



Angular核心特性

大漠穷秋 2017-05-13

内容提纲

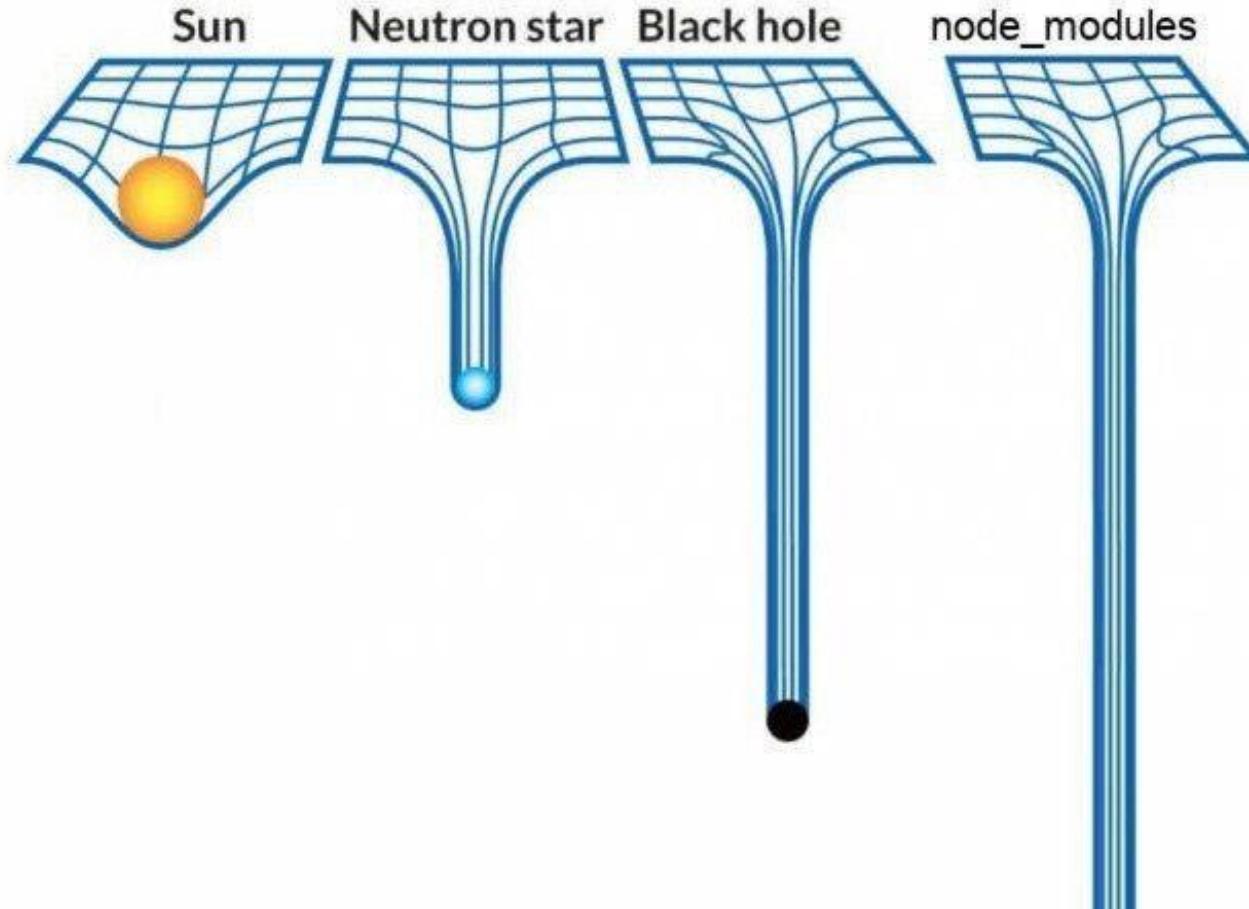
- 第一块内容：集成开发环境@angular/cli
- 第二块内容：Angular三大核心概念
 - Component,Module,Route
- 第三块内容：Angular架构特色
 - 依赖注入、数据绑定
- 第四块内容：UI库
 - Angular-Material,Prime-NG,ng2-bootstrap,ionic
- 第五块内容：参考资源推荐

第一块：集成开发环境

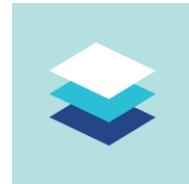
Tool Chains based on NodeJS



npm : 世界上最糟糕的模块管理器

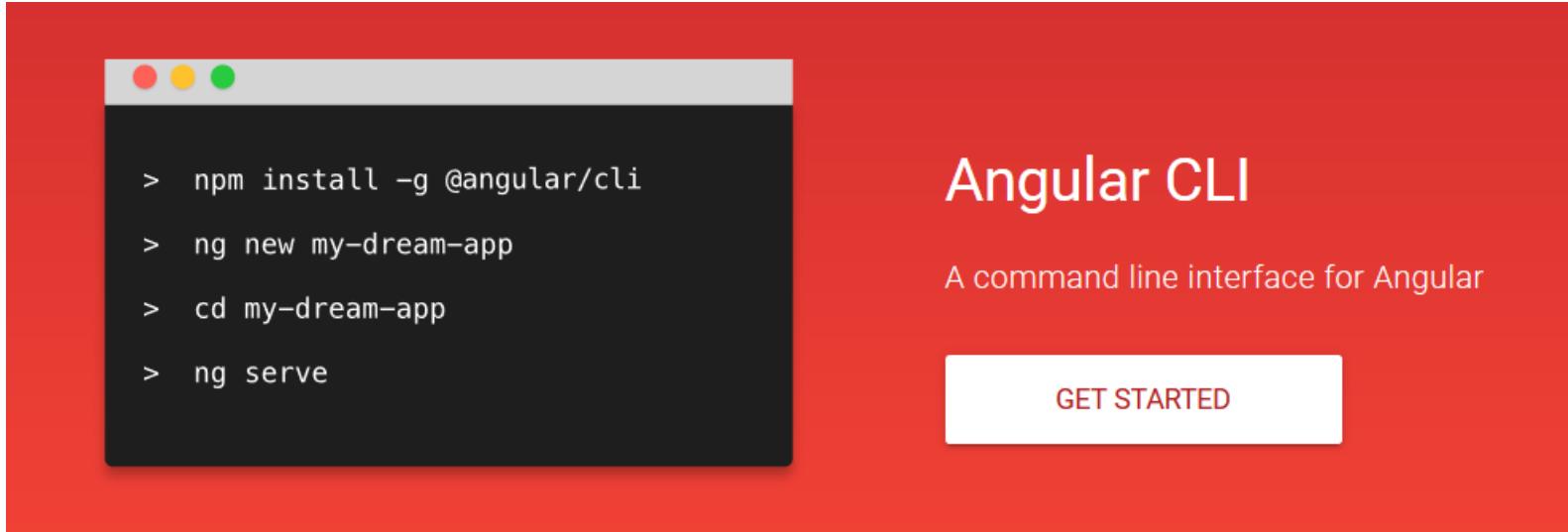


@angular/cli



把所有零散的Node工具都集成起来多好啊！

@angular/cli



The image shows the Angular CLI landing page. On the left, there is a terminal window icon containing a black terminal screen with white text showing the following command sequence:

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

On the right, the text "Angular CLI" is displayed in large white font, followed by "A command line interface for Angular" in smaller white font. Below this is a white button with the text "GET STARTED" in red.

