

⚠ 2FA BYPASS ⚠

Bypassing two-factor authentication

[] Flawed two-factor verification logic Sometimes flawed logic in two-factor authentication means that after a user has completed the initial login step, the website doesn't adequately verify that the same user is completing the second step For example, the user logs in with their normal credentials in the first step as follows:

```
POST /login-steps/first HTTP/1.1
Host: vulnerable-website.com
...
username=carlos&password=qwerty
```

They are then assigned a cookie that relates to their account, before being taken to the second step of the login process:

```
HTTP/1.1 200 OK
Set-Cookie: account=carlos

GET /login-steps/second HTTP/1.1
Cookie: account=carlos
```

When submitting the verification code, the request uses this cookie to determine which account the user is trying to access:

```
POST /login-steps/second HTTP/1.1
Host: vulnerable-website.com
Cookie: account=carlos
...
verification-code=123456`
```

In this case, an attacker could log in using their own credentials but then change the value of the account cookie to any arbitrary username when submitting the verification code.

```
POST /login-steps/second HTTP/1.1
Host: vulnerable-website.com
Cookie: account=victim-user
...
verification-code=123456
```

[] Clickjacking on 2FA Disable Feature

1. Try to Iframe the page where the application allows a user to disable 2FA
2. If Iframe is successful, try to perform a social engineering attack to manipulate victim to



[] Response Manipulation

1. Check Response of the 2FA Request.
2. If you Observe "Success":false
3. Change this to "Success":true and see if it bypass the 2FA

[] Status Code Manipulation

1. If the Response Status Code **is** 4XX like 401, 402, etc.
2. Change the Response Status Code to **"200 OK"** and see **if** it bypass the 2FA

[] 2FA Code Reusability

1. Request a 2FA code **and use it**
2. Now, Re-use **the** 2FA code **and if it is** used successfully **that's** an issue.
3. Also, **try** requesting multiple 2FA codes **and** see **if** previously requested Codes expire **or not** wh
4. Also, **try to** re-use **the** previously used code **after** long time duration say 1 day **or** more. That



[] CSRF on 2FA Disable Feature

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2. Now, Re-use **the** 2FA code **and if it is** used successfully **that's** an issue.
3. Also, **try** requesting multiple 2FA codes **and** see **if** previously requested Codes expire **or not** when a new code **is** requested
4. Also, **try to** re-use **the** previously used code **after** long time duration say 1 day **or** more. That will be an potential issue **as** 1 day **is** enough duration **to** crack **and** guess a 6-digit 2FA code

[] Backup Code Abuse

Apply same techniques used **on** 2FA such **as** Response/Status Code Manipulation, Brute-force, etc. **to** bypass Backup Codes **and disable/reset** 2FA

[] Enabling 2FA Doesn't Expire Previous Session

1. **Login to** the application **in** two different browsers **and enable** 2FA **from** 1st **session**.
2. Use 2nd **session** **and if it is not** expired, it could be an issue **if** there **is** an insufficient **session** expiration issue. **In** this scenario **if** an attacker hijacks an active **session** **before** 2FA, it **is** possible **to** carry out all functions **without** a need **for** 2FA



[] 2FA Refer Check Bypass

1. Directly Navigate **to** the page which comes after 2FA **or** any other authenticated page of the application.
2. **If** there is **no** success, change the refer header **to** the 2FA page URL. This may fool application **to** pretend as **if** the request came after satisfying 2FA Condition

[] 2FA Code Leakage in Response

1. At 2FA Code Triggering Request, such **as** Send OTP functionality, capture **the** Request.
2. See **the** Response **of** this request **and** analyze **if the** 2FA Code is leaked.

[] JS File Analysis

1. **while** triggering the 2FA Code Request,
2. Analyze all the JS Files that are referred **in** the Response

3. to see **if** any JS file contain information that can help bypass 2FA code.

