Angular Advanced Module - Lazy loading

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What is lazy loading

- Deferred loading of modules, until the user needs them.
  - Modules are loaded once the user navigates to them.
- OR: for optimal user experience:
  - Load the minimum setup for the application to work, so the user can interact with the app.
  - Then asynchrounously load other modules.
  - They are instantly available if the user navigates to them
- Only *modules* can be loaded lazily, not *components*.
- Lazy loading works in conjunction with the router.
- It is considered best practice nowadays to use LL from the start

Victor Savkin – creator of the router

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Victor Savkin

Co-founder of Narwhal Technologies (nrwl.io), where we provide Angular consulting to large teams who wa...

Oct 12, 2016 · 3 min read

Angular Router: Preloading Modules

Victor Savkin is a co-founder of nrwl.io, providing Angular consulting to enterprise teams. He was previously on the Angular core team at Google, and built the dependency injection, change detection, forms, and router modules.

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https://vsavkin.com/angular-router-preloading-modules-ba3c75e424cb

Official documentation

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Lazy-loading feature modules

By default, NgModules are eagerly loaded, which means that as soon as the application loads, so do all the NgModules, whether or not they are immediately necessary. For large applications with lots of routes, consider lazy loading—a design pattern that loads NgModules as needed. Lazy loading helps keep initial bundle sizes smaller, which in turn helps decrease load times.

> For the final sample application with two lazy-loaded modules that this page describes, see the live example / download example.

Lazy loading basics

This section introduces the basic procedure for configuring a lazy-loaded route. For a step-by-step example, see the step-by-step setup section on this page.

To lazy load Angular modules, use `loadChildren` (instead of `component`) in your `AppRoutingModule` `routes` configuration as follows.

AppRoutingModule (excerpt)

```
const routes: Routes = [
  {
    path: 'items',
    loadChildren: () => import('./items/items.module').then(m => m.ItemsModule)
  }
];
```

In the lazy-loaded module's routing module, add a route for the component.

Routing module for lazy loaded module (excerpt)

https://angular.io/guide/lazy-loading-ngmodules

How to lazy load : Angular 4.x – 7.x

Add or edit `app-routing.module.ts`

- Don't point directly to components
- Point to Modules instead. Use `loadChildren()`
- Note the (ugly) stringnotation

```
const routes: Routes = [
   {path: '', redirectTo: 'customers', pathMatch: 'full'},
   {path: 'customers', loadChildren: './customer/customer.module#CustomerModule'},
   {path: 'products', loadChildren: './products/products.module#ProductsModule'},
];

export const AppRoutingModule = RouterModule.forRoot(routes);
```

How to lazy load : Angular 8.x+

Add or edit `app-routing.module.ts`

- Use the browser `import()` statement
- More in line with other frameworks
- More Typesafe.

```
const routes: Routes = [
    {path: '', redirectTo: 'customers', pathMatch: 'full’},
    // New notation (Angular 8+):
    {
        path: 'customers',
        loadChildren: () => import('./customer/customer.module')
            .then(mod => mod.CustomerModule)
    },
    {
        path: 'products',
        loadChildren: () => import('./products/products.module')
            .then(mod => mod.ProductsModule)
    },
];
export const AppRoutingModule = RouterModule.forRoot(routes);
```

Edit `app.module.ts` (no more loading of modules)

```
// import routing module that defines the LL
import {AppRoutingModule} from './app.routing.module';

@NgModule({
    …
   imports      : [
      BrowserModule,
      AppRoutingModule
   ],
   bootstrap    : [AppComponent]
})
export class AppModule {
}
```

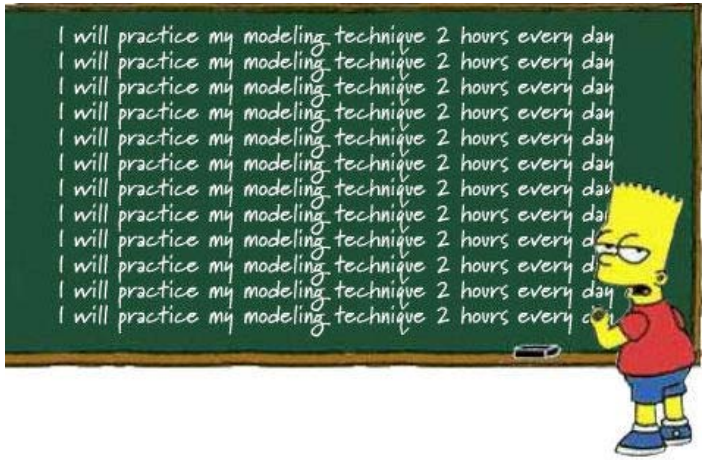
Edit separate modules,
add `RouterModule.forChild()` with various components.

```
import {RouterModule, Routes} from '@angular/router';

// Lazy loaded routes for this module
const customerRoutes: Routes = [
   {path: '', component: CustomerComponent}
];

@NgModule({
   imports      : [
      …
      RouterModule.forChild(customerRoutes)
   ],
    …
})
export class CustomerModule {
}
console.log('CustomerModule loaded lazily...');
```