@angular/cli

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

```
>ng --version
```

```
>ng help
```

```
>ng new my-project1
```

```
>ng serve
```

@angular/cli

>**ng generate**

c:class

c:component

d:directive

e:enum

m:module

p:pipe

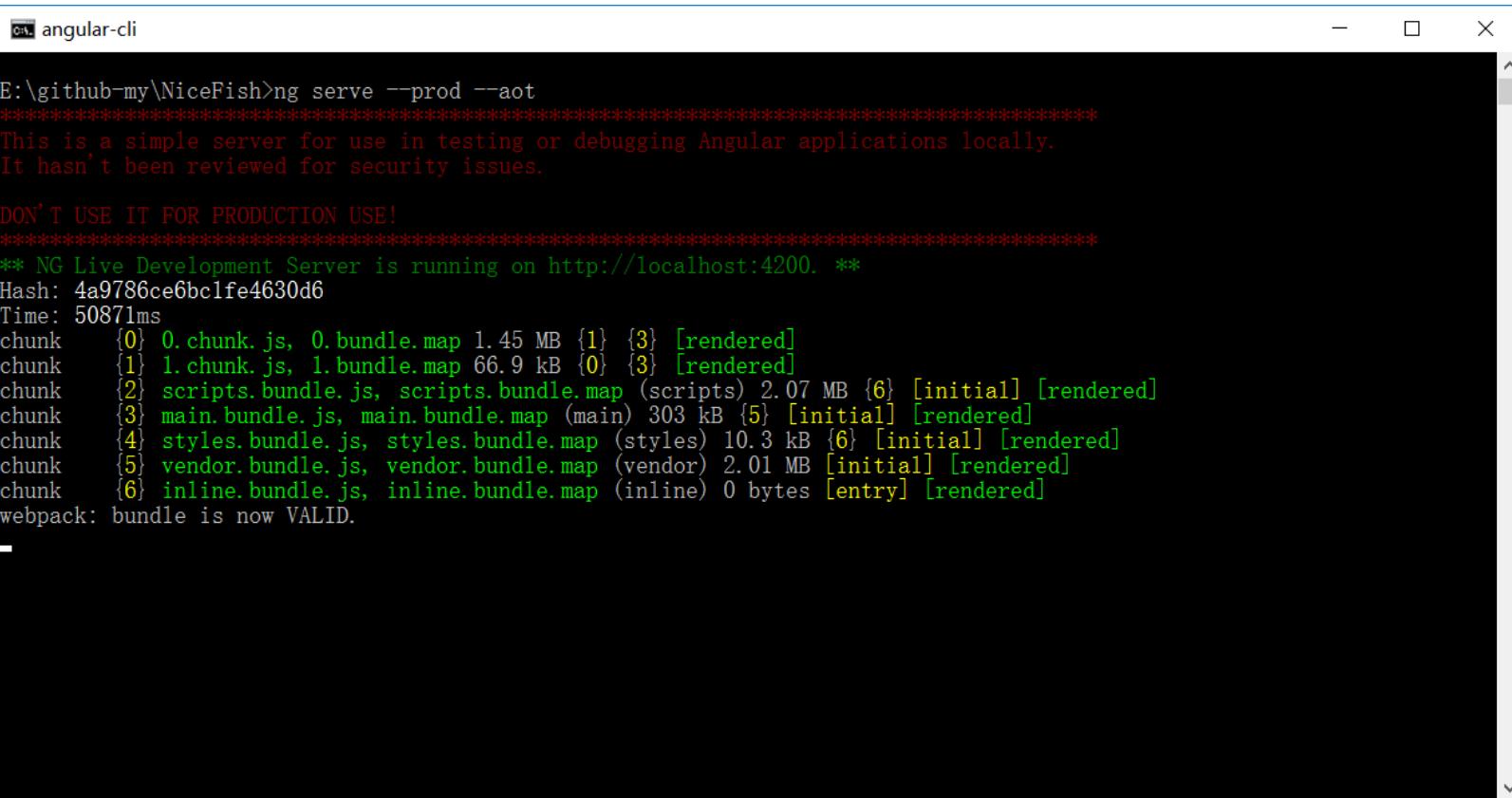
s:service

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



```
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 /#i6GLl46TuIVZlkPKAAAA 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 (1 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:
    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)
```

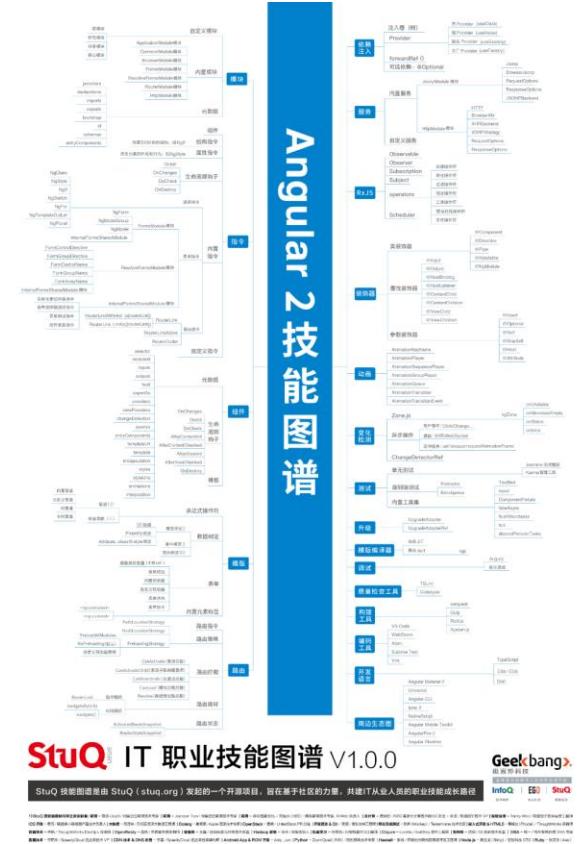
ng test

@angular/cli



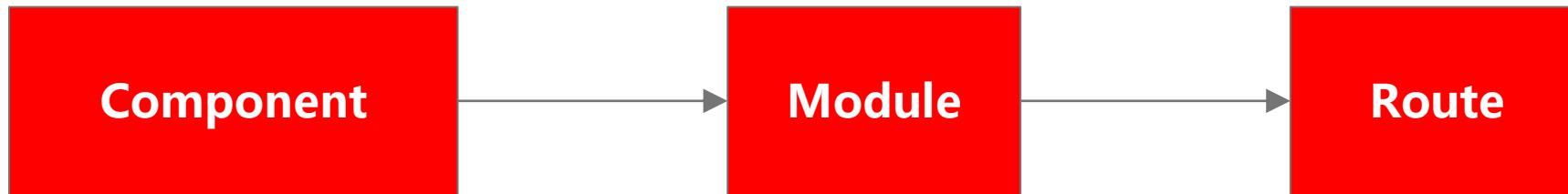
第二块：Angular中的3大核心概念

一张图覆盖Angular所有概念



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”

