Your Quick Guide to JWT

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What is JWT

JWT is short for JSON Web Tokens

It is a standard format to transmit data between systems in a secure way through JSON objects

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Why Use JWT?

Authentication

Verifies user identity

Authorization

Grants access to protected resources according to role (in claims)

Stateless

No need to store session data on the server.

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JWT Security Model

JWTs are digitally signed to ensure integrity and authenticity

Digital signing ensures no one has tampered with the data contained within the JWT

Optionally, JWTs can also be encrypted to protect sensitive data

JWT Structure

A JWT consists of three parts, each part represented as a base64 URL-encoded string, separated by dots (.):

Header
Contains metadata (algorithm & token type).

Payload
Holds user data (claims).

Signature
Ensures token integrity and authenticity

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JWT Example

eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.
eyJuYW1laWQiOiIxIiwibmJmIjoxNzQxMzI3NjEyL
CJleHAiOjE3NDEzMjg1MTAsImlhdCI6MTc0MTMy
NzYxMiwiaXNzIjoiaHR0cDovL2NvZGluZ3NvbmF
0YS5jb20iLCJhdWQiOiJodHRwOi8vY29kaW5nc2
9uYXRhLmNvbSJ9.
MLzdiWUCEbInTH5YKRpqMmtQ4ptxeMM9LRIjE
a80UCY

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JWT Example Breakdown

Header

eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9

Payload

eyJuYW1laWQiOiIxIiwibmJmIjoxNzQxMzI3NjEyLCJleHAiO
jE3NDEzMjg1MTAsImlhdCI6MTc0MTMyNzYxMiwiaXNzIj
oiaHR0cDovL2NvZGluZ3NvbmF0YS5jb20iLCJhdWQiOiJo
dHRwOi8vY29kaW5nc29uYXRhLmNvbSJ9

Signature

MLzdiWUCEblnTH5YKRpqMmtQ4ptxeMM9LRIjEa8OUCY

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JWT Claims

Claims represent the data contained within JWT as the payload.

These are defined as a dictionary of key,value pairs, where the key can be either predefined or custom, and the value can be any JSON value

There is a long list of predefined claims, but some of them are commonly used

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JWT Claims

Most common Predefined (Registered) Claims are:

iss: Issuer
sub: Subject
aud: Audience
exp: Expiry time (in epoch)
nbf: Not before time
iat: Issued at time (in epoch)
jti: JWT unique Identifier

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Decoding JWT

Since each part of a JWT is a base64 url-encoded string, then you can easily **decode** it.

VS 2022 has a built-in support to decode any JWT while debugging

You can also use **JWT.io** to decode your JWT.

