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Angular
Module – Lazy Loading

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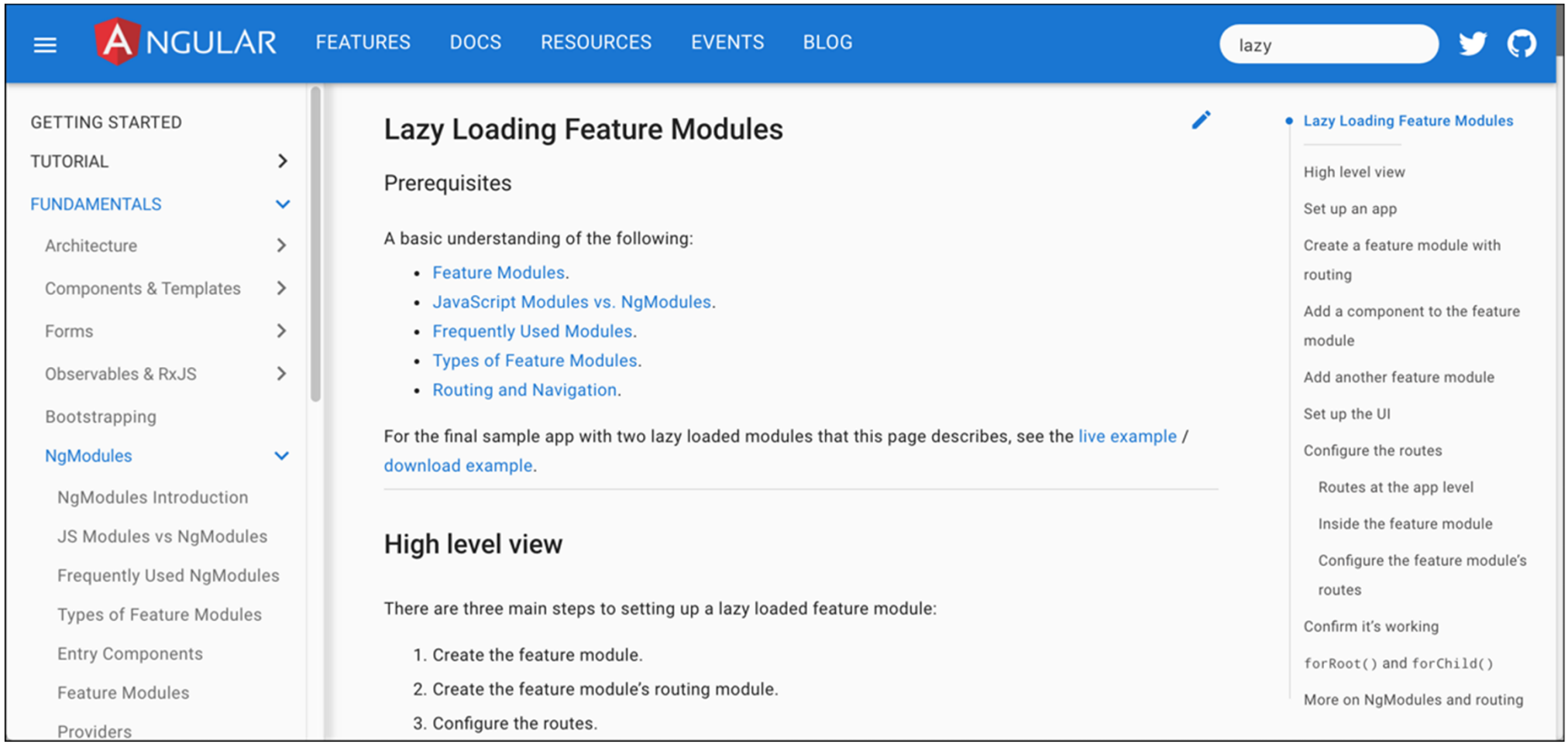
What is lazy loading