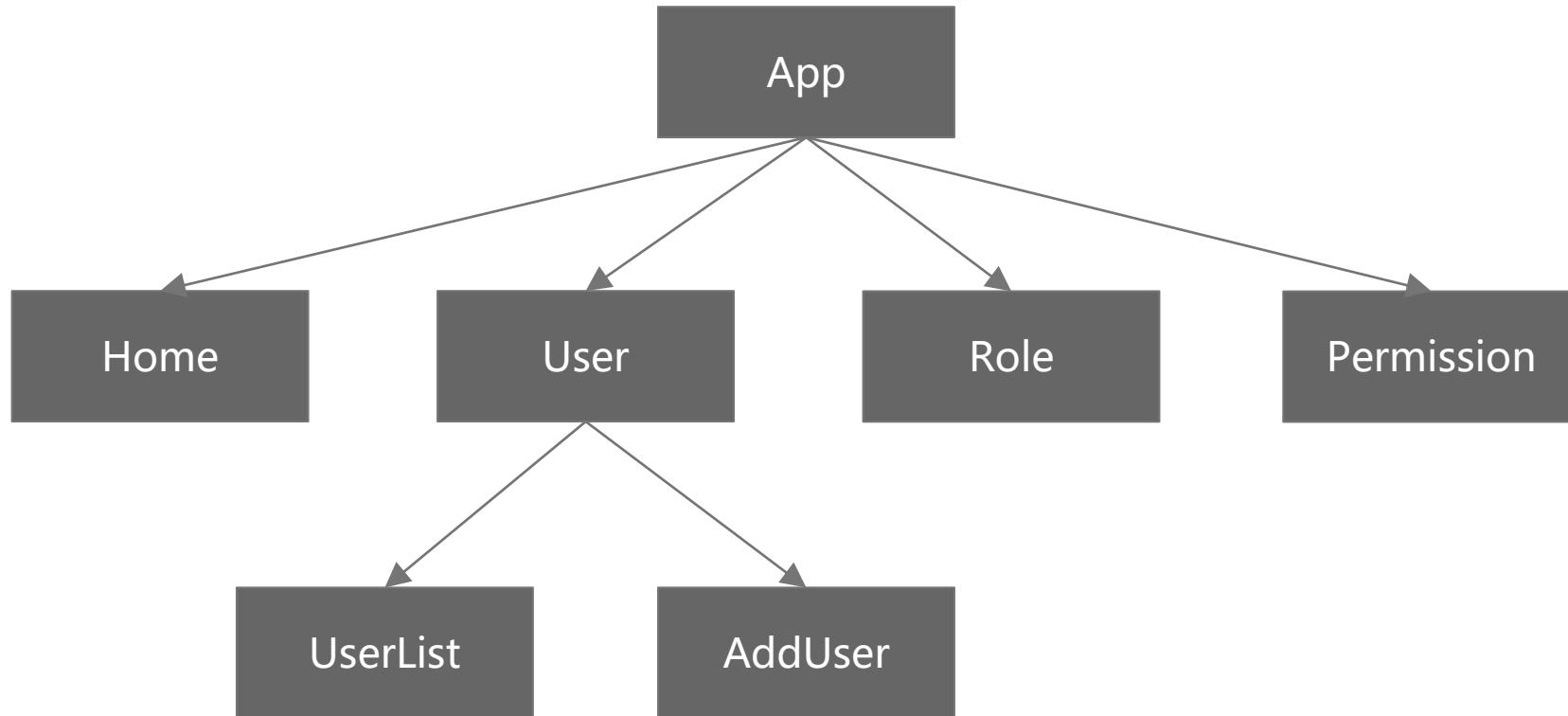
第一个核心概念：Component

The screenshot shows a web application window titled "NiceFish" with the URL "121.196.220.118:8081/posts/page/1". The interface is divided into several sections:

- Header:** A purple navigation bar with tabs for "NiceFish", "动态", "集成图表", "高德地图", "集成jQuery", "集成jsplumb", "NiceFish", and "CodeBe". It also includes "登录" and "注册" buttons.
- Search Bar:** A search input field with a placeholder "搜索" and a green "搜索" button.
- Post List:** A main content area displaying five posts, each with a title, author, date, and view/comment counts.
 - Post 1: "这玩意必须用严格的JSON格式，我也是醉了" by 大漠穷秋, 2016-11-21 10:44, 10000 views, 10000 comments.
 - Post 2: "Key和Value都必须用双引号！" by 大漠穷秋, 2016-11-21 10:44, 10000 views, 10000 comments.
 - Post 3: "这玩意必须用严格的JSON格式，我也是醉了" by 大漠穷秋, 2016-11-21 10:44, 10000 views, 10000 comments.
 - Post 4: "Key和Value都必须用双引号！" by 大漠穷秋, 2016-11-21 10:44, 10000 views, 10000 comments.
 - Post 5: "这玩意必须用严格的JSON格式，我也是醉了" by 大漠穷秋, 2016-11-21 10:44, 10000 views, 10000 comments.
- Sidebar:** A vertical sidebar on the right side of the page.
 - 社交媒体:** Links to "官方微博", "优酷视频教程", and "油管视频教程".
 - QQ群:** "QQ群-请勿加多个" followed by four groups:
 - Angular 1区:286047042 (满)
 - Angular 2区:139357161 (满)
 - Angular 3区:473129930 (将满)
 - Angular 4区:483016484 (空)
 - Statistics:** Data from May 6, 2017, including:
 - 访问总数 : 16742169
 - 文章总数 : 2458
 - 评论总数 : 7880
 - 会员总数 : 12772
 - 在线访客 : 187
 - 在线会员 : 2
 - 在线记录 : 268
- Footer:** A dark footer bar with the text "Powered by NiceFish".

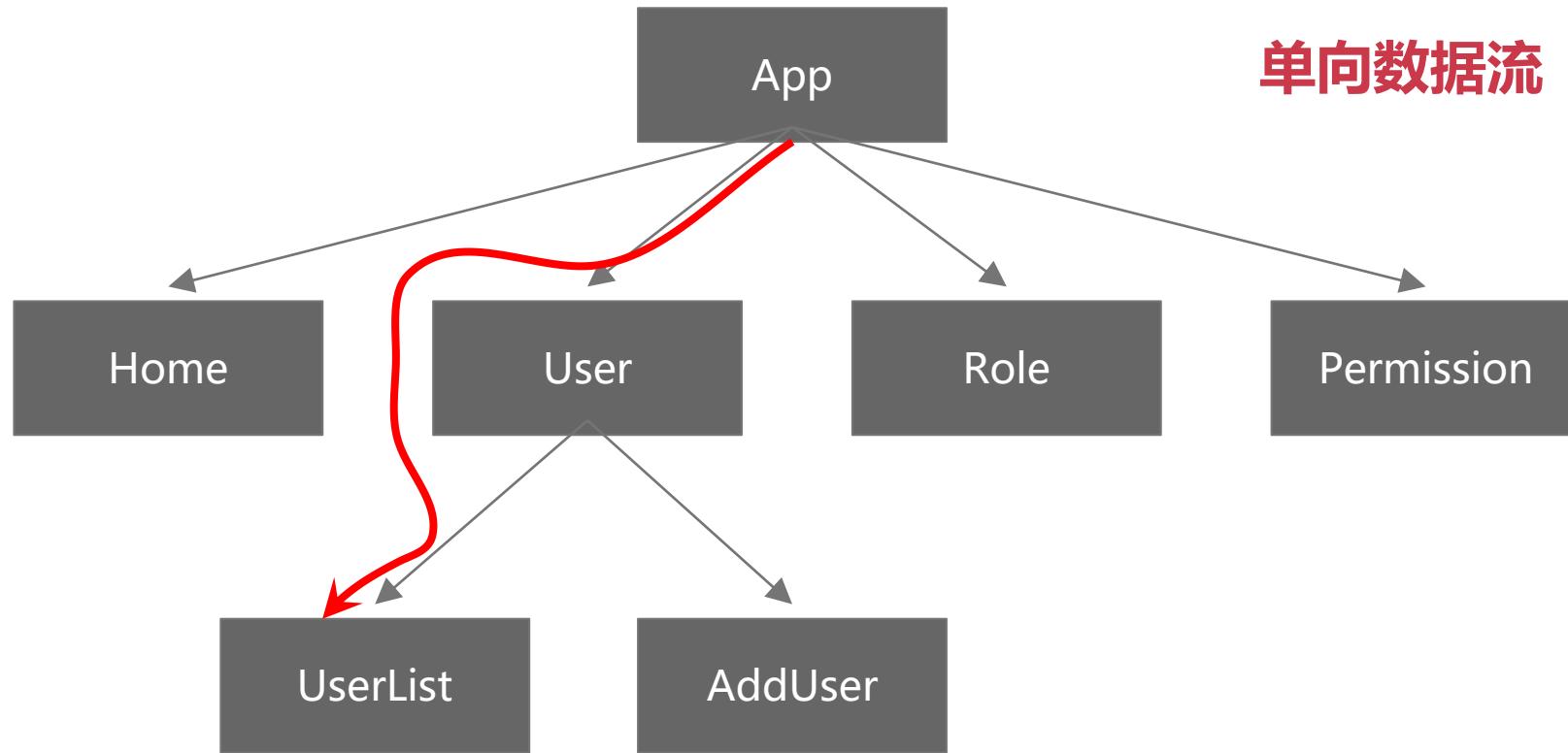
<http://git.oschina.net/mumu-osc/NiceFish>

