链滴

关于微前端实现原理与 ngx-planet(一)

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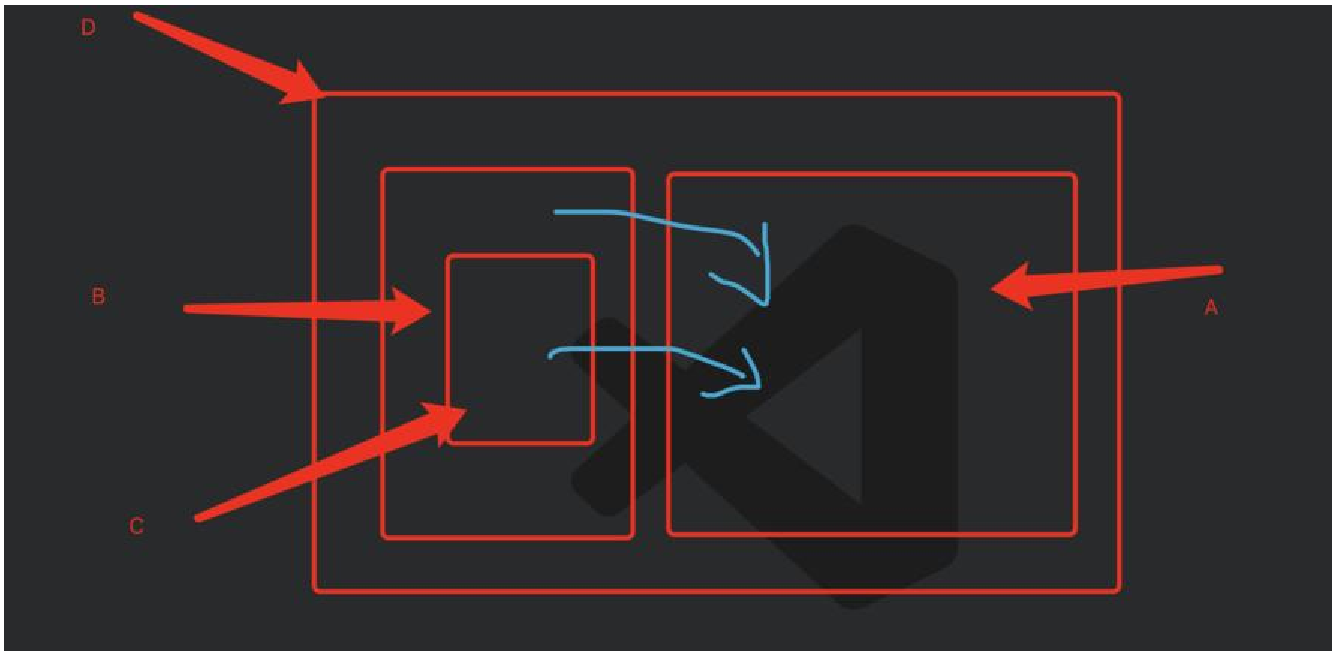
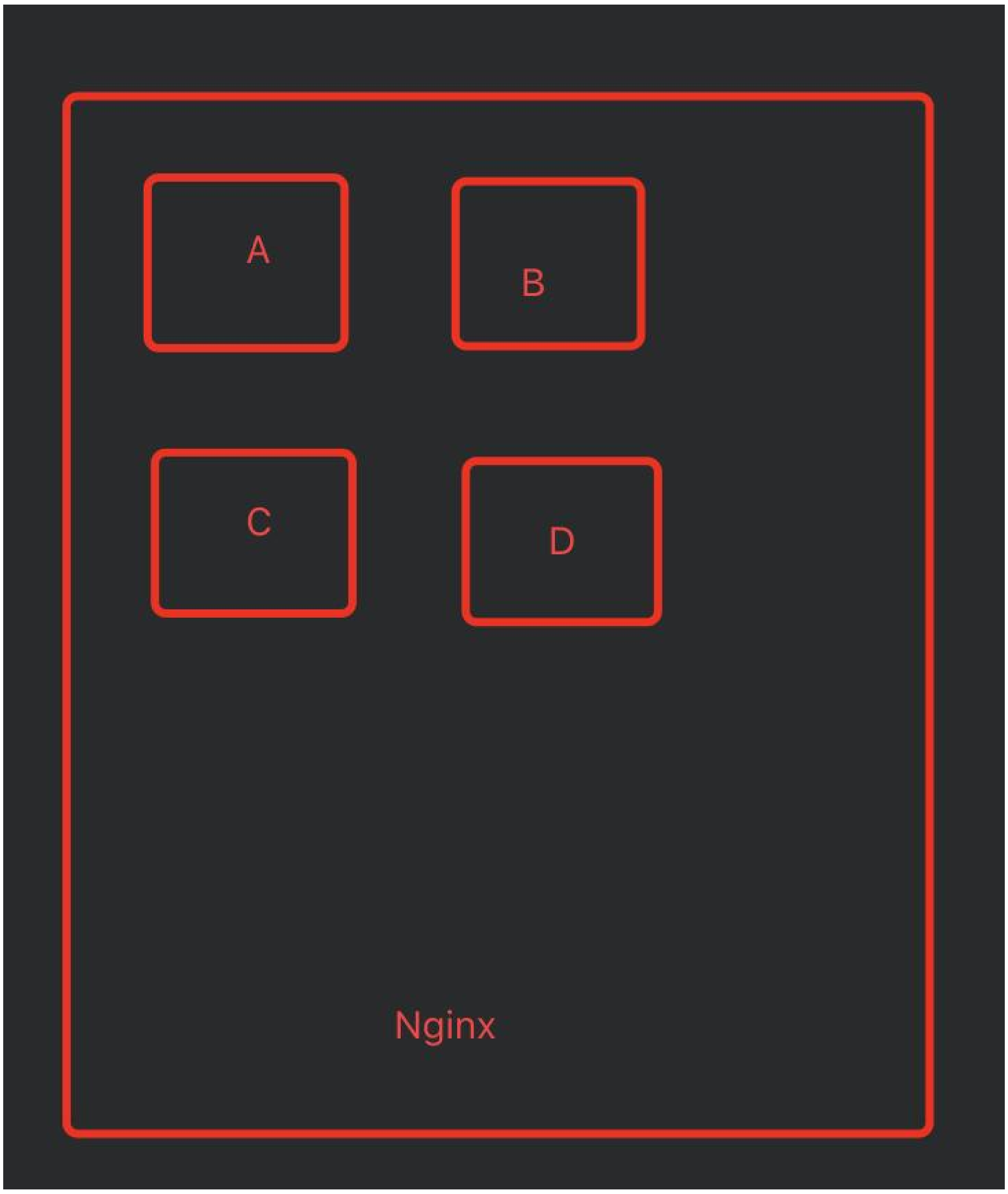
微前端?