- 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

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

Official documentation



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 WebPack `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 {
}
```

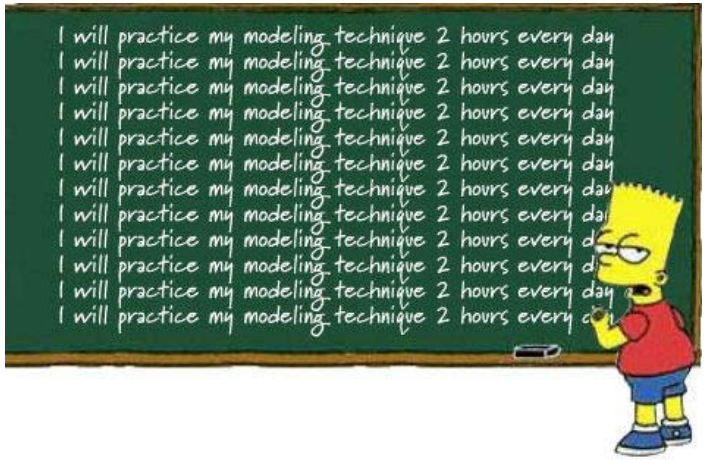
Edit separate modules,
add `RouterModule.forChild()` with various components.

```
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

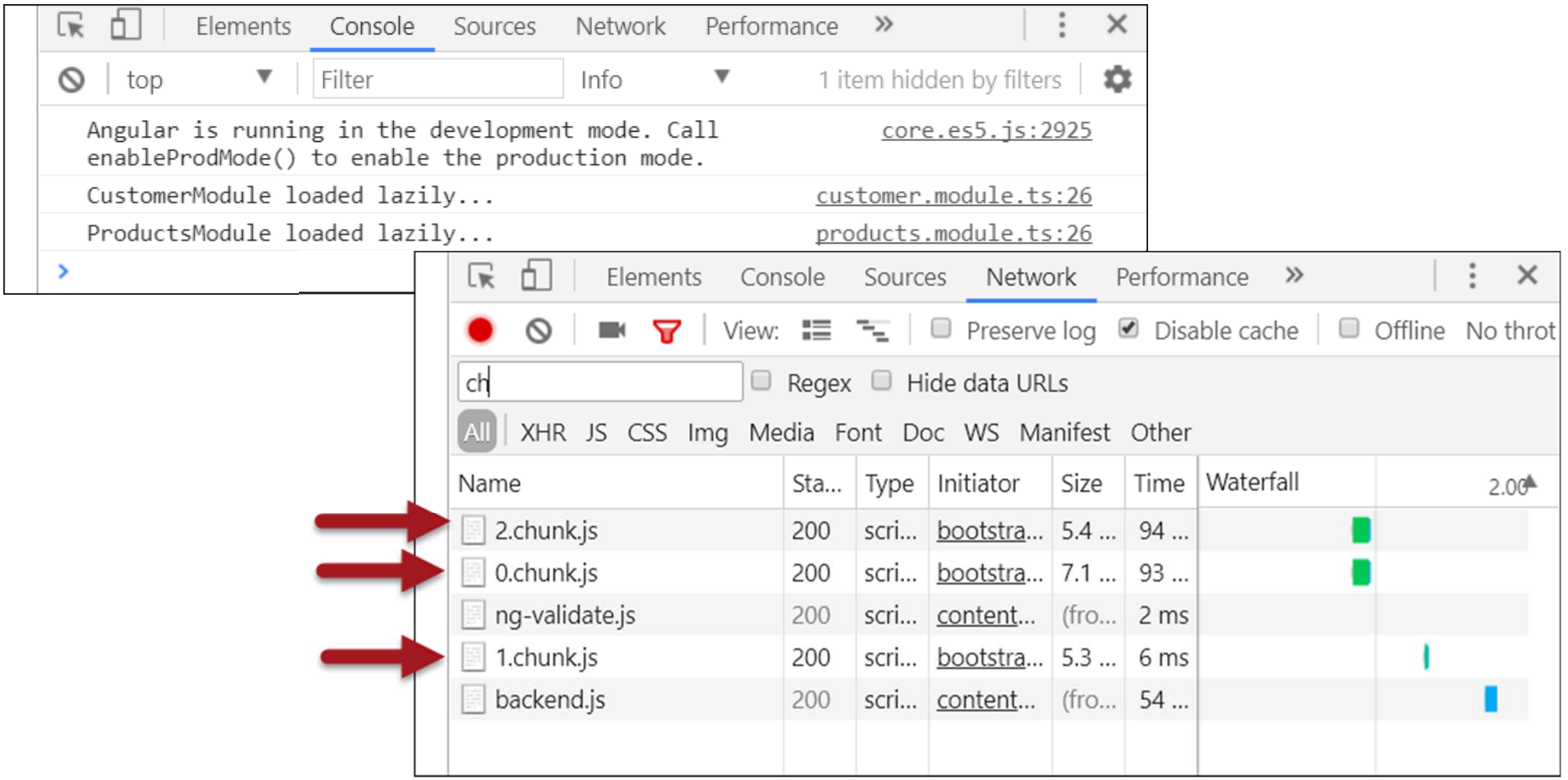


Preloading strategies

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);
```



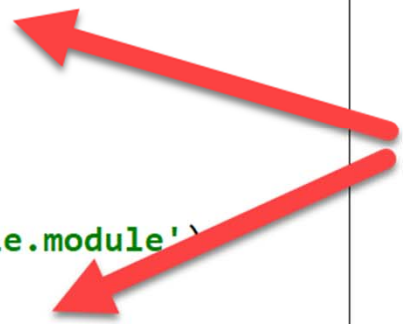
https://angular.io/api/router/PreloadAllModules

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 {
}
```