Component Tree



NiceFish实例项目的组件树结构

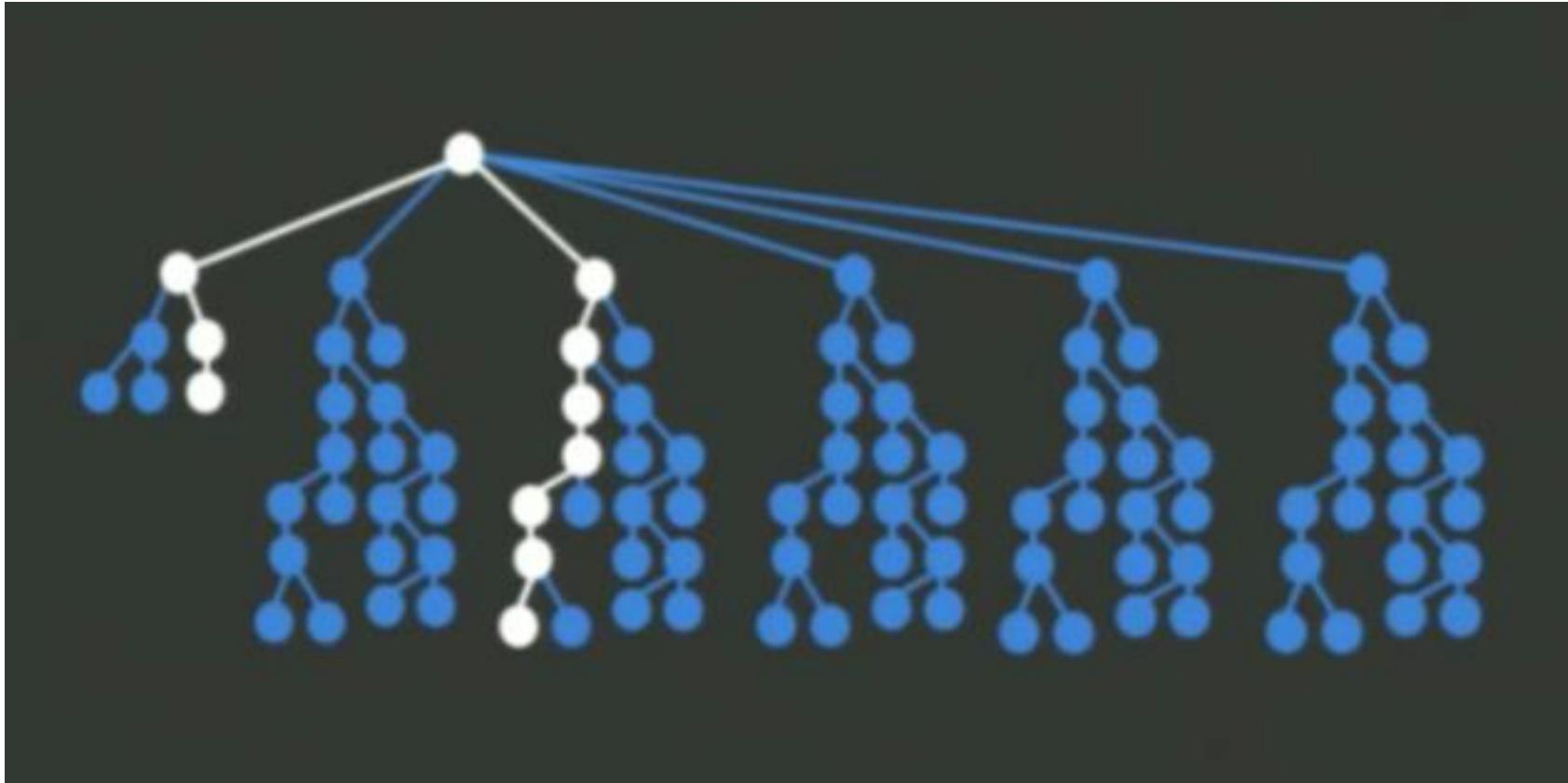
单向数据流



单向数据流

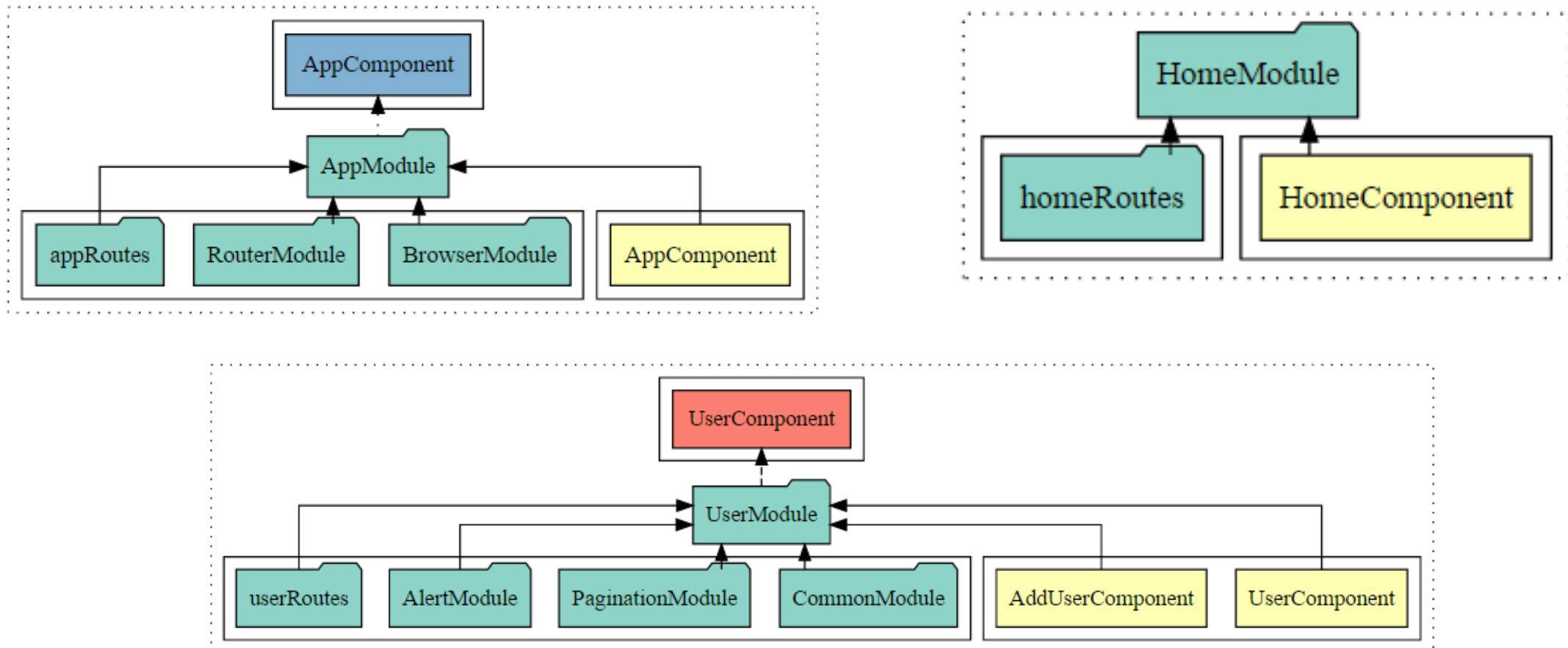
<https://github.com/modern-javascript/angular2-data-flow>