[] Lack of Brute-Force Protection

This involves all sort **of** issues which comes under security misconfiguration such **as** lack **of** rate limit, no brute-force protection, etc.

1. Request 2FA code **and** capture this request.
2. Repeat this request **for 100-200 times** **and if** there **is** no limitation **set**, **that's** a rate limit
3. At 2FA Code Verification page, **try to** brute-force **for** valid 2FA **and** see **if** there **is** any succ
4. You can also **try to** initiate, requesting OTPs **at** one side **and** brute-forcing **at** another side. Somewhere **the** OTP will match **in middle and** may give you a quick **result**

[] Password Reset/Email Change - 2FA Disable

1. Assuming that you are able **to perform** email change **or password reset for** the victim **user or** make victim **user do** it **by any** means possible.
2. 2FA **is** disabled **after** the email **is** changed **or password is reset**. This could be an issue **for some** organizations. However, **depends on case by case** basis.

[] Missing 2FA Code Integrity Validation

1. Request a 2FA code **from** Attacker Account.
2. Use **this** valid 2FA code **in** the victim 2FA Request **and** see **if** it bypass the 2FA Protection.

[] Direct Request

1. Directly Navigate **to** the page which comes after 2FA **or** any other authenticated page of the application.
2. See **if** this bypasses the 2FA restrictions.
3. try **to** change the ****Referrer header**** as **if** you came **from** the 2FA page.

[] Reusing token

1. Maybe you can reuse **a** previously used **token** inside **the** account to authenticate.

[] Sharing unused tokens

1. Check **if** you can get **the token** from your account **and try** to use **it** to bypass **the** 2FA **in a diff**

[] Leaked Token

1. Is **the** token leaked **on** a response **from the** web application?

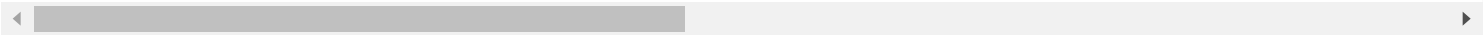
[] Session permission

1. **Using** the same session start the flow **using** your account **and** the victim's account.
2. **When** reaching the 2FA point **on** both accounts,
3. complete the 2FA **with** your account but **do not** access the **next** part.

- 4. Instead of that, try to access the next step with the victim's account flow.
- 5. If the back-end only set a boolean inside your sessions saying that you have successfully pass

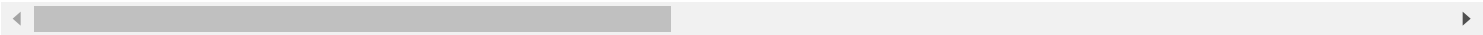
[] Password reset function

- 1. In almost all web applications the password reset function automatically logs the user into
- 2. Check if a mail is sent with a link to reset the password and if you can reuse



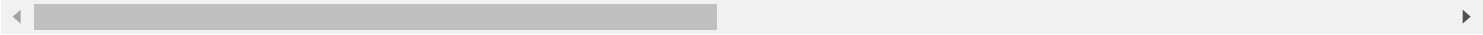
[] Lack of Rate limit

Is there any limit on the number of codes that you can try, so you can just brute force it? Be ca



[] Flow rate limit but no rate limit

In this case, there is a flow rate limit (you have to brute force it very slowly: 1 thread and so



[] Re-send code and reset the limit

There is a rate limit but when you "resend the code" the same code is sent and the rate limit is

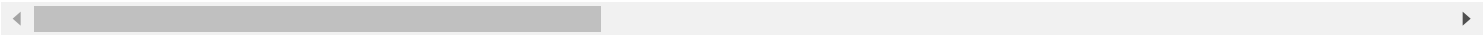


[] Client side rate limit bypass

{% content-ref url="rate-limit-bypass.md" %} rate-limit-bypass.md {% endcontent-ref %}

[] Lack of rate limit in the user's account

Sometimes you can configure the 2FA for some actions inside your account (change mail, password..