简单来说



- 从使用角度考虑 D应用是由 ABC三个应用/组件组合而成，通常在Angular/Vue/React单项目中很易实现，但为了复用解耦，D应用现由3个独立部署并带有通信机制的应用/组件组合而成。



● 从部署角度考虑 A,B,C,D为并行四个打包后的静态文件，当有E应用使用A,B,C,D应用中的组件或者件时通过类eureka 服务发现注册的方式去复用组件或应用。

当然，这只是众多思路中的一种

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好处:

● 应用自治: 只需要遵循统一的接口规范或者框架，以便于系统集成到一起，相互之间是不存在依赖系的。

● 单一职责: 每个前端应用可以只关注于自己所需要完成的功能。

● 技术栈无关: 你可以使用 Angular 的同时，又可以使用 React 和 Vue。

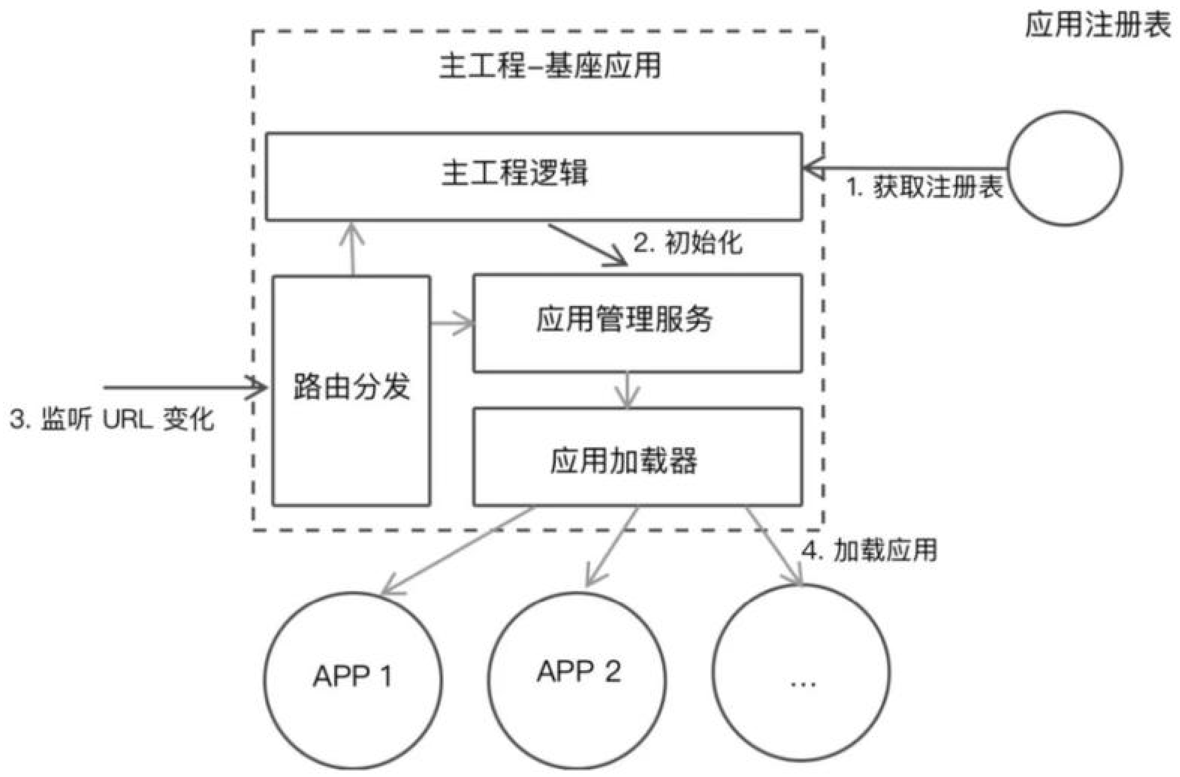
这就好像使用k8s集群和grpc调用一样

架构模式

- 基座模式: 通常有一个main/portal应用来充当基座，提供基础服务，剩下的应用可插拔在基座上。像dashboard和widget的关系
- 自组织模式: 各个应用平级不存在相互管理

实现思路

基于基座模式的微服务无非是 服务发现,服务注册,服务调用等功能



- 1. 基座应用: 主要应有注册表，通过各个应用标识存储 key:component|application 以应对路不通渲染哪个应用
- 2. 工程逻辑/应用管理/加载: 先看成一个黑盒
- 3. 路由分发: 通过对url规则和分析出渲染哪个应用/组件，经过黑盒渲染到需要渲染的dom上

难点

- Load，决定加载哪个应用，并绑定生命周期
- bootstrap，获取静态资源

原文链接：关于微前端实现原理与 ngx-planet(一)

- Mount，安装应用，如创建 DOM 节点
- Unload，删除应用的生命周期
- Unmount，卸载应用，如删除 DOM 节点、取消事件绑定

单个浏览器多个应用还需做到 状态|css 共享/隔离

技术方式

从技术实践上，微前端架构可以采用以下的几种方式进行：

- 路由分发式。通过 HTTP 服务器的反向代理功能，来将请求路由到对应的应用上。