实际项目中的组件树



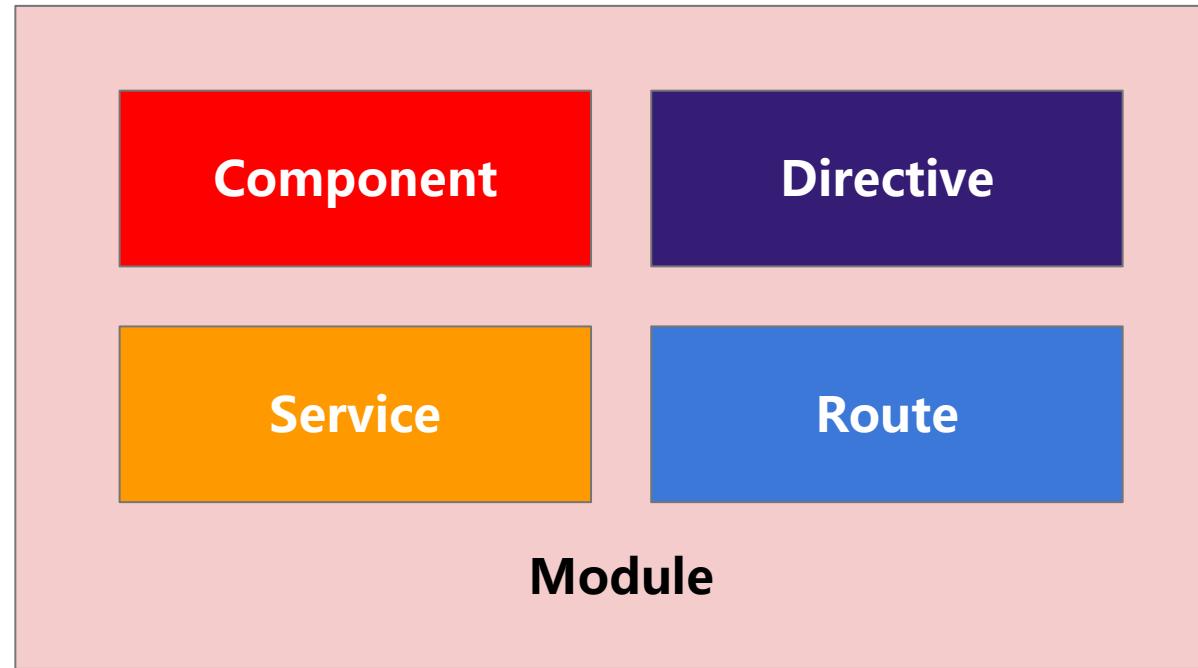
不可变数据类型

组件树生成器



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

第二个核心概念：NgModule



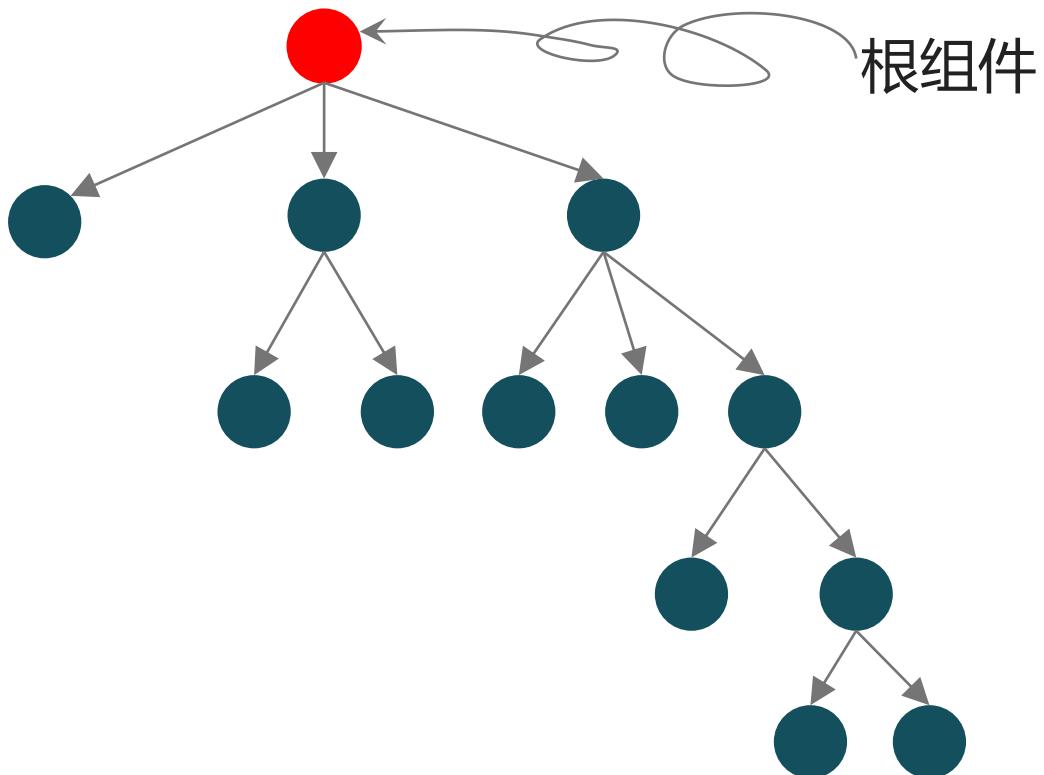
什么是模块？

第二个核心概念：NgModule

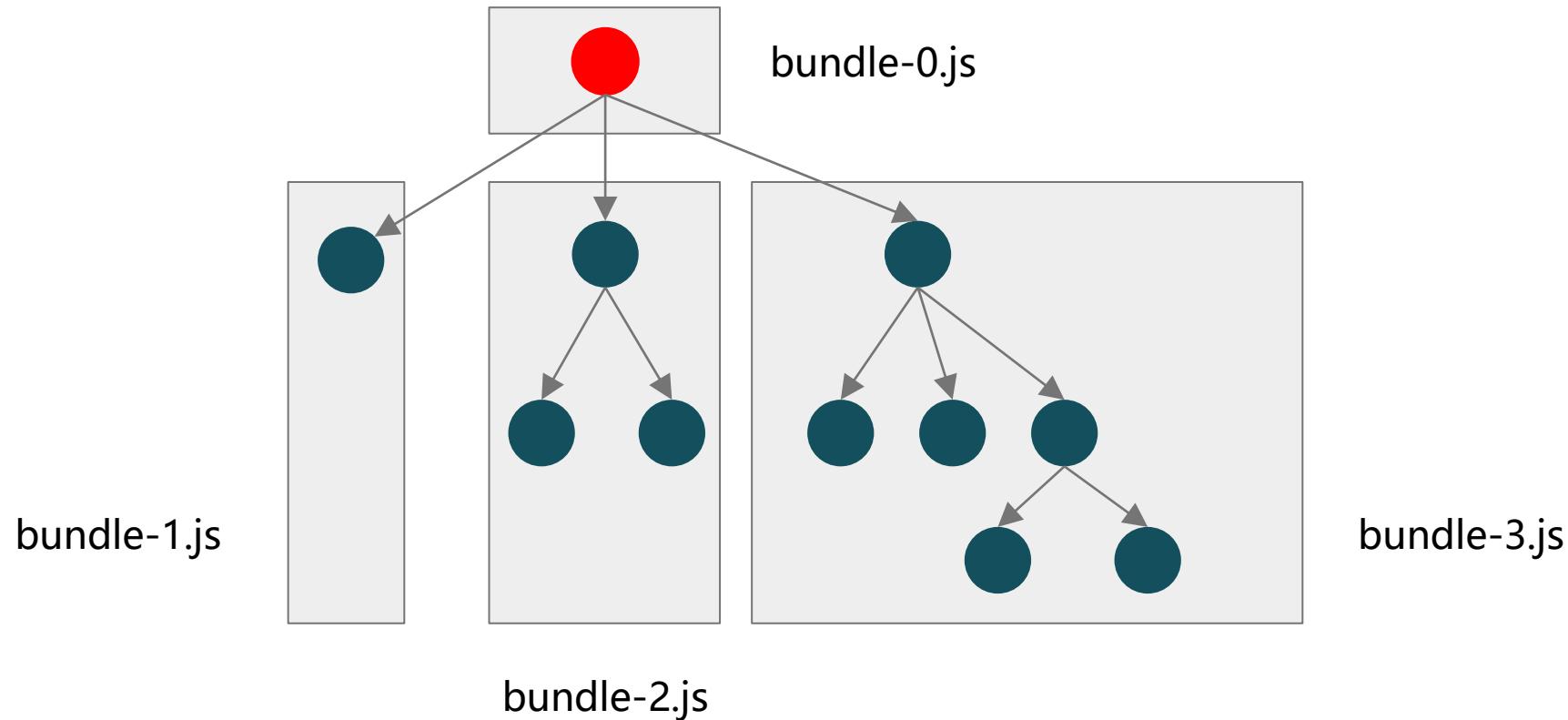
问题：为什么需要NgModule？

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

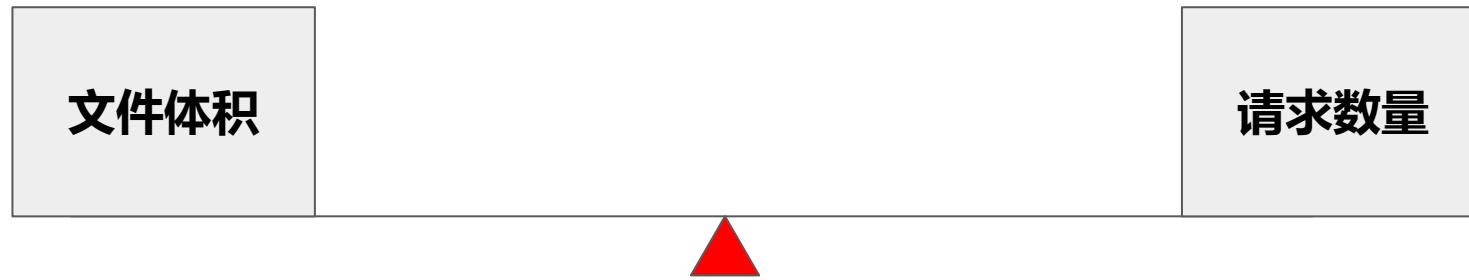
NgModule



NgModule



NgModule



这里需要取得一个平衡

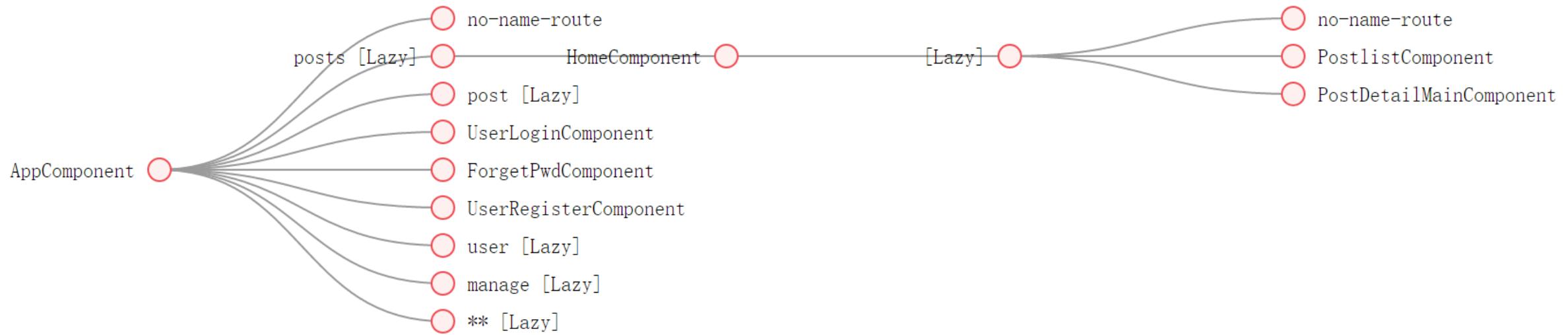
第三个核心概念：Router

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     {
