Authentication mechanism using JWT

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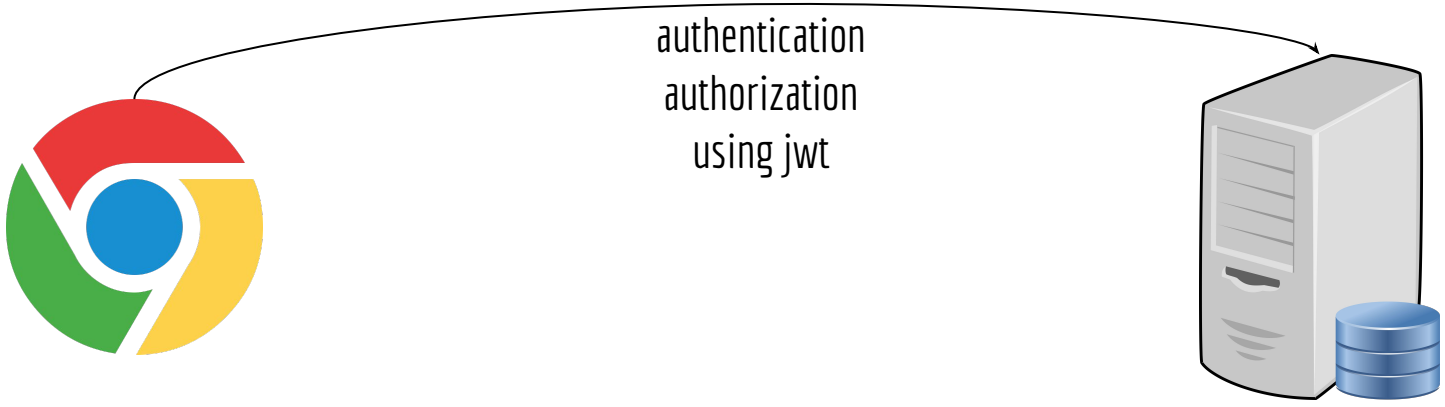
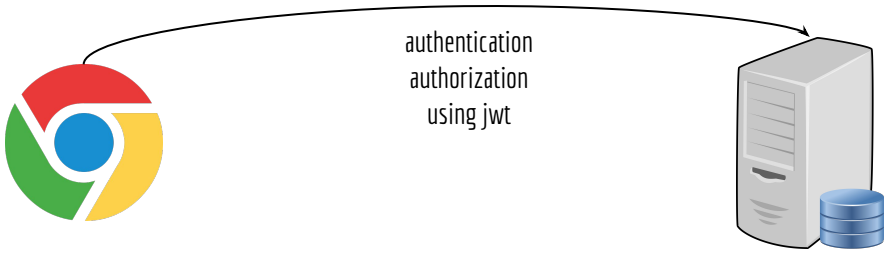
Agenda

1. What is JWT
2. Guards
3. Authentication with Guards
4. Authorization with Guards
5. HTTP Interceptors

The Problem


authentication
authorization
using jwt



User_X is Authenticated

User_X is Authorized to access **Page_A**

User_Y is **NOT** Authorized to access **Page_A**

What is JWT

JWT stands for **J**SON **W**eb **T**oken

A compact and self-contained way for securely transmitting information between parties

JWT

xxxxx.yyyyy.zzzzz

- Header
- Payload
- Signature

Header

Two properties

1. Hashing algorithm being used
2. Type of the token

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

Payload

Contains the claims.

Claims are statements about an entity (typically, the user)

```
{
  "username": "profanis",
  "first": "Fanis",
  "last": "Prodromou"
}
```

Signature

Recipe

1. Encoded header
2. Encoded payload
3. A secret
4. The algorithm specified in the header
5. Sign that
6. Enjoy :)

```
HMACSHA256(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),
  secret)
```

Encoded PASTE A TOKEN HERE


```
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJ
1c2VybmFtZSI6IlByb2ZhbmlzIiwiZmlyc3QiOiJ
mYW5pcyIsImxhc3QiOiJwcm9kcm9tb3UiLCJpZCI
6MTIzNDU2Nzg5MCwicm9sZXMiOlsiYWRtaW4iXX0
.BYCbmcm1hPJ-F8jwVyPpmJsXl-B0jbH6B-
zLz3d1Aog
```


Decoded EDIT THE PAYLOAD AND SECRET

HEADER: ALGORITHM & TOKEN TYPE


```
{
  "alg": "HS256",
  "typ": "JWT"
}
```


PAYLOAD: DATA


```
{
  "username": "Profanis",
  "first": "fanis",
  "last": "prodromou",
  "id": 1234567890,
  "roles": [
    "admin"
  ]
}
```


VERIFY SIGNATURE

```
HMACSHA256(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),
  your-256-bit-secret
) secret base64 encoded
```