- 前端微服务化。在不同的框架之上设计通讯、加载机制，以在一个页面内加载对应的应用。
- 微应用。通过软件工程的方式，在部署构建环境中，组合多个独立应用成一个单体应用。
- 微件化。开发一个新的构建系统，将部分业务功能构建成一个独立的 chunk 代码，使用时只需要程加载即可。
- 前端容器化。通过将 iFrame 作为容器，来容纳其它前端应用。
- 应用组件化。借助于 Web Components 技术，来构建跨框架的前端应用。

ngx-planet

项目地址: https://github.com/worktile/ngx-planet

Ngx-Planet 是国内少有用Angular的公司worktile 徐海风设计出来的一款 基于 基座模式，粒度到Cmponent 共用，带有消息事件注册的 微前端项目结构实现。

原帖在知乎不多赘述<a href="https://zhuanlan.zhihu.com/p/93813936"># 使用 Angular 打造微端架构的 ToB 企业级应用</a>

ngx-planet-v8

由于公司数十个项目都是ng8所以将ngx-planet降级为v8版本测试了一下，还可以

项目地址: https://github.com/ferried/ngx-planet-v8

降级过程

- 1.安装脚手架: `npm install -g @angular/cli@8.3.29`
- 2.创建项目: `ng new ngx-planet-parent --style=less`
- 3.额外创建两个项目: `ng new portal --style=less && ng new app1 --style=less --prefix=app1`
- 4.将额外两个项目移入 `ngx-planet-parent`中`mv portal app1 ngx-planet-parent/example`
- 5.生成 v8 包: `ng new library ngx-planet-v8`
- 6.三个项目安装 cdk: `npm install @angular/cdk@8.2.3`
- 7.example 目录下两个项目安装其余依赖:
  - `npm install @angular-builders/custom-webpack@8.4.1`