9         path: 'home',
10        loadChildren:'app/home/home.module'
11    },
12    {
13        path: 'user',
14        loadChildren:'app/user/user.module'
15    },
16    {
17        path: 'role',
18        loadChildren:'app/role/role.module'
19    },
20 ],
21 export default RouterModule.forRoot(appRoutes);
```

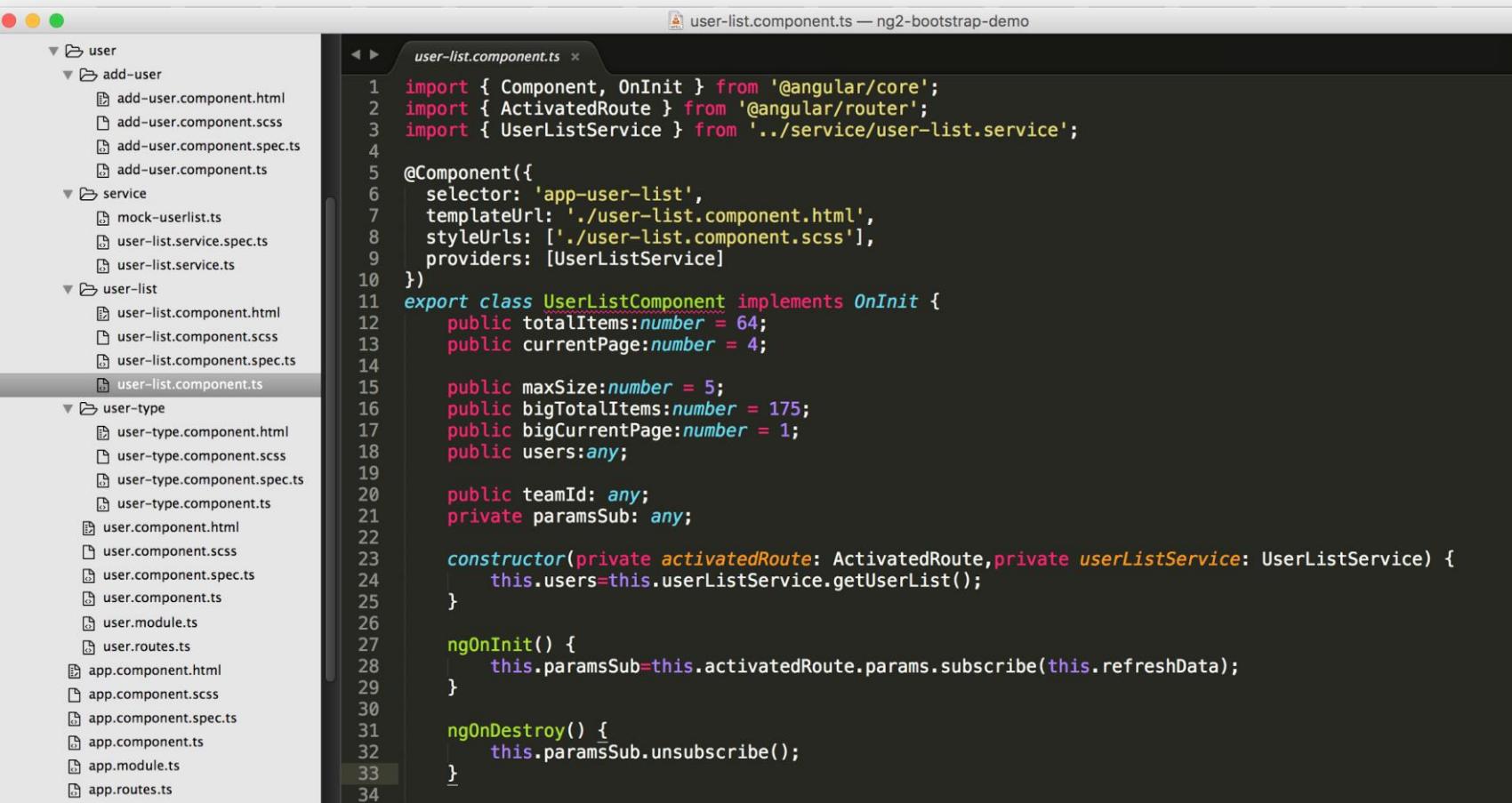
Angular路由用法：路由守卫

```
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], // 代码行13，被红色方框包围
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