Workshop

- Open `../110-lazy-loading`.
- Create a new module
- Create a new component inside this new module and give it some UI.
- Add a route to the new component
- Use the new module in the root module and lazy load it
- Add a link to navigate to the lazy loaded module.

- *OR:*
- Add LL from scratch to your own application, using the steps described in this module.
- Add a new (dynamic) child route to Module



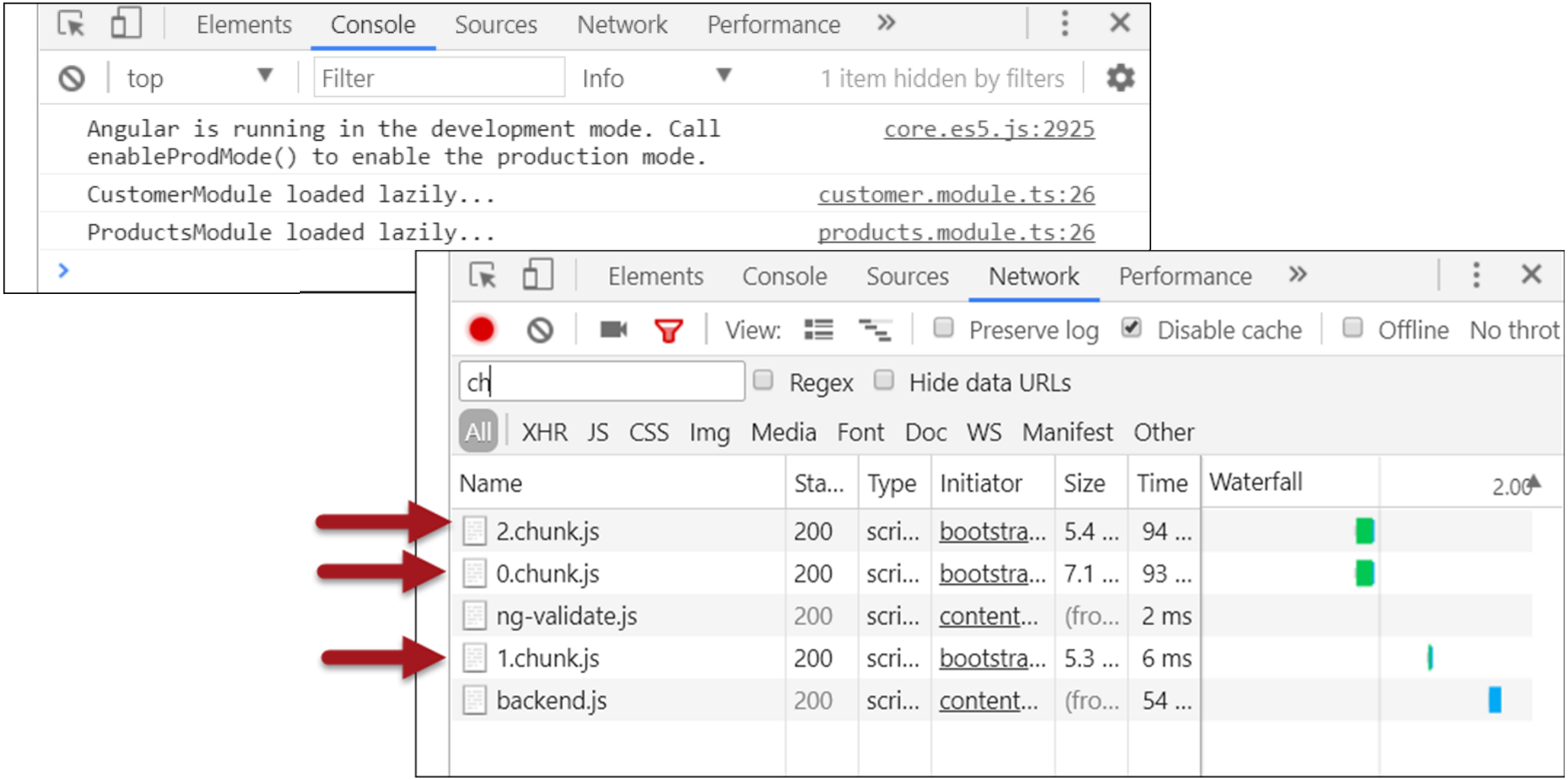
Preloading strategies

Preloading Strategies

- Optimize Lazy Loading even further: preloading strategies
  - Load all modules in background
  - Load only modules *you want to load* in the background
- Default preloading: `PreloadAllModules`

```
import {ExtraOptions, PreloadAllModules,
        RouterModule, Routes} from '@angular/router';
```

```
const config: ExtraOptions    = {
   preloadingStrategy: PreloadAllModules
};

export const AppRoutingModule = RouterModule.forRoot(routes, config);
```



https://angular.io/api/router/PreloadAllModules

Custom preloading strategy

- Define which module(s) are loaded lazily, while others are loaded on demand

- Solution: compose a strategy that *only* preloads routes when a custom `data.preload` flag is set to `true`

```
    path: 'products',