- @worktile/planet-postcss-prefixwrap@1.19.2
  - webpack-assets-manifest@3.1.1
- 8.清空　library生成的项目，将ngx-planet项目中的 packages/ngx-planet的src整体复制入projects/ngx-planet-v8最后将 mdule.ts 种的模块名称修改一下NgxPlanetV8Module
- 9.　复制tsconfig.lib.json并打包ng build ngx-planet-v8
- 10.　example下的两个项目加入依赖npm install ../../dist/ngx-planet-v8
- 11.准备三个文件　proxy.config.js,extra-webpack.config.js,postcss.config.js

portal 下的 postcss

```
module.exports = {
  plugins: [require("autoprefixer")],
};
```

app1 下的 postcss

```
module.exports = {};
```

portal 下的 extra-webpack.config.js,这个文件是混入 customWebpack 用的,原项目是.scss 这里改了.less

```
const WebpackAssetsManifest = require("webpack-assets-manifest");
const PrefixWrap = require("@worktile/planet-postcss-prefixwrap");

module.exports = {
  optimization: {
    runtimeChunk: false,
  },
  plugins: [new WebpackAssetsManifest()],
  module: {
    rules: [
      {
        test: /\.less$/,
        use: [
          {
            loader: "postcss-loader",
            options: {
              plugins: [
                PrefixWrap(".portal", {
                  prefixRootTags: true,
                }),
              ],
            },
          },
          "less-loader",
        ],
      },
    ],
  },
};
```

app1 下的 extra-webpack.config.js,

```
const WebpackAssetsManifest = require("webpack-assets-manifest");
const PrefixWrap = require("@worktile/planet-postcss-prefixwrap");

module.exports = {
  optimization: {
    runtimeChunk: false,
  },
  plugins: [new WebpackAssetsManifest()],
  module: {
    rules: [
      {
        test: /\.less$/,
        use: [
          {
            loader: "postcss-loader",
            options: {
              plugins: [
                PrefixWrap(".app1", {
                  hasAttribute: "planet-inline",
                  prefixRootTags: true,
                }),
              ],
            },
          },
          "less-loader",
        ],
      },
    ],
  },
};
```

portal 下的 proxy.config.js

```
const PROXY_CONFIG = {};

PROXY_CONFIG["/static/app1"] = {
  target: "http://localhost:3001",
  secure: false,
  changeOrigin: false,
};

PROXY_CONFIG["/static/app2"] = {
  target: "http://localhost:3002",
  secure: false,
  changeOrigin: true,
};

module.exports = PROXY_CONFIG;
```

- 12.修改 angular.json

portal 的 angular.json

```
{
```

```
...
    "architect": {
      "build": {
          // build改成 custom-webpack
        "builder": "@angular-builders/custom-webpack:browser",
        "options": {
          "customWebpackConfig": {
              // extra-webpack.config.js
            "path": "extra-webpack.config.js",
            // 混入配置
            "mergeStrategies": {
              "externals": "replace",
              "module.rules": "append"
            }
          },
          // baseHref
          "baseHref": "/",
          "outputPath": "dist/portal",
          "index": "src/index.html",
          "main": "src/main.ts",
          "polyfills": "src/polyfills.ts",
          "tsConfig": "tsconfig.app.json",
          // 加入 extractCss
          "extractCss": true,
          "aot": true,
          "assets": [
            "src/favicon.ico",
            "src/assets"
          ],
          "styles": [
            "src/styles.less"
          ],
          "scripts": []
        },
        "configurations": {
          "production": {
            "fileReplacements": [
              {
                "replace": "src/environments/environment.ts",
                "with": "src/environments/environment.prod.ts"
              }
            ],
            "optimization": true,
            "outputHashing": "all",
            "sourceMap": false,
            "extractCss": true,
            "namedChunks": false,
            "aot": true,
            "extractLicenses": true,
            // 加入 vendorChunk
            "vendorChunk": false,
            "buildOptimizer": true,
            "budgets": [
              {
```

```
              "type": "initial",
              "maximumWarning": "2mb",
              "maximumError": "5mb"
            },
            {
              "type": "anyComponentStyle",
              "maximumWarning": "6kb",
              "maximumError": "10kb"
            }
          ]
        }
      }
    },
    "serve": {
       // serve改成 custom-webpack
      "builder": "@angular-builders/custom-webpack:dev-server",
      "options": {
        "browserTarget": "portal:build",
        // 混入代理文件
        "proxyConfig": "proxy.conf.js",
        "port": 3000
      },
      "configurations": {
        "production": {
          "browserTarget": "portal:build:production"
        }
      }
    },

...
  "defaultProject": "portal"
}
```