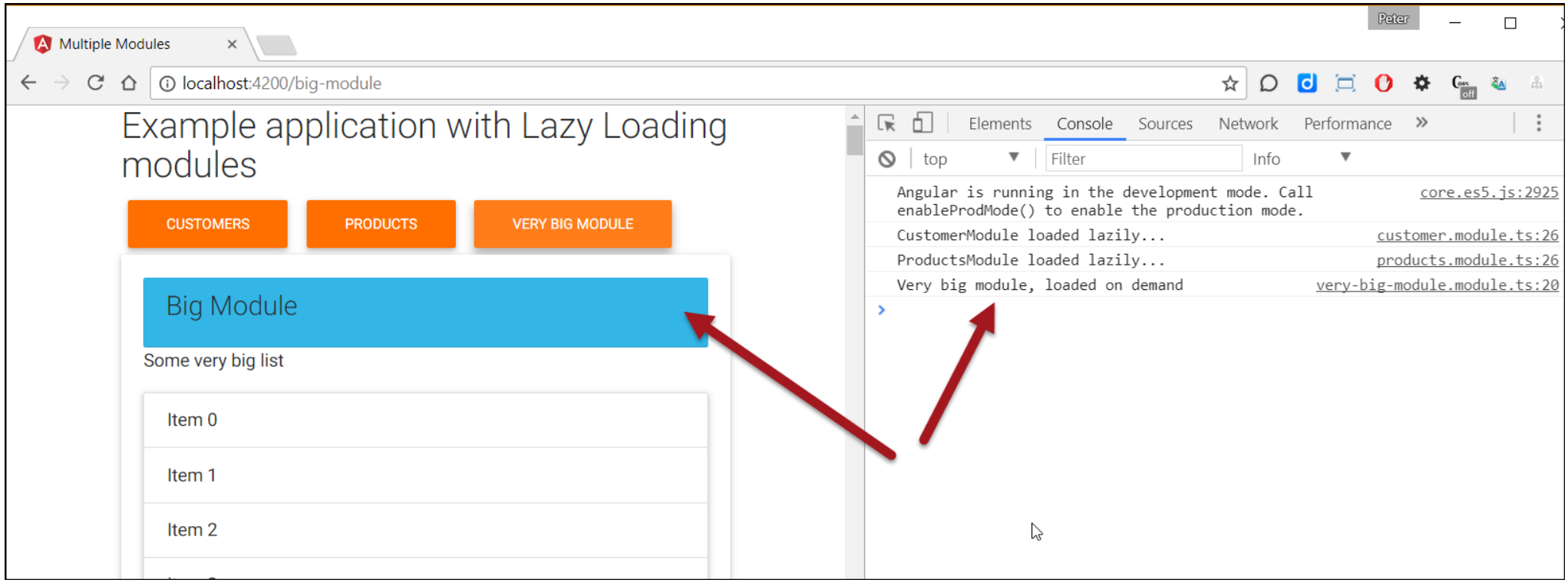
Define custom loader

```
// 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

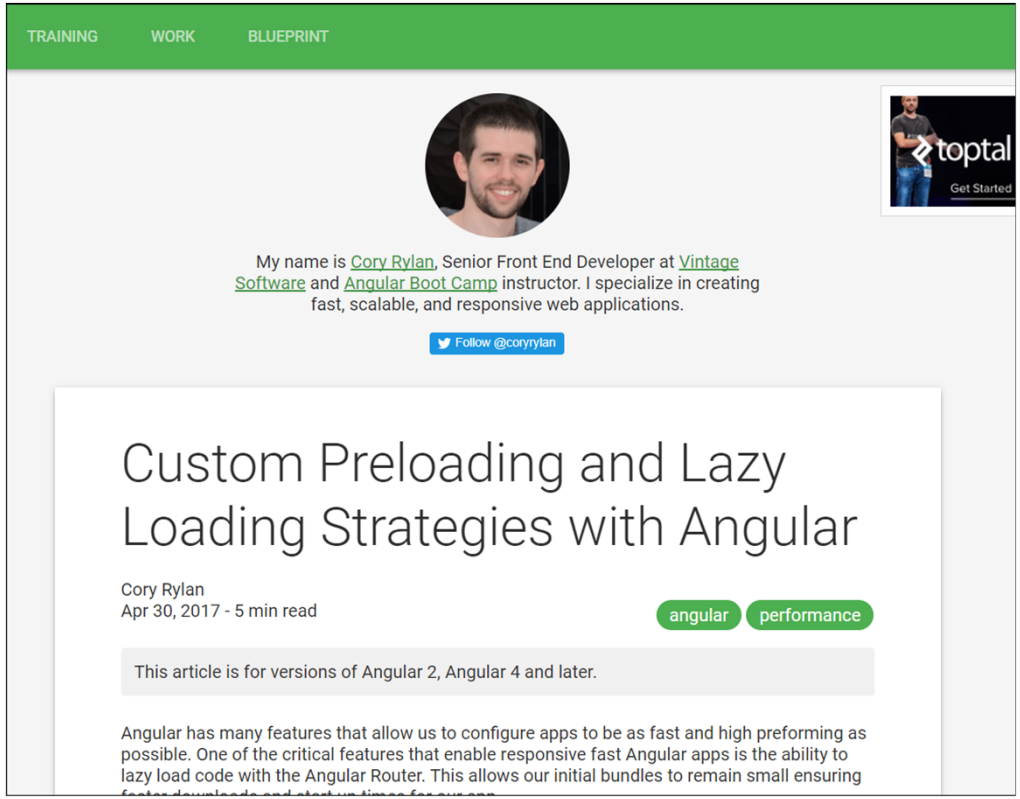
Run the app

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



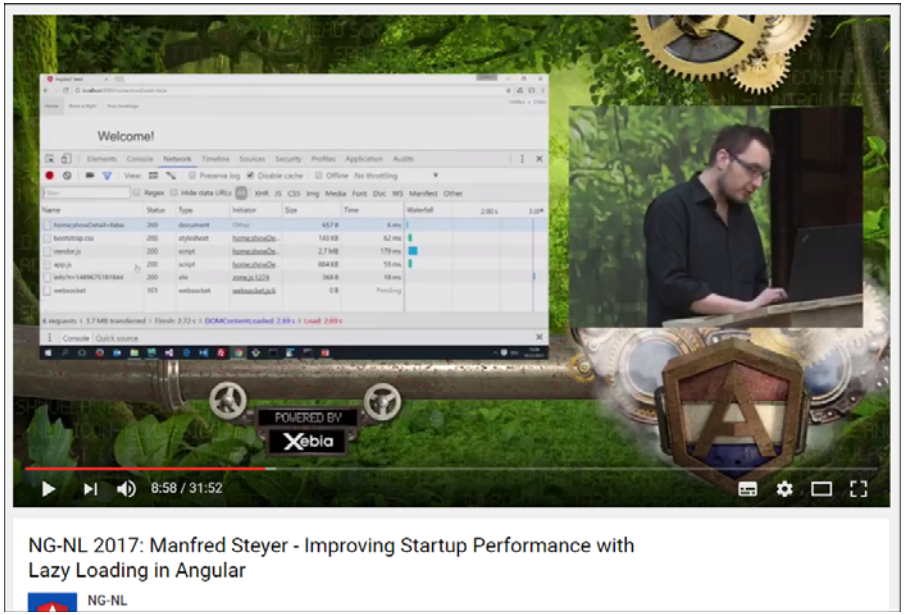
Example: ../120-custom-preloading

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.
- Let *other* modules be loaded lazily by adding a `data` property
- Write a custom preloading class, in `app.preloader.ts`
- Add the custom preloader to `app.routing.module.ts`.
  - Note: make sure this is (now) actually a Module,
    as it has to import and provide `app.preloader.ts`
- Example: `../120-custom-preloading`