Decode the token

Decode

1. Using a ready library
   a. @auth0/angular-jwt
   b. jwt-decode
   c. jsonwebtoken
2. Custom

```
getDecodedToken(token: string) {
  const tokenPayload = token.split(".")[1];
  return JSON.parse(base64.Base64.decode(tokenPayload));
}
```

Authentication

Procedure

1. **HTTP** call

2. Set the token in **localStorage**

3. On each route check if the user is authenticated

Auth form

Username

Enter username

Password

Enter password

Submit

HTTP Call

```
import { Injectable } from '@angular/core';
import { HttpClient } from '@angular/common/http';
import { tap } from 'rxjs/operators';

@Injectable()
export class LoginService {

  constructor(private http: HttpClient) {}

  login(username, password) {
    return this.http.post("/login", {username, password}).pipe(
      tap((data: any) => localStorage.setItem("token", data))
    );
  }
}
```

Guards

Type of Guards

- **CanActivate**
  Validates whether the user can visit the route or not

- **CanDeactivate**
  Validates whether the user can leave a route or not

- **CanActivateChild**
  Validates whether the user can visit a routes children or not

- **CanLoad**
  Validates whether the user can visit a lazy load module

CanActivate Guard

```
@Injectable({providedIn: 'root'})
export class AuthenticatedGuard implements CanActivate {

  constructor (private router: Router,
               private userService: UserService,
               private toastr: ToastrService) {}

  canActivate(
    next: ActivatedRouteSnapshot,
    state: RouterStateSnapshot): boolean {

      if(!this.userService.isLoggedIn) {
        this.toastr.warning("You are not authenticated");
        this.router.navigate(["/auth"]);
      }

    return this.userService.isLoggedIn;
  }
```

Use the CanActivate Guard

```
const routes: Routes = [
  {path: "hotels",
  component: HotelListComponent,
  canActivate: [AuthenticatedGuard]}
];
```

Authentication on the Server Side

Always send an **http header** with the **token**

HTTP Call With Headers

```
@Injectable()
export class HotelService {

  constructor(private http: HttpClient) { }

  getHotels() {
    return this.http.get("/hotel", {
      headers: {"Authorization": localStorage.getItem("token")}
    });
  }
}
```

Authorization

CanActivate Guard

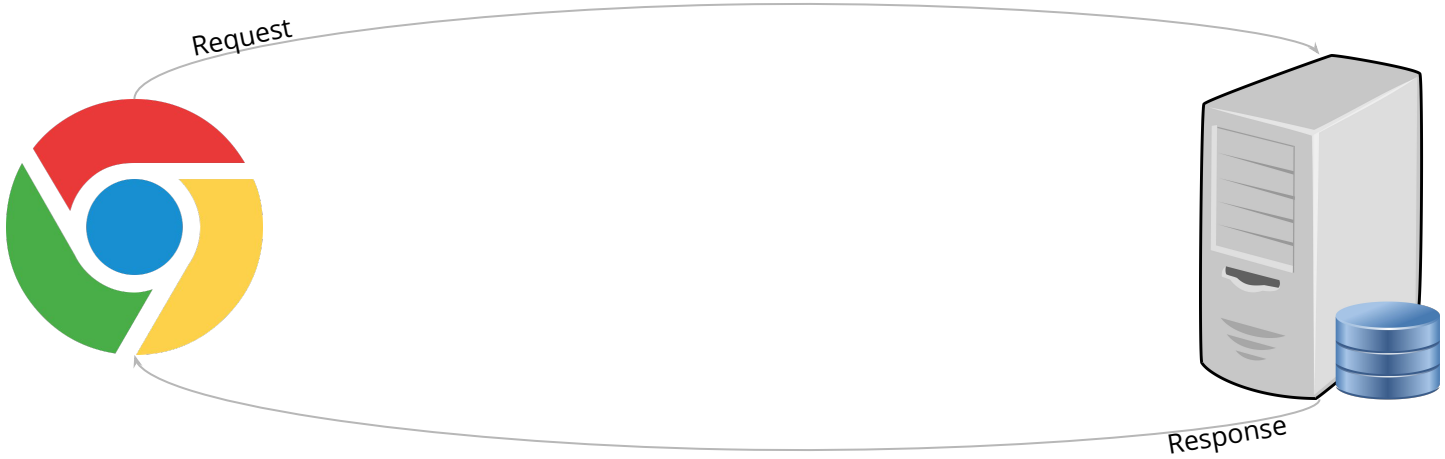
```
@Injectable({providedIn: 'root'})
export class IsAdminGuard implements CanActivate {

  constructor (private router: Router, private userService: UserService, private
toastr: ToastrService) {}

  canActivate(next: ActivatedRouteSnapshot, state: RouterStateSnapshot): boolean {

      const isAdmin = this.userService.roles.includes("admin");

      if(!isAdmin) {
        this.toastr.warning("You are not authorized to access this page");
        this.router.navigate(["/auth"]);
      }

    return isAdmin;

  }
}
```

