

AUTHENTICATION / AUTHORIZATION

- Authentication (Auth)
 - Who are you?
- Authorization (Authz)
 - What are you allowed to do?

FACTORS

A way of proving auth/authz

- Something you know
 - passwords, PIN
- Something you have
 - keycards, yubikey, RSA token, cellphone
- Something you are
 - fingerprints, iris, face

2FA is "two factor auth", MFA is "multi-factor (2+) auth"

LOGIN

Authenticates, possibly authorizes

- Username
- Password

Send both. Per security discussion, server will compare hashed password+salt to stored salt+hash for that username.

But then what?

BEYOND STATELESS

Web requests are stateless

How do you let the server know a later request is from someone that has already authenticated?

SESSION ID

How to solve with session id

When user successfully authenticates:

- create a random string (session id)
- on the server:
 - connect the username and authz info with id
 - often a DB entry. For class just keep in memory
 - return this session id to the client
- on the client:
 - send this session id with any later requests

OTHER TOKENS

Session Id is a "token" that by itself is random

Other tokens contain usable info directly, but are "signed" to prove who created them

Example: JWT (JSON Web Token) ("jot")

Basically a text file saying "Whoever has this token has proven themselves to be X or be allowed to Y", with a digital signature to prove it came from the owner of some private key.

JWT

Advantages

- No DB check each time used
- Can be passed to others
 - This is how many 3rd party login systems work

Disadvantages

- Good for their lifetime, even if user "logs out"
- Don't want to store changing info in them

SENDING AUTH TOKEN BACK AND FORTH

- Cookies
 - header of a request/response
 - connected to a domain
 - server can "set" in a response
 - stored in browser
 - browsers automatically send on later requests
 - Works across tabs/browser windows
 - Not across profiles/incognito/private mode
- Forms (rough)
 - send as hidden field
- Front end JS to include on requests

COOKIE DETAILS

- "Remember me"?
 - sets cookie to not expire/expire after a long time
 - Otherwise cookie gone when browser exits
- Logout
 - Server can overwrite with new stored value/expiration date
- Other cookie config options
 - A path root (rare)
 - HTTPS only ("secure", recommended)
 - Not interact with front end JS (confusing name)
 - Not interact with 3rd party pages (recommended)

EXPRESS COOKIE EXAMPLE

```
// express "middleware", this time as an extra library
const cookieParser = require('cookie-parser');
app.use(cookieParser());

// (skipping over other express stuff)
app.get('/', (req, res) => {
  const store = req.query.store;
  if(store) {
    res.cookie('saved', store, { maxAge: 15000 });
  }

  const saw = req.cookies.saved;
  res.send(`

Request had cookie "saved": ${saw}</p>`);
});


```

STEPS

1. Create project directory
2. Inside directory:
 - `npm init -y`
 - `npm install express`
 - `npm install cookie-parser`
3. Create the `server.js` (or whatever you call it) file
4. run `node server.js`
5. go to `localhost:3000` in the browser
6. use `?store=SOMEVAL` at end of url to set the cookie
7. DevTools-Network-Headers to see the `Set-Cookie` in the response and the `Cookie` in the request
8. DevTools-Application-Cookies (left) to see cookies
9. Remember this is a 15 sec expiration time

CHANGING THE COOKIE EXAMPLE

Do you know how to:

- Store the cookie under a different name than `"saved"`?
- Change the expiration time of the cookie?
- Change the name of the query param you are sending to set the cookie value? (instead of `"store"`)
- Redirect the user to `'/'` (no query param) after setting the cookie?