app1 的 angular.json

```
{
...
      "architect": {
        "build": {
           // 同样改成custom-webpack:browser
          "builder": "@angular-builders/custom-webpack:browser",
          "options": {
              // 混入配置
            "customWebpackConfig": {
              "path": "extra-webpack.config.js",
              "mergeStrategies": {
                "module.rules": "append"
              },
              // replaceDuplicatePlugins
              "replaceDuplicatePlugins": true
            },
            "outputPath": "dist/app1",
            "index": "src/index.html",
            "main": "src/main.ts",
          "polyfills": "src/polyfills.ts",
          "tsConfig": "tsconfig.app.json",
          // vendorChunk & extractCss
          "vendorChunk": false,
          "extractCss": true,
          "aot": true,
          "assets": [
            "src/favicon.ico",
            "src/assets"
          ],
          "styles": [
            "src/styles.less"
          ],
          "scripts": []
        },
        "configurations": {
          "production": {
            "fileReplacements": [
              {
                "replace": "src/environments/environment.ts",
                "with": "src/environments/environment.prod.ts"
              }
            ],
            "optimization": true,
            "outputHashing": "all",
            "sourceMap": false,
            "namedChunks": false,
            "aot": true,
            "extractLicenses": true,
            // extractCss &&  vendorChunk
            "extractCss": true,
            "vendorChunk": false,
            "buildOptimizer": true,
            "budgets": [
              {
                "type": "initial",
                "maximumWarning": "2mb",
                "maximumError": "5mb"
              },
              {
                "type": "anyComponentStyle",
                "maximumWarning": "6kb",
                "maximumError": "10kb"
              }
            ]
          }
        }
      },
      "serve": {
      // custom-webpack:dev-server,加入port3001和vendorChunk
        "builder": "@angular-builders/custom-webpack:dev-server",
        "options": {
          "port": 3001,
          "vendorChunk": false,
          "browserTarget": "app1:build"
        },
...
  "defaultProject": "app1"
}
```

● 13.构建 portal 应用

修改 Approuting

```
import { NgModule } from "@angular/core";
import { Routes, RouterModule } from "@angular/router";
import { EmptyComponent } from "ngx-planet-v8";

const routes: Routes = [
  {
    path: "app1",
    component: EmptyComponent,
    children: [
      {
        path: "**",
        component: EmptyComponent,
      },
    ],
  },
  {
    path: "app2",
    component: EmptyComponent,
    children: [
      {
        path: "**",
        component: EmptyComponent,
      },
    ],
  },
];

@NgModule({
  imports: [RouterModule.forRoot(routes)],
  exports: [RouterModule],
})
export class AppRoutingModule {}
```

app.module

```
import { BrowserModule } from "@angular/platform-browser";
import { NgModule } from "@angular/core";
import { BrowserAnimationsModule } from "@angular/platform-browser/animations";
import { AppRoutingModule } from "./app-routing.module";
import { AppComponent } from "./app.component";
import { FormsModule } from "@angular/forms";
import { CommonModule } from "@angular/common";
import { NgxPlanetV8Module } from "ngx-planet-v8";
```

```
@NgModule({
  declarations: [AppComponent],
  imports: [
    BrowserModule,
    BrowserAnimationsModule,
    FormsModule,
    CommonModule,
    AppRoutingModule,
    // 引入模块
    NgxPlanetV8Module,
  ],
  providers: [],
  bootstrap: [AppComponent],
})
export class AppModule {}
```

app.component.html

```
// 通过路由从基座应用跳到app1
<a [routerLink]="['/app1']" routerLinkActive="active"> APP1 </a>

// 容器
<div id="app-host-container">
  <router-outlet></router-outlet>
</div>

// 加载状态
<div *ngIf="!loadingDone">加载中</div>
```