JWT.io also **checks the signature** if you put the secret used to sign the JWT

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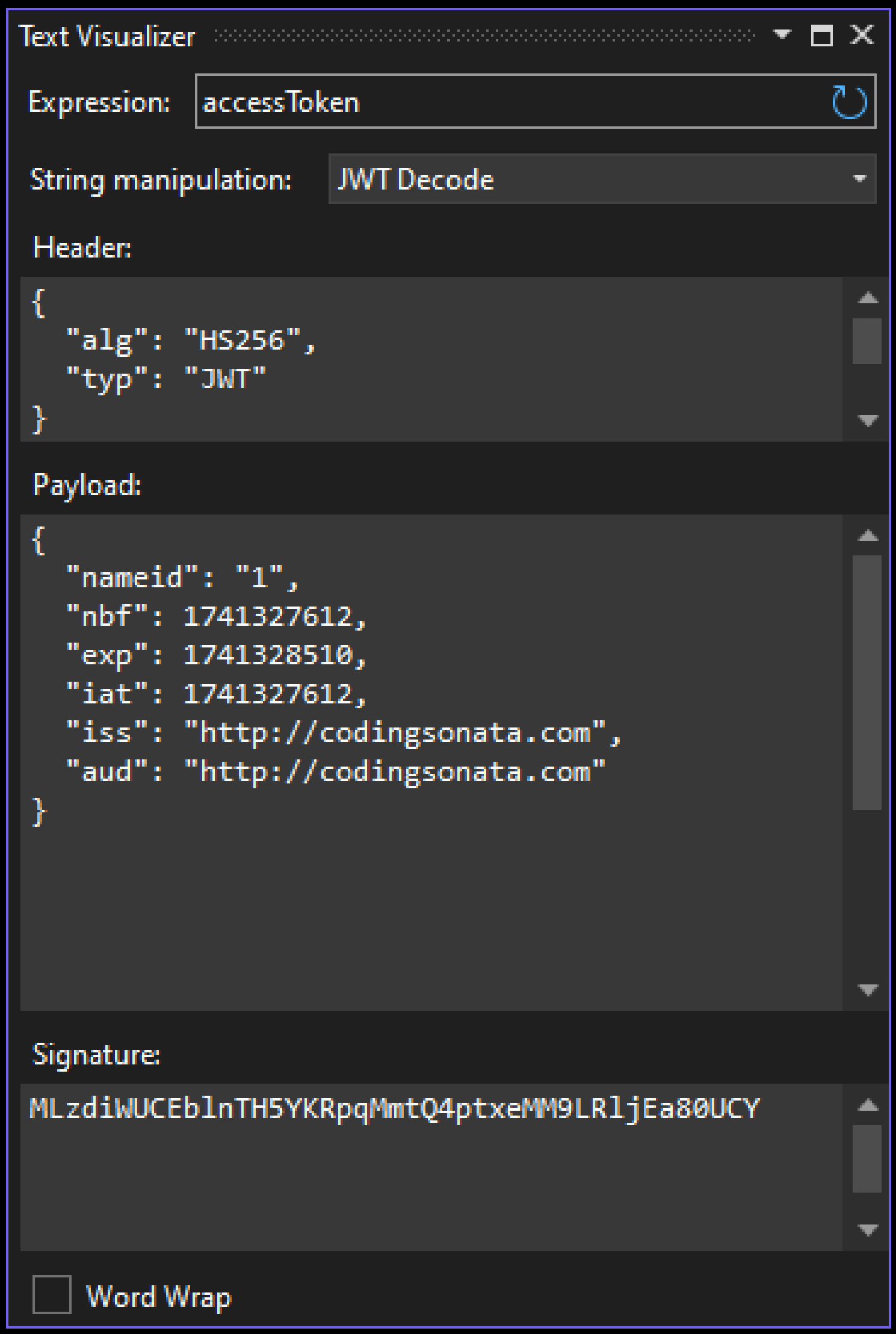
Decoding JWT in VS 2022



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Decoding JWT in JWT.io

DECODED HEADER

JSON CLAIMS TABLE

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

DECODED PAYLOAD

JSON CLAIMS TABLE

```
{
  "nameid": "1",
  "nbf": 1741327612,
  "exp": 1741328510,
  "iat": 1741327612,
  "iss": "http://codingsonata.com",
  "aud": "http://codingsonata.com"
}
```

JWT SIGNATURE VERIFICATION (OPTIONAL)

Enter the secret used to sign the JWT below:

SECRET

Valid secret

MySuperSecureBase64EncodedSecretKey

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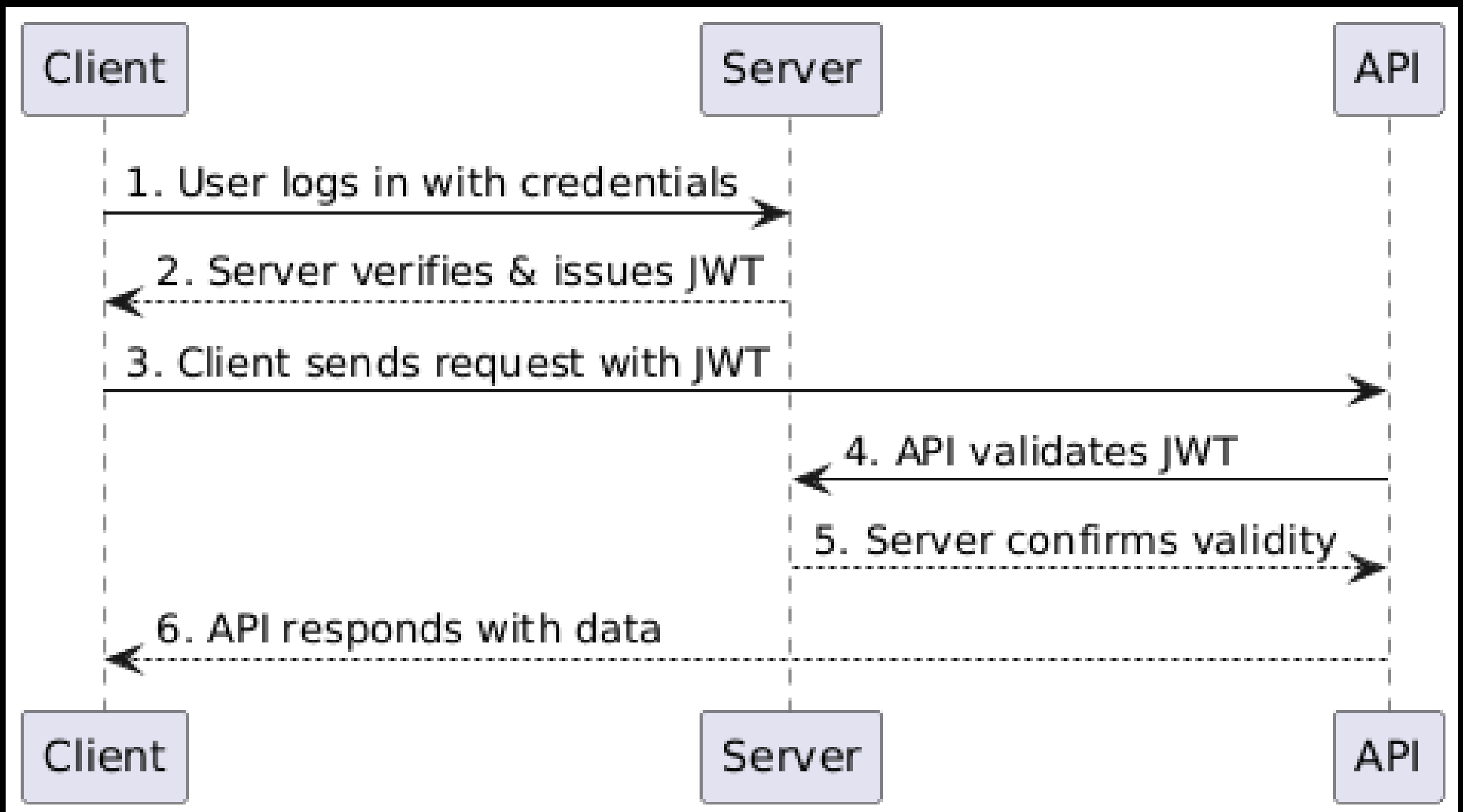
Authentication with JWT



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JWT Best Practices

Store the secret key in a secure place (environment variable or a vault), don't keep it in code or in source control

Always use HTTPS to prevent man-in-the-middle attacks (interception).

Do not store sensitive data in JWTs unless you encrypt them

Set short expiry (exp), usually in few minutes time, and use refresh tokens for long sessions.

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JWT Best Practices

On frontend, store JWTs in HTTP-only cookies, not localStorage.

Use SameSite=strict for cookies to prevent CSRF.

Avoid using the none algorithm type for signing the JWT, unless you are totally sure the JWT is already verified

Validate essential claims like:

- exp
- iss
- aud
- iat

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