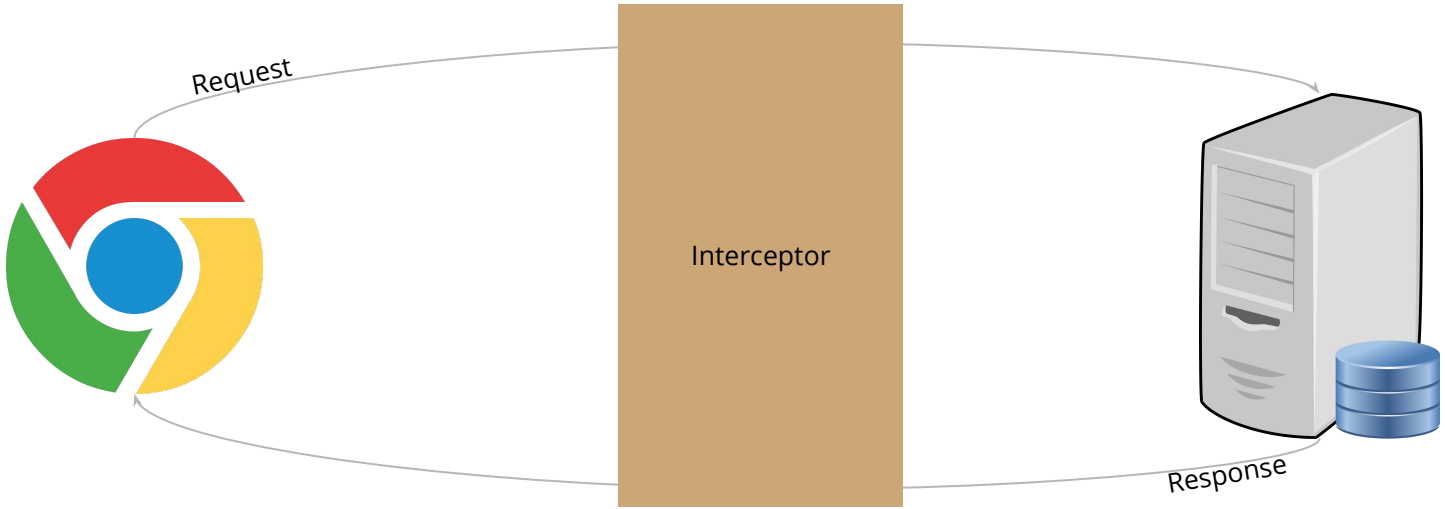
Use the CanActivate Guard

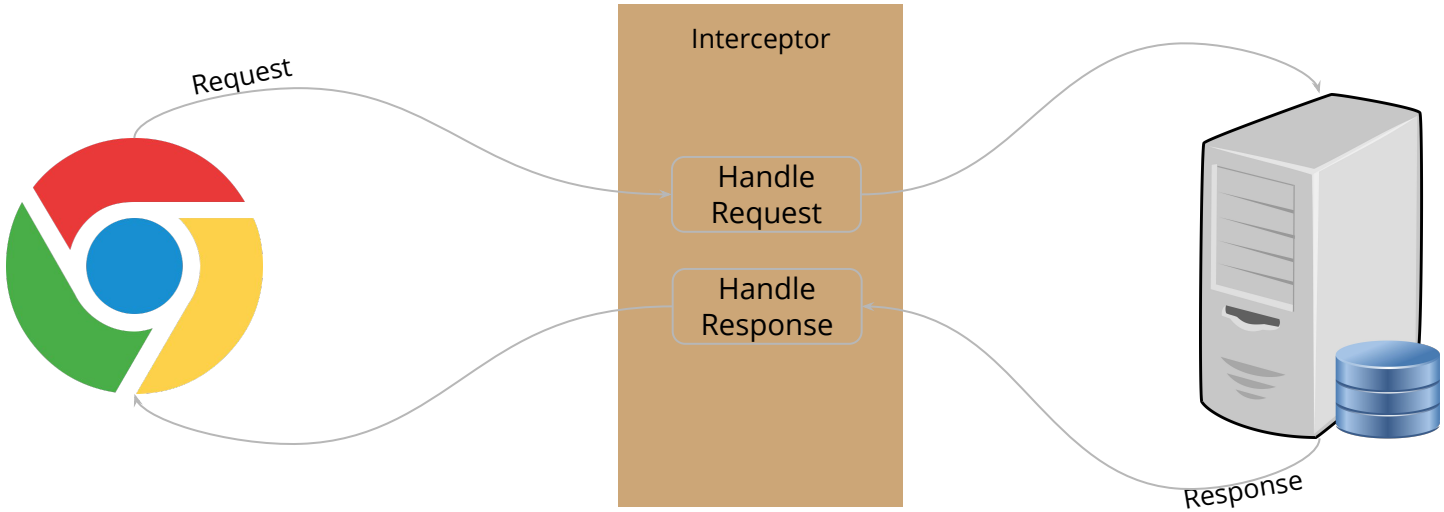
```
const routes: Routes = [
  {path: "hotels",
  component: HotelListComponent,
  canActivate: [AuthenticatedGuard, IsAdminGuard]}
];
```