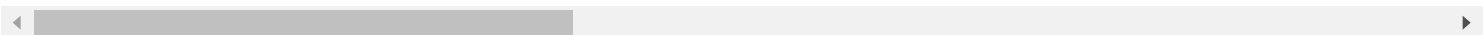


[] Lack of rate limit re-sending the code via SMS

You won't be able to bypass the 2FA but you will be able to waste the company's money.

[] Infinite OTP regeneration

If you can generate a new OTP infinite times, the OTP is simple enough (4 numbers), and y



[] Guessable cookie

If the "remember me" functionality uses a new cookie with a guessable code, try to guess it.

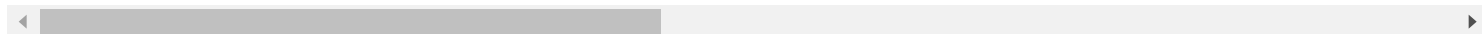
[] IP address

If the "remember me" functionality is attached to your IP address, you can try to figure out the



[] Subdomains

If you can find some "testing" subdomains with the login functionality, they could be using old v



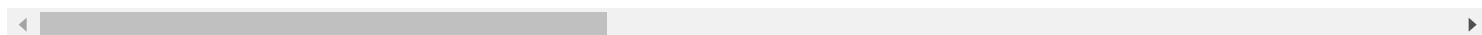
[] APIs

If you find that the 2FA is using an API located under a /v*/ directory (like "/v3/"), this proba



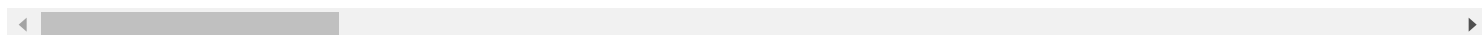
[] Previous sessions

When the 2FA is enabled, previous sessions created should be ended. This is because when a client



[] Improper access control to backup codes

Backup codes are generated immediately after 2FA is enabled and are available on a single request



[] Information Disclosure

If you notice some confidential information appear on the 2FA page that you didn't know previousl



[] Bypass 2FA with null or 000000

[] Previously created sessions continue being valid after MFA activation

1 access the same account on <https://account.grammarly.com> in two devices
2 on device 'A' go to <https://account.grammarly.com/security> > complete all steps to activate the
Now the 2FA is activated for this account
3 back to device 'B' reload the page The session still active



[] Enable 2FA without verifying the email I able to add 2FA to my account without verifying my email

Attack scenario :

Attacker sign up with victim email (Email verification will be sent to victim email).
Attacker able to login without verifying email.
Attacker add 2FA.

[] Password not checked when disabling 2FA

PoC
1- go to your account and activate the 2FA from /settings/auth
2- after active this option click on Disabled icon beside Two-factor authentication.
3- a new window will open asking for Authentication or backup code - Password to confirm the disa

- 4- in the first box enter a valid Authentication or backup code and in the password field enter a
- 5- the option will be disabled successful without check the validation of the password.

[] "email" MFA mode allows bypassing MFA from victim's device when the device trust is not expired

Steps To Reproduce:

Note:

- 1-Use burp suite or another tool to intercept the requests
- 2-Turn on and configure your MFA
- 3-Login with your email and password
- 4-The page of MFA is going to appear
- 5-Enter any random number
- 6-when you press the button "sign in securely" intercept the request POST auth.grammarly.com/v3/a
"mode":"sms" by "mode":"email"
"secureLogin":true by "secureLogin":false
- 7-send the modification and check, you are in your account! It was not necessary to enter the pho

[] 2FA bypass by sending blank code

- 1- Login to Glassdoor and navigate to https://www.glassdoor.com/member/account/securitySettings_i
- 2- Enable 2FA
- 3- Logout
- 4- Login again and notice OTP is asked
- 5- Now using Burp suite intercept the POST request by sending incorrect code. [Do not forward]
- 6- Before forwarding the request to server, remove the code and forward
- 7- Turnoff Intercept and notice that your login request has been fulfilled