    loadChildren: () => import('./products/products.module')
      .then(module => module.ProductsModule),
    data: {preload: true} // preload flag
  },
  {
    path: 'big-module',
    loadChildren: () => import('./very-big-module/very-big-module.module')
      .then(module => module.VeryBigModule)
    // Note: NO flag for preloading
  },
```

Steps

1. Create new module, with a (potential) heavy load
2. Add `data` property and set `{ preload:true }` to every route you want to load lazily
3. Assign custom preloader to `preloadingStrategy`:

```
…
const config: ExtraOptions = {
   preloadingStrategy: MyCustomPreloader
};
@NgModule({
   imports   : [RouterModule.forRoot(routes, config)],
   exports   : [RouterModule],
   providers: [MyCustomPreloader]
})
export class AppRoutingModule {
}
```

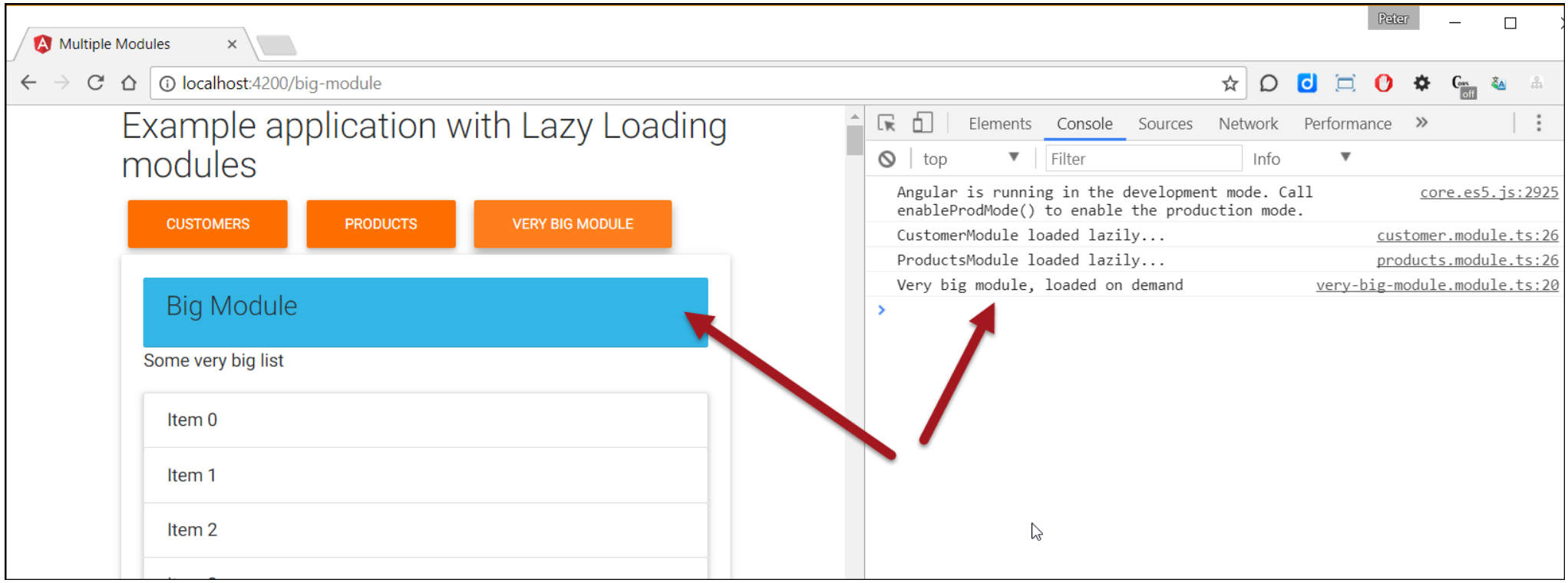
Define custom loader

```
// app.routing.loader.ts
import { PreloadingStrategy, Route } from '@angular/router';

import { Observable, of } from 'rxjs';

export class MyCustomPreloader implements PreloadingStrategy {
   preload(route: Route, load: Function): Observable<any> {
      // only preload the route if data attribute is set and preload===true
      return route.data && route.data.preload ? load() : of(null);
   }
}
```

