Lab: JWT authentication bypass via weak signing key

This lab uses a JWT-based mechanism for handling sessions. It uses an extremely weak secret key to both sign and verify tokens. This can be easily brute-forced using a wordlist of common secrets.

To solve the lab, first brute-force the website's secret key. Once you've obtained this, use it to sign a modified session token that gives you access to the admin panel at `/admin`, then delete the user `carlos`.

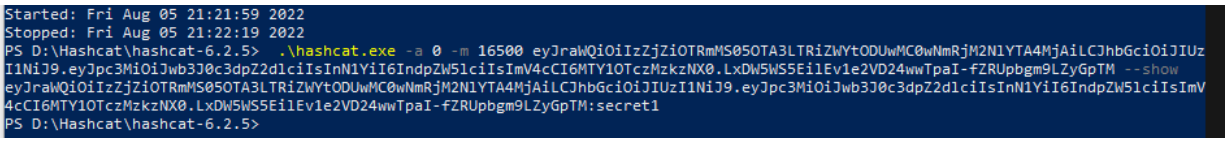
You can log in to your own account using the following credentials: `wiener:peter`

Part 1 - Brute-force the secret key

1. In Burp, load the JWT Editor extension from the BApp store.
2. In the lab, log in to your own account and send the post-login `GET /my-account` request to Burp Repeater.
3. In Burp Repeater, change the path to `/admin` and send the request. Observe that the admin panel is only accessible when logged in as the `administrator` user.

4. Copy the JWT and brute-force the secret. You can do this using hashcat as follows:

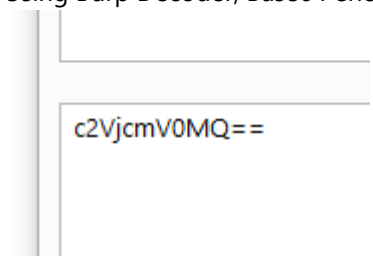
```
`hashcat -a 0 -m 16500 <YOUR-JWT> /path/to/jwt.secrets.list`
![[Pasted image 20220805212301.png]]
```



If you're using hashcat, this outputs the JWT, followed by the secret. If everything worked correctly, this should reveal that the weak secret is `secret1`.

