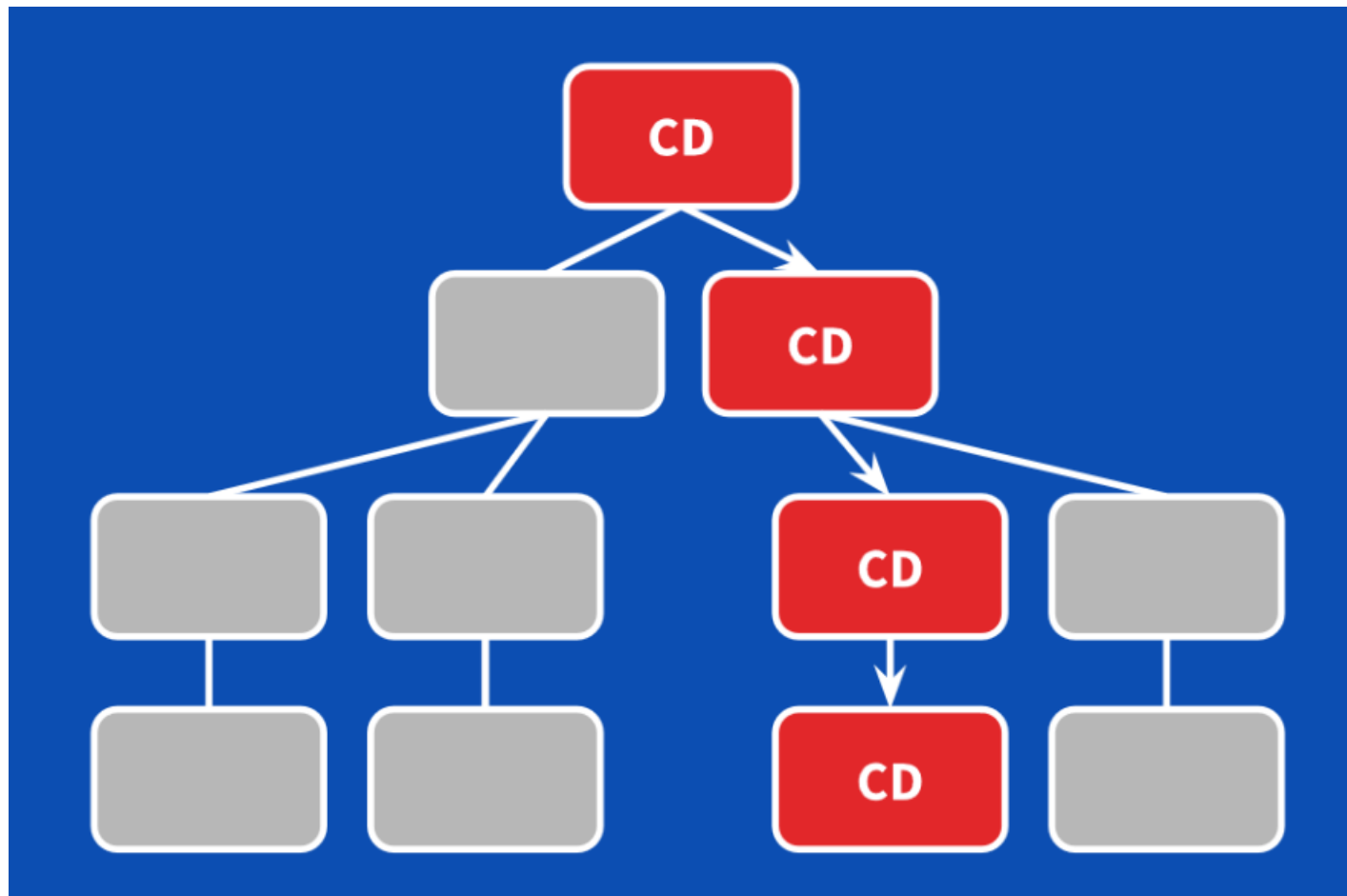
数据绑定



Immutable Data

简而言之，新版本的Angular已经彻底重写了脏检查机制

数据绑定



极其高效的脏检查机制

数据绑定

<http://blog.thoughttram.io/angular/2016/02/22/angular-2-change-detection-explained.html>