Official documentation https://angular.io/guide/router#custom-preloading-strategy

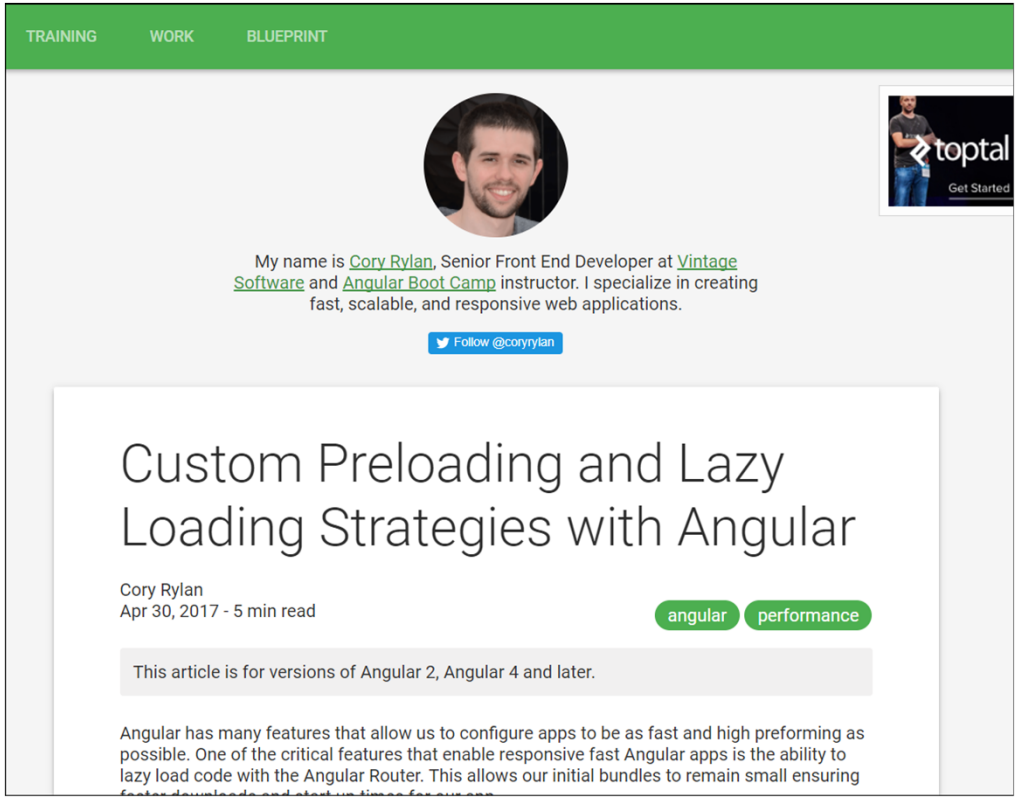
Run the app

Run the app. The first 2 modules should be loaded lazily, the third module should be loaded on demand



