

Authentication

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Introduction

Authentication is the process of **verifying who a user is**.

- It answers the question: “*Are you really who you say you are?*”
- Commonly done via:
 - Username & password
 - Tokens (JWT)
 - OAuth (Google, Facebook login)
 - Biometric methods (fingerprint, face ID)

Why?

Why do we need it?

1. **Protect user data** – Only the right person can access their account.
2. **Secure application resources** – Prevent unauthorized users from performing actions.
3. **Personalized experience** – Show user-specific content after login.

How?

How Authentication Works (Basic Flow)

1. **User submits credentials** (username & password).
2. **Backend verifies** credentials against a database.
3. **If valid:** backend generates a **token** (e.g., JWT) or session.
4. **Frontend stores the token** (localStorage, cookies).
5. **Future requests** include the token to prove the user is authenticated.

Gitlab Repo

Clone this repo:

<https://gitlab.com/ait-fsad-2025/labreference/fullstackapplication>

Project Structure

Running the Application

To run the application, the db and the backend must be up and running first, only then the frontend can be run.

- ❑ cd backend/
- ❑ docker compose up --build //for first time use

```
v22.6.0 ~/FSAD_Labs/full-stack-application/backend git:(main) 4 files
docker compose up --build
"{}"
mongodb | {"t":{"$date":"2025-10-29T13:20:16.465+00:00"},"s":":22430,"ctx":"Checkpointer","msg":"WiredTiger message","attr":61744016,"ts_usec":465561,"thread":"1:0x7392c5305640","session_id":0,"category":"WT_VERB_CHECKPOINT_PROGRESS","category_id":6,"verbose_level_id":1,"msg":"saving checkpoint snapshot min: 58, size count: 0, oldest timestamp: (0, 0) , meta checkpoint timestamp: 0"}]}
mongodb | {"t":{"$date":"2025-10-29T13:21:16.538+00:00"},"s":":22430,"ctx":"Checkpointer","msg":"WiredTiger message","attr":61744076,"ts_usec":538426,"thread":"1:0x7392c5305640","session_id":0,"category":"WT_VERB_CHECKPOINT_PROGRESS","category_id":6,"verbose_level_id":1,"msg":"saving checkpoint snapshot min: 61, size count: 0, oldest timestamp: (0, 0) , meta checkpoint timestamp: 0"}}
"\""
```

MongoDB

Schema: defines the structure, rules, and behavior of documents.

Model: class based on schema to interact with MongoDB collection.

Mongoose: makes working with MongoDB easier with validation, hooks, and methods.

```
backend > models > js user.js > ...
1  const mongoose = require('mongoose')
2  const bcrypt = require('bcrypt')
3
4  const userSchema = new mongoose.Schema({
5    email: {type: String, required: true},
6    password: {type: String, required: true}
7  })
8
9  userSchema.pre('save', async function(next) {
10    if (!this.isModified('password')) return next();
11    this.password = await bcrypt.hash(this.password, 10);
12    next();
13  });
14
15  userSchema.methods.comparePassword = async function(password) {
16    return await bcrypt.compare(password, this.password);
17  };
18
19  module.exports = mongoose.model('User', userSchema)
20
```

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16    return await bcrypt.compare(password, this.password);
17  };
18
19  module.exports = mongoose.model('User', userSchema)
20
```

/users/register api

- The body will have new email and password.
- Check for existing email
- Save if everything checks out

```
router.post('/register', async function(req, res, next) {
  const { email, password } = req.body;

  if (!email || !password) {
    res.status(500).json({message: "Empty fields!"})
  }

  const existing_user = await User.findOne( {email} )

  if (existing_user) {
    return res.status(500).json({message: "Email already in use."})
  }

  const new_user = new User({email, password})
  await new_user.save()

  res.status(200).json({ new_user })
})
```

JWT

[What is JWT Authentication?](#)

JWT

When the user does the login, the token should be sent along with other infos to the frontend. The token now tells the frontend the user is there/logged in.

```
13  router.post('/login', async function(req, res, next) {
14    const { email, password } = req.body;
15
16    const existing_user = await User.findOne( {email} )
17
18    if (!existing_user) {
19      return res.status(500).json({message: "User not found"})
20    }
21
22    const isMatch = await existing_user.comparePassword(password);
23    if (!isMatch) return res.status(401).json({ message: "Invalid password" })
24
25    const token = jwt.sign({ email }, SECRET_KEY, { expiresIn: '1h' })
26    res.status(200).json({token, user: existing_user})
27  }
28}
```

Frontend Integration

- Same approach for both react and angular
- Call the users/login api and save the token in localstorage
- While trying to access the **protected** route/link/page, check for token.
- If the token exists, the user is logged in

React

- Since we are not using advanced techniques for state management, let's use `useEffect` hook to check authentication status.
 - In the `useEffect` hook, check whether there exists token in `localStorage` to confirm the login status of the user.

```
13 const handleSubmit = async() => {
14   console.log("Login button clicked", email, password)
15   if (!email || !password) {
16     setError('Please fill all the fields.')
17   }
18
19   const res = await fetch('http://localhost:3000/users/login', {
20     method: 'POST',
21     headers: { 'Content-Type': 'application/json' },
22     body: JSON.stringify({ email: email, password: password }),
23   });
24   const data = await res.json();
25
26   if (res.status === 200) {
27     localStorage.setItem('token', data.token)
28     navigator('/')
29   }
30   else {
31     setError('Something went wrong.')
32   }
33 }
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Angular

- Login Component
- Protect all/any routes
- Middleware
- canActivate
- Implement logout feature