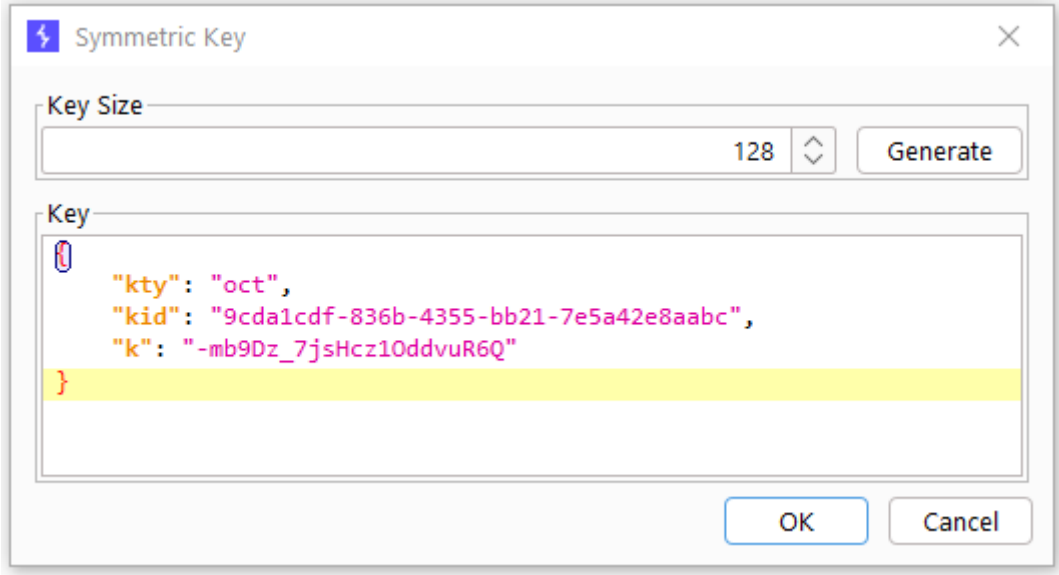
Part 2 - Generate a forged signing key

1. Using Burp Decoder, Base64 encode the secret that you brute-forced in the previous section.



c2VjcmV0MQ==

2. In Burp, go to the **JWT Editor Keys** tab and click **New Symmetric Key**. In the dialog, click **Generate** to generate a new key in JWK format. Note that you don't need to select a key size as this will automatically be updated later.



3. Replace the generated value for the `k` property with the Base64-encoded secret.

Keys

ID	
23378c37-d9c9-4e7b-9c49-06abb950be4d	OCT 56

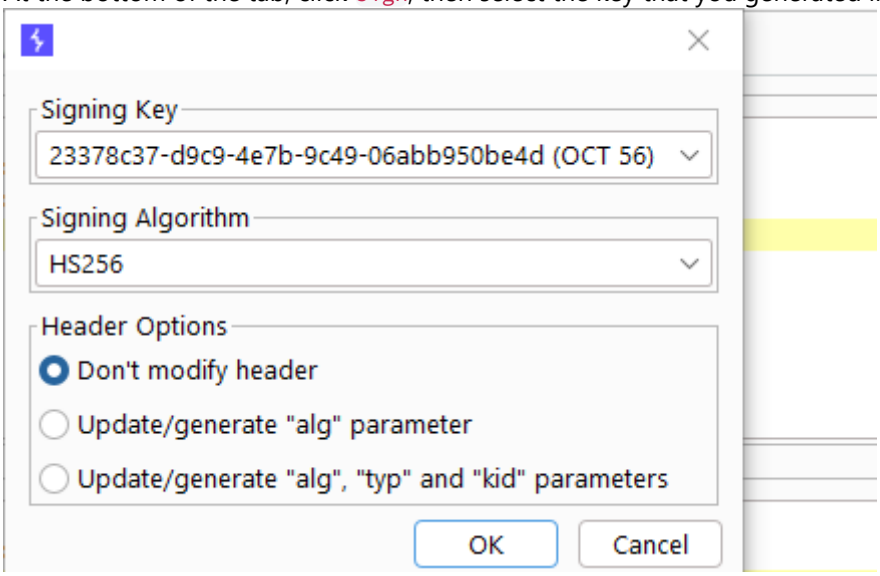
4. Click **OK** to save the key.

Part 3 - Modify and sign the JWT

1. Go back to the `GET /admin` request in Burp Repeater and switch to the extension-generated **JSON Web Token** message editor tab.
2. In the payload, change the value of the `sub` claim to `administrator`

```
{
    "iss": "portswigger",
    "sub": "administrator",
    "exp": 1659733935
}
```

3. At the bottom of the tab, click `Sign`, then select the key that you generated in the previous section.



4. Make sure that the `Don't modify header` option is selected, then click `OK`. The modified token is now signed with the correct signature.
5. Send the request and observe that you have successfully accessed the admin panel.

Response

Pretty Raw Hex Render

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Users

carlos - Delete
wiener - Delete

6. In the response, find the URL for deleting Carlos (`/admin/delete?username=carlos`). Send the request to this endpoint to solve the lab.

```
    <span>
      carlos -
    </span>
    <a href="/admin/delete?username=carlos">
      Delete
    </a>
  </div>
  <div>
    <span>
```

Request

Pretty Raw Hex JSON Web Token

```
1 GET /admin/delete?username=carlos HTTP/1.1
2 Host: 0a4300dd03ceec0fc093950800980022.web-sec
3 Cookie: session=
  eyJraWQiOiJhZTI2ZDUwOS0zNWI1LTQ4NTctYThkNiO2Nj
  1YiI6ImFkbWluaXNOcmFOb3IiLCJleHAiOjE2NTk3MzUyM
```

Congratulations, you solved the lab!