<http://pascalprecht.github.io/slides/angular-2-change-detection-explained/#/>

<https://vsavkin.com/change-detection-in-angular-2-4f216b855d4c>

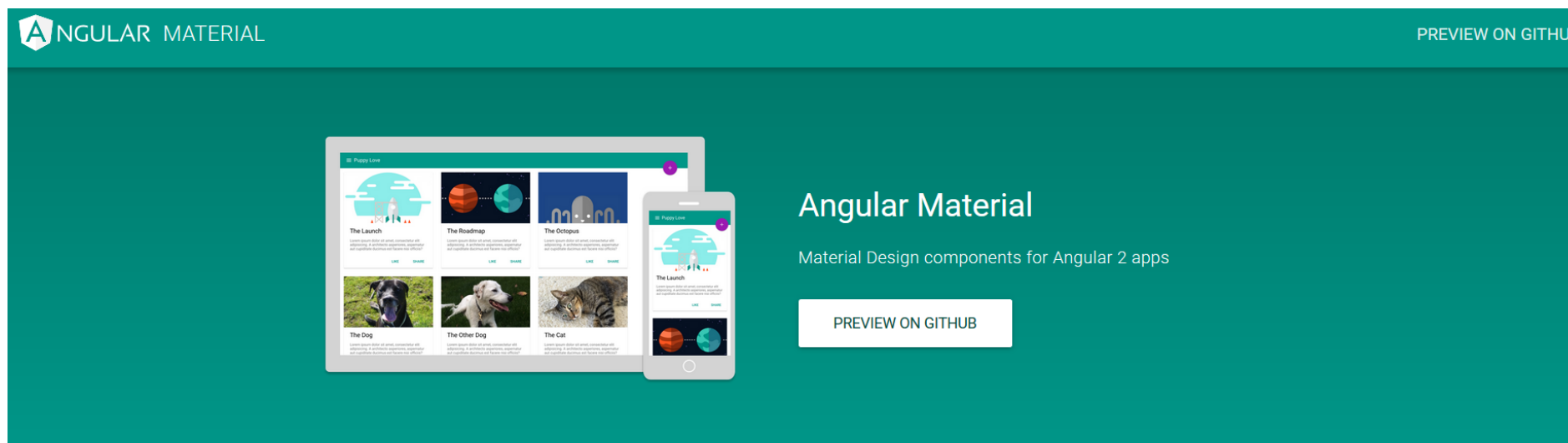
第四块：UI库

UI Libraries

- [ng2-bootstrap](#) is currently available.
- [PrimeNG](#) has largest number of components.
- [Angular-Material2](#) from Angular team.
- [Ionic](#) is very popular.

What if there is no ANSI C standard library?

UI Libraries



Sprint from Zero to App

Hit the ground running with comprehensive, modern UI components that work across web, mobile and desktop.

[Angular-Material](#)

UI Libraries

The screenshot shows the PrimeNG website interface. On the left is a dark navigation sidebar with icons and labels for various UI components: Input, Button, Data, Panel, Overlay, Menu, Charts, Messages, Multimedia, DragDrop, and Misc. The main content area has a blue header with the PrimeNG logo and navigation links for Setup, Free Themes, and Forum. Below the header, the 'PrimeNG' title is displayed in red. A descriptive paragraph follows, stating that PrimeNG is a collection of rich UI components for Angular 2, developed by PrimeTek Informatics. Below this, there are two prominent buttons: a yellow 'Download' button with a green checkmark icon and an orange 'View on GitHub' button with a green document icon. The main content area is organized into a grid of feature cards, each with an icon, a title, and a brief description:


- PRIMEFACES UI**: Derived from the mighty PrimeFaces
- WIDGETS**: 60+ Components, Easy to Use, Accessible
- PRODUCTIVITY**: Simple, Lightweight, Powerful
- MOBILE**: Responsive, Cross Browser, Touch Optimized
- COMMUNITY**: Active, Vibrant, Open Source
- THEMES**: 35+ Free Themes, Premium Themes, Theme Creator Tool

[PrimeNG](#)

UI Libraries

ng-bootstrap Getting Started Components

Star 1,057 Tweet #ngbootstrap



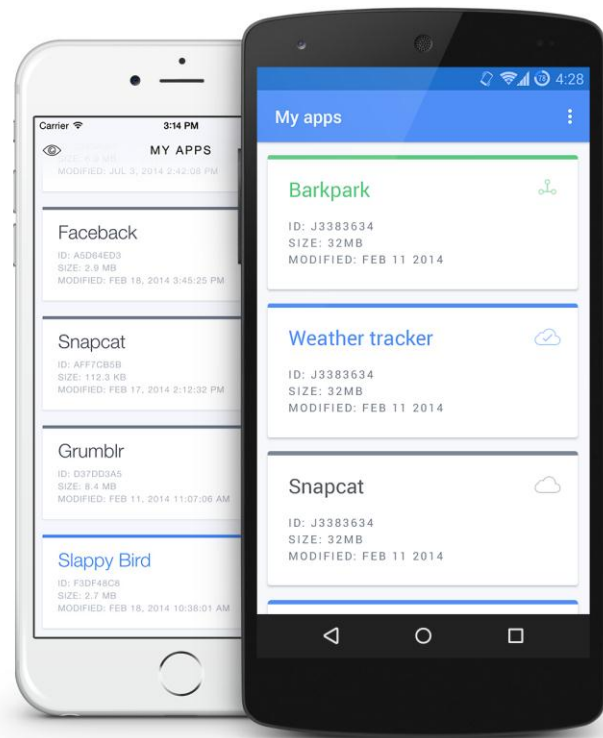
Bootstrap 4 components, powered by Angular 2 and written by the angular-ui Team.