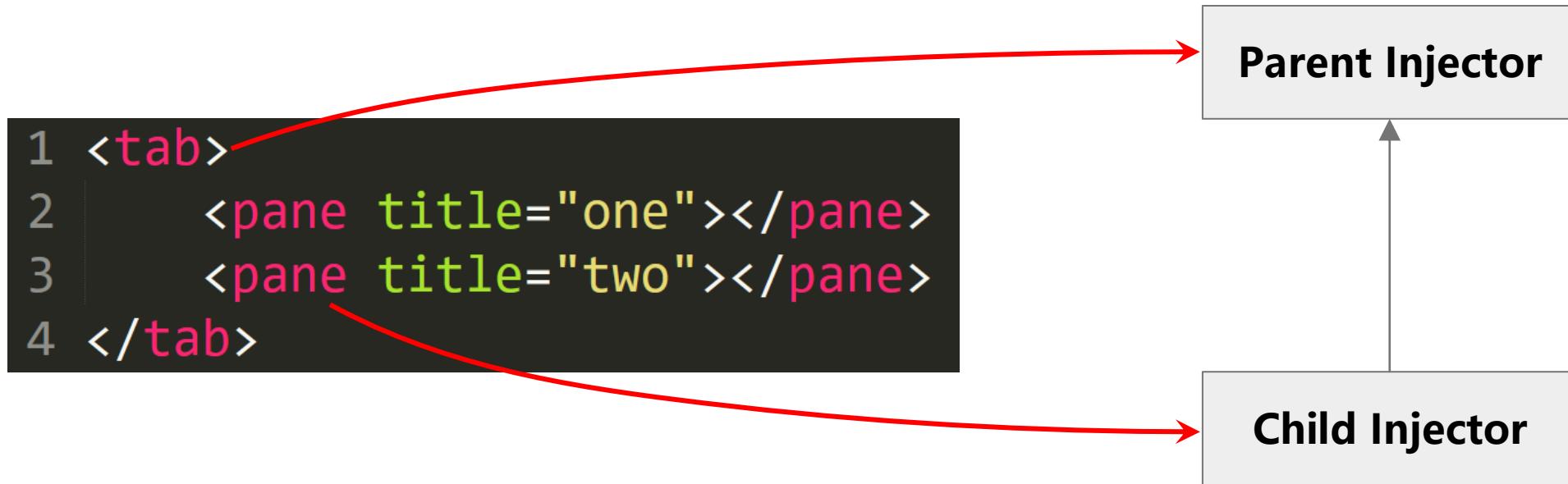
第三块：Angular架构特色

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



注射器 (Injector) 也是一个树型结构

依赖注入

```
✖  <top frame> ▼  Preserve log  
▼ EXCEPTION: No provider for NgForm (ShowError -> NgForm) browser_adapter.js:110  
  STACKTRACE: browser_adapter.js:106  
    browser_adapter.js:106  
    Error: DI Exception  
      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  
    browser_adapter.js:106  
    ▼ _Context {element: show-error.ng-binding, componentElement: template-driven-forms, injector: Injector}  
      ▶ componentElement: template-driven-forms  
      ▶ element: show-error.ng-binding ← The injector of the element where  
      ▶ injector: Injector Angular failed to instantiate a directive  
      ▶ __proto__: \_Context
```

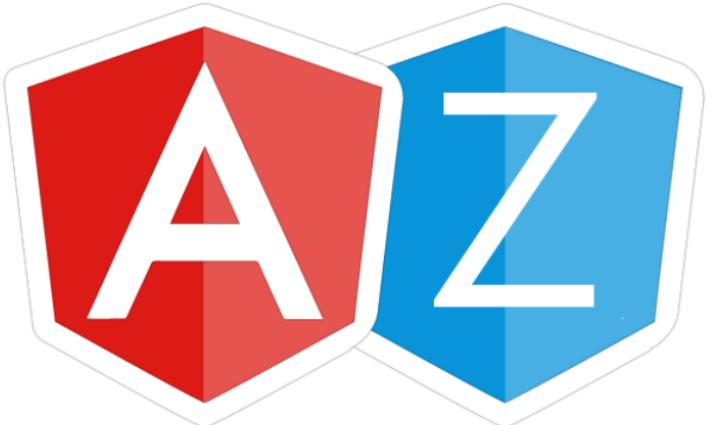
依赖注入

- 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>

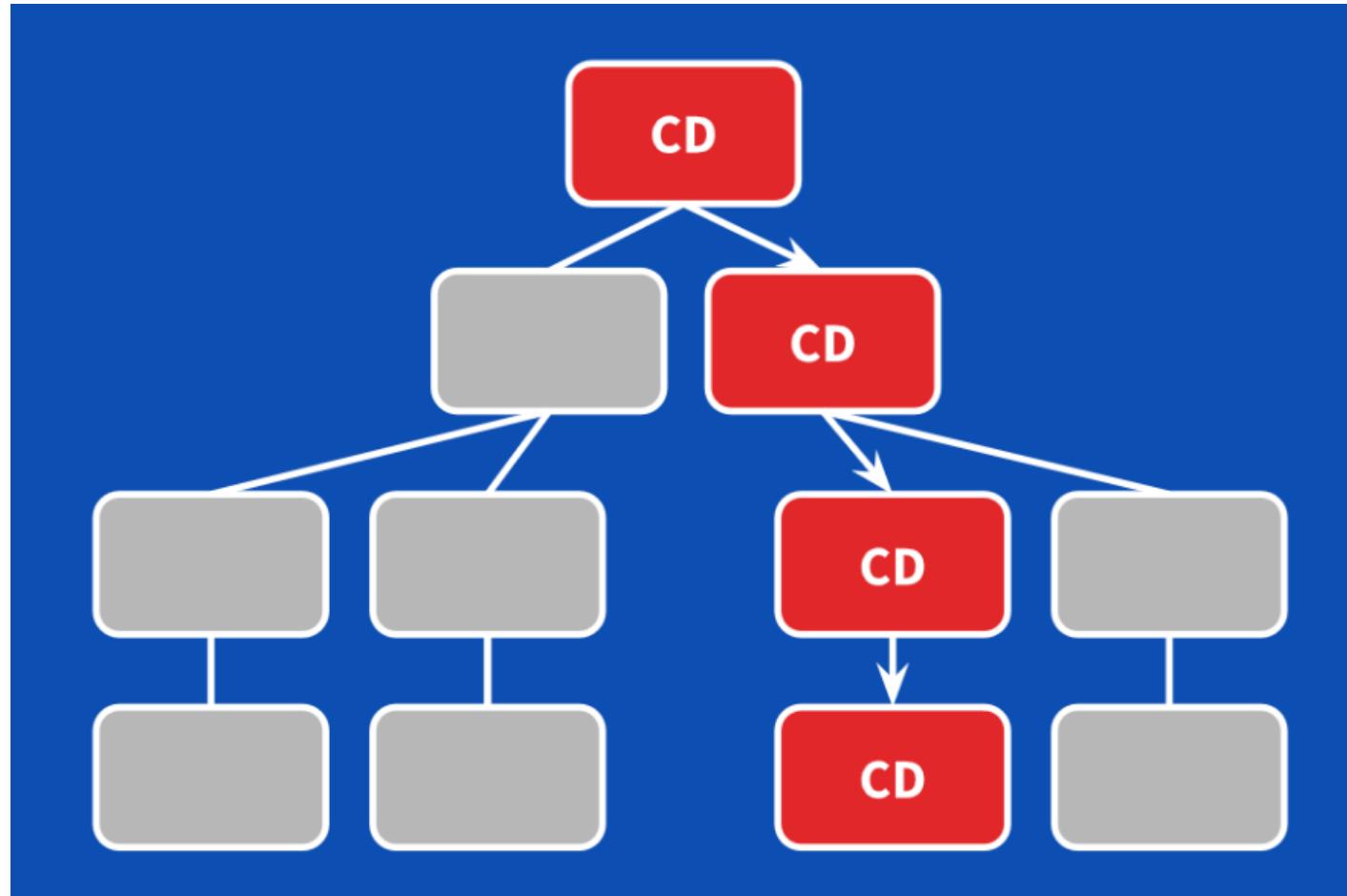
数据绑定



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.thoughtram.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

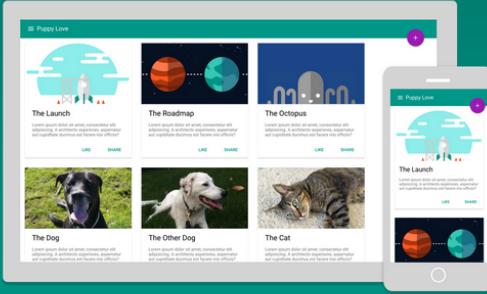
- [ng2-bootstrap](#) is currently available.
- [PrimeNG](#) has largest number of components.
- [Angular-Material2](#) from Angular team.
- [Ionic](#) is very popular.