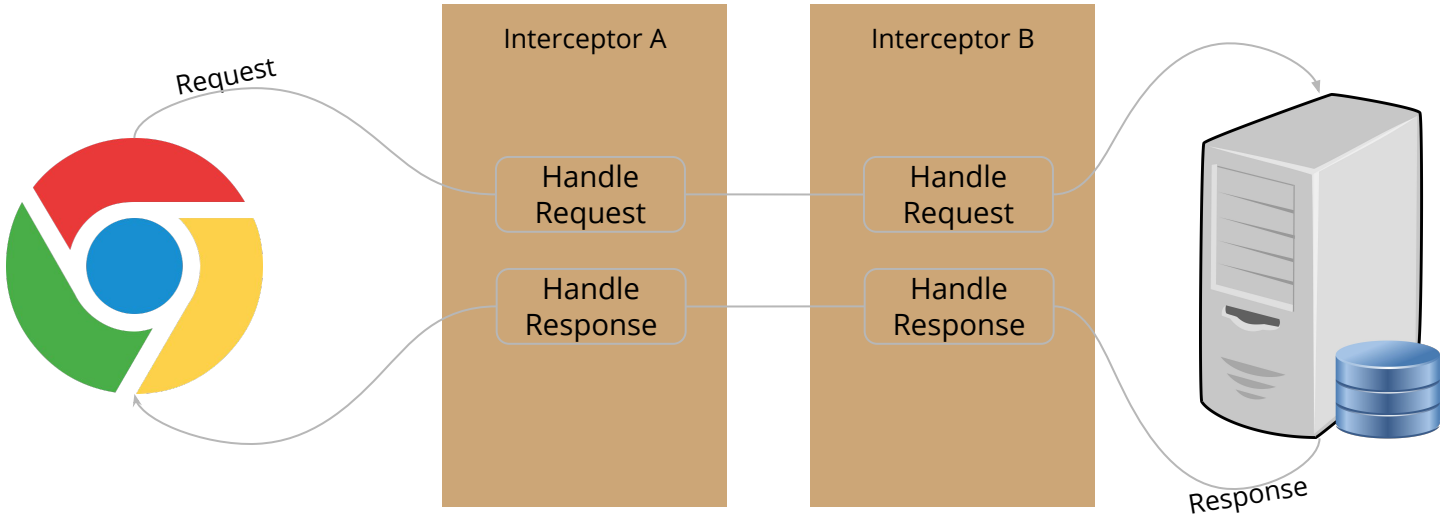
HTTP Interceptor

For the rescue of DRY :)


Request
Response


Request
Interceptor
Response


Request
Interceptor
Handle Request
Handle Response
Response


Request
Interceptor A
Handle Request
Handle Response
Interceptor B
Handle Request
Handle Response
Response

HTTP Interceptor - Snippet

```
import { Injectable } from '@angular/core';
import { HttpInterceptor,
         HttpEvent,
         HttpHandler,
         HttpRequest } from '@angular/common/http';
import { Observable } from 'rxjs';

@Injectable()
export class HeaderInterceptor implements HttpInterceptor {
  intercept(req: HttpRequest<any>, next: HttpHandler): Observable<HttpEvent<any>>
    return next.handle(req);
  }
}
```

HTTP Interceptor - Snippet

```
@NgModule({
  declarations: [
    AppComponent
  ],
  imports: [
    BrowserModule
  ],
  providers: [
    {
      provide: HTTP_INTERCEPTORS,
      useClass: HeaderInterceptor,
      multi: true
    }
  ],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

HTTP Interceptor - Handle Response

```
@Injectable()
export class HeaderInterceptor implements HttpInterceptor {
  intercept(req: HttpRequest<any>, next: HttpHandler): Observable<HttpEvent<any>>
    return next.handle(req).pipe(
      map((event: HttpEvent<any>) => {
        if (event instanceof HttpResponse) {
          if (event.status === 200) {
            console.log("I am 200");
          }
        }
        return event;
      })
    )
  }
}
```

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Q & A

Thank you!!

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