[Demo](#) [Installation instructions](#)

Currently v1.0.0-alpha.6

强烈推荐 : [ng2-bootstrap](#)

移动端开发神器



ionic , 底层是NativeScript

第五块：参考资源推荐

特别推荐：ng2-admin



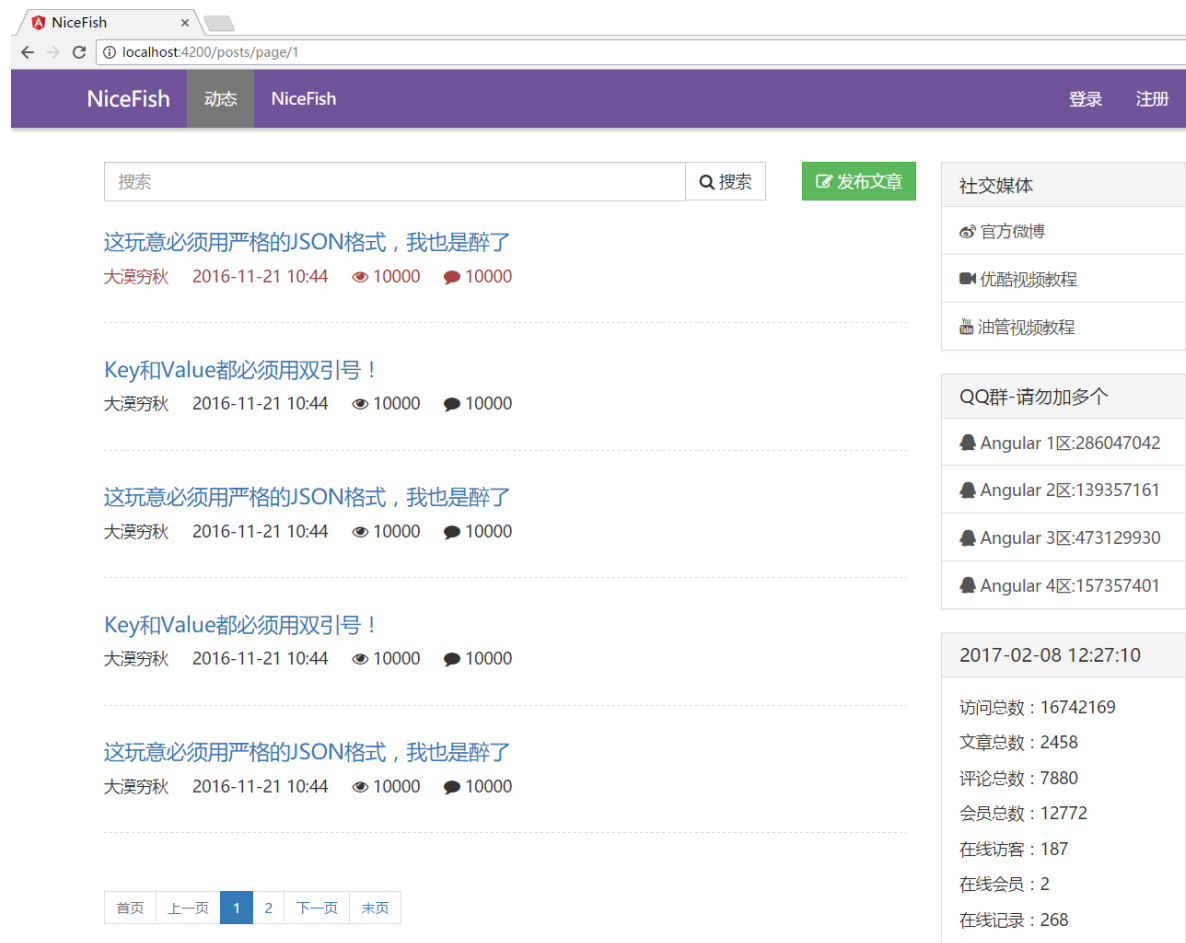
<https://github.com/akveo/ng2-admin>

特别推荐：JHipster-后端基于SpringMVC



<https://jhipster.github.io/>

一般推荐：NiceFish



<http://git.oschina.net/mumu-osc/NiceFish>

谢谢