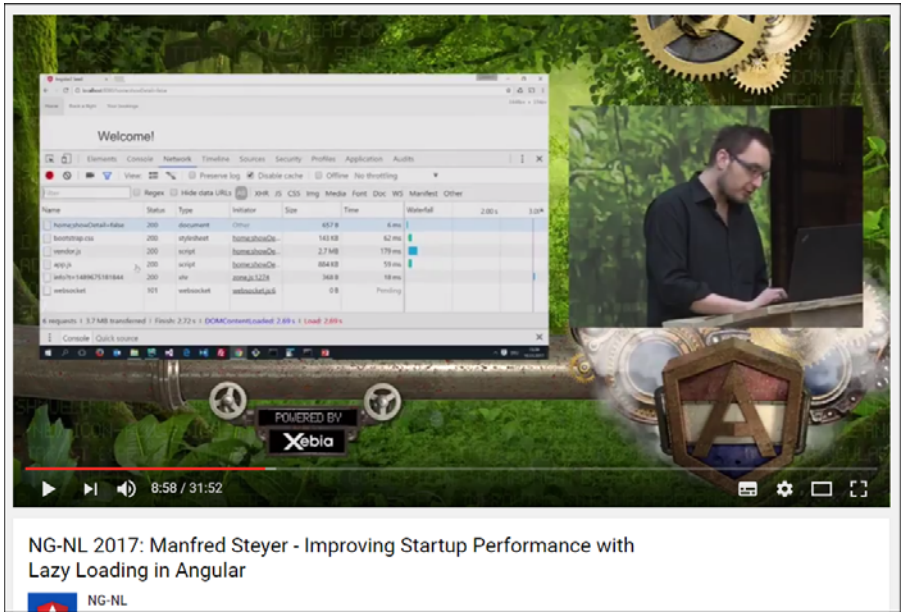
Example: ../120-custom-preloading

More information



https://coryrylan.com/blog/custom-preloading-and-lazy-loading-strategies-with-angular

Manfred Steyer - Improving Startup Performance with Lazy Loading in Angular



https://www.youtube.com/watch?v=n6EMOeCDfjc

Angular | custom preloading strategy

Muthu Devendra Follow

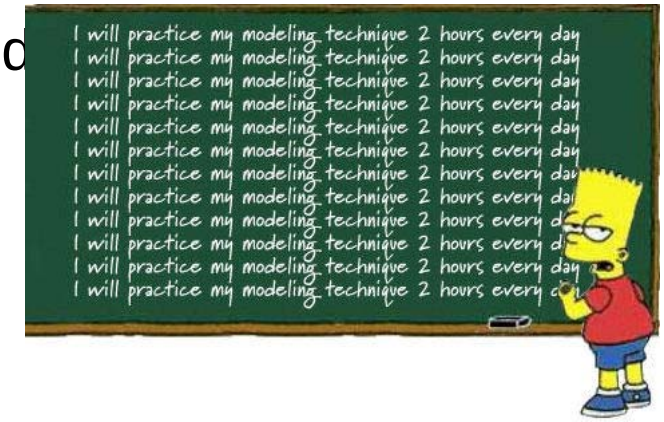
Feb 3, 2019 · 3 min read

In my previous post I talked about three angular module loading types which are eager loading, lazy loading and preloading strategy. if you haven't read it already you can find it in this link. Today I will talk about preloading strategy and how to write your own preloading strategy.

https://medium.com/@muthudevendra/angular-custom-preloading-strategy-32abe99944f8

Workshop

- Add a new module w/ component to your application.
- Add the module to the routing section of your application. Add a link to navigate to the route.
  - Use the `PreloadAllModules` strategy
- Let *other* modules be loaded lazily by adding a `data` property
- Write a custom preloading service class, e.g. `preload.service.ts`
- Add the custom preloader to `app.routing.mod`
  - Note: make sure this is (now) actually a Module, as it has to import and provide `app.preloader.ts`
- Example: `../120-custom-preloading`



Naming your JavaScript-chunks on code splitting

1./* webpackChunkName: “<your-name>” */

```
const routes: Routes = [
    {path: '', redirectTo: 'customers', pathMatch: 'full’},
    {
        path: 'customers',
        loadChildren: () => import(/* webpackChunkName: "Customers" */
                    './customer/customer.module')
            .then(mod => mod.CustomerModule)
    },
    {
        path: 'products',
        loadChildren: () => import(/* webpackChunkName: "Products" */
                    './products/products.module')
            .then(mod => mod.ProductsModule)
    },
];
export const AppRoutingModule = RouterModule.forRoot(routes);
```

Creates `Customers.js`, `Products.js`, and so on