What if there is no ANSI C standard library?

UI Libraries

ANGULAR MATERIAL

PREVIEW ON GITHUB



Angular Material

Material Design components for Angular 2 apps

PREVIEW ON GITHUB

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 homepage of the PrimeNG website (www.primefaces.org/primeng/#/). The page has a dark header with a red logo and a blue navigation bar with icons for Setup, Free Themes, and Forum. On the left is a sidebar with a tree view of UI components: Input, Button, Data, Panel, Overlay, Menu, Charts, Messages, Multimedia, DragDrop, and Misc. The main content area features the PrimeNG logo and a brief introduction. It highlights that PrimeNG is a collection of rich UI components for Angular 2, derived from PrimeFaces. It mentions that all widgets are open source and free to use under Apache License 2.0. The page also lists PrimeNG's development by PrimeTek Informatics, its mobile responsiveness, and its community support. Call-to-action buttons for 'Download' and 'View on GitHub' are present.

PrimeNG

PrimeNG is a collection of rich UI components for Angular 2. PrimeNG is a sibling of the popular JavaServer Faces Component Suite, [PrimeFaces](#).

All widgets are open source and free to use under Apache License 2.0, a commercial friendly license.

PrimeNG is developed by [PrimeTek Informatics](#), a company with years of expertise in developing open source UI components. For project news and updates, follow us on [twitter](#).

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

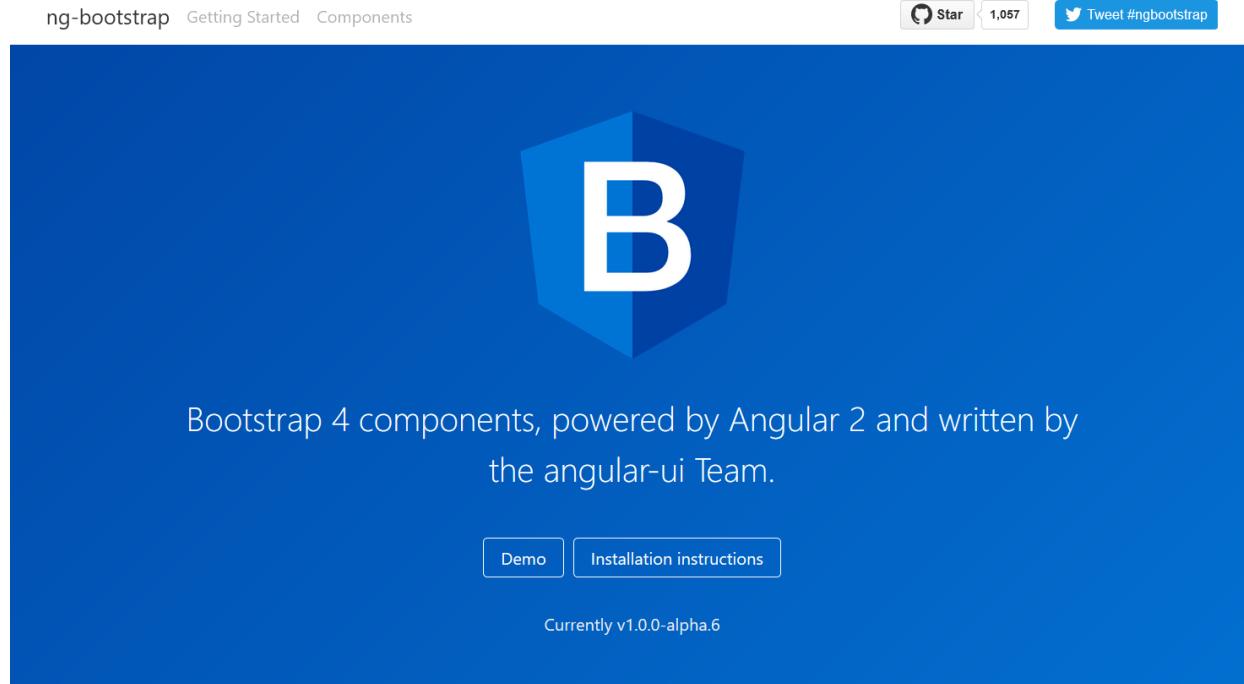
THEMES
35+ Free Themes
Premium Themes
Theme Creator Tool

Download

View on GitHub

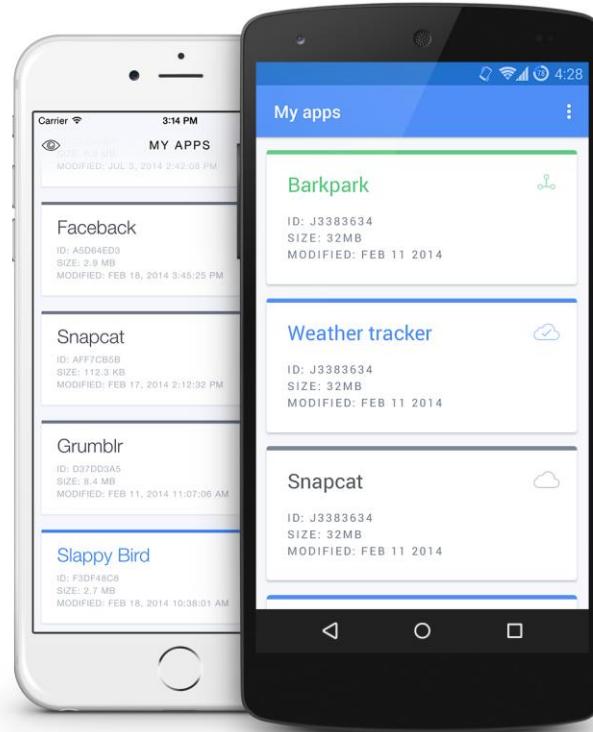
[PrimeNG](#)

UI Libraries



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

The screenshot shows a web browser window titled "NiceFish" with the URL "localhost:4200/posts/page/1". The page has a purple header bar with tabs for "NiceFish" (selected), "动态" (Dynamic), and "NiceFish". On the right side of the header are "登录" (Login) and "注册" (Register) buttons. Below the header is a search bar with a "搜索" (Search) button and a "发布文章" (Publish Article) button. The main content area displays several posts:

- Post 1: "这玩意必须用严格的JSON格式，我也是醉了" by 大漠春秋 (2016-11-21 10:44) with 10000 views and 10000 comments.
- Post 2: "Key和Value都必须用双引号！" by 大漠春秋 (2016-11-21 10:44) with 10000 views and 10000 comments.
- Post 3: "这玩意必须用严格的JSON格式，我也是醉了" by 大漠春秋 (2016-11-21 10:44) with 10000 views and 10000 comments.
- Post 4: "Key和Value都必须用双引号！" by 大漠春秋 (2016-11-21 10:44) with 10000 views and 10000 comments.
- Post 5: "这玩意必须用严格的JSON格式，我也是醉了" by 大漠春秋 (2016-11-21 10:44) with 10000 views and 10000 comments.

At the bottom left is a navigation bar with buttons for "首页" (Home), "上一页" (Previous Page), "1" (Current Page), "2", "下一页" (Next Page), and "末页" (Last Page). On the right side, there are two sidebar boxes:

- 社交媒体** box:
 - 官方微博
 - 优酷视频教程
 - 油管视频教程
- QQ群-请勿加多个** box:
 - Angular 1区:286047042
 - Angular 2区:139357161
 - Angular 3区:473129930
 - Angular 4区:157357401
- 2017-02-08 12:27:10** box:
 - 访问总数 : 16742169
 - 文章总数 : 2458
 - 评论总数 : 7880
 - 会员总数 : 12772
 - 在线访客 : 187
 - 在线会员 : 2
 - 在线记录 : 268

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

谢谢