app.module.ts

```
import { Component, OnInit } from "@angular/core";
import { Planet, SwitchModes } from "ngx-planet-v8";

@Component({
  selector: "app-root",
  templateUrl: "./app.component.html",
  styleUrls: ["./app.component.less"],
})
export class AppComponent implements OnInit {
  title = "portal";

  get loadingDone() {
    return this.planet.loadingDone;
  }

  constructor(private planet: Planet) {}
  ngOnInit(): void {
    // 向基座注册app1应用,当然可以变成json通过http远程配置
    const appHostClass = "thy-layout";
    this.planet.registerApps([
      {
        name: "app1",
        hostParent: "#app-host-container",
        hostClass: appHostClass,
        routerPathPrefix: /\/app1|app4/, // '/app1',
        resourcePathPrefix: "/static/app1/",
        preload: false,
        switchMode: SwitchModes.coexist,
        loadSerial: true,
        stylePrefix: "app1",
        // prettier-ignore
        scripts: [
          'main.js',
          // 'polyfills.js'
        ],
        styles: ["styles.css"],
        manifest: "/static/app1/manifest.json",
        extra: {
          name: "应用1",
          color: "#ffa415",
        },
      },
      {
        name: "app2",
        hostParent: "#app-host-container",
        hostClass: appHostClass,
        routerPathPrefix: "/app2",
        resourcePathPrefix: "/static/app2/",
        preload: false,
        switchMode: SwitchModes.coexist,
        stylePrefix: "app2",
        // prettier-ignore
        scripts: [
          'main.js'
        ],
        styles: ["styles.css"],
        manifest: "/static/app2/manifest.json",
        extra: {
          name: "应用2",
          color: "#66c060",
        },
      },
    ]);
    this.planet.start();
  }
}
```

- 14.修改 app1

main.ts

```
import { enableProdMode, NgModuleRef, Type, NgZone } from "@angular/core";
import { platformBrowserDynamic } from "@angular/platform-browser-dynamic";

import { AppModule } from "./app/app.module";
import { environment } from "./environments/environment";
import { PlanetPortalApplication, defineApplication } from "ngx-planet-v8";

if (environment.production) {
  enableProdMode();
}

defineApplication("app1", {
  template: `<app1-root class="app1-root"></app1-root>`,
  bootstrap: (portalApp: PlanetPortalApplication) => {
    return platformBrowserDynamic([
      {
        provide: PlanetPortalApplication,
        useValue: portalApp,
      },
    ])
      .bootstrapModule(AppModule)
      .then((appModule) => {
        return appModule;
      })
      .catch((error) => {
        console.error(error);
        return null;
      });
  },
});
```

routing.ts

```
import { NgModule } from "@angular/core";
import { Routes, RouterModule } from "@angular/router";
import { EmptyComponent } from "ngx-planet-v8";

const routes: Routes = [{ path: "app1", component: EmptyComponent }];

@NgModule({
  imports: [RouterModule.forRoot(routes)],
  exports: [RouterModule],
})
export class AppRoutingModule {}
```

module.ts

```
import { BrowserModule } from "@angular/platform-browser";
import { NgModule } from "@angular/core";
import { BrowserAnimationsModule } from "@angular/platform-browser/animations";

import { AppRoutingModule } from "./app-routing.module";
import { AppComponent } from "./app.component";
import { CommonModule } from "@angular/common";
import { RouterModule } from "@angular/router";
import { FormsModule } from "@angular/forms";
import { NgxPlanetV8Module } from "ngx-planet-v8";

@NgModule({
  declarations: [AppComponent],
  imports: [
    BrowserModule,
    BrowserAnimationsModule,
    FormsModule,
    CommonModule,
    AppRoutingModule,
    RouterModule,
    NgxPlanetV8Module,
  ],
  providers: [],
  bootstrap: [AppComponent],
})
export class AppModule {}
```

最后向 app1 的 package.json 中 script下加入 "start": "ng serve --deploy-url=/static/app1/",这 deploy-url 将来就是你 nginx 的文件夹路径

end: 分别启动portal和app1然后进行测试吧

参考资料

<a href="https://csdnnews.blog.csdn.net/article/details/94930460?utm_medium=distribute.pc_relevant.none-task-blog-BlogCommendFromBaidu-5.control&depth_1-utm_source=distribute.pc_relevant.none-task-blog-BlogCommendFromBaidu-5.control"># 微前端如何落地？</a>

<a href="https://zhuanlan.zhihu.com/p/93813936"># 使用 Angular 打造微前端架构的 ToB 企级应用</a>