THE DEVELOPER'S CONFERENCE

API – Desmistificando o OAuth2

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Sumário

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- Ambientação
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Sumário

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- ✓ Errors


No princípio, tudo era mato!

Então vieram Desktops, Websites, Integrações

E o JavaScript tocou as trombetas do apocalípse

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Além dos computadores,
outros dispositivos também queriam
acessar seus dados.

OAuth2

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Quatro bravos guerreiros se erguem

Flickr Auth

AuthSub

BBAuth

OAuth Core 1.0

OAuth2

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> We want something like Flickr Auth / Google AuthSub / Yahoo! BBAuth, but published as an open standard, with common server and client libraries, etc.

Blaine Cook, April 5, 2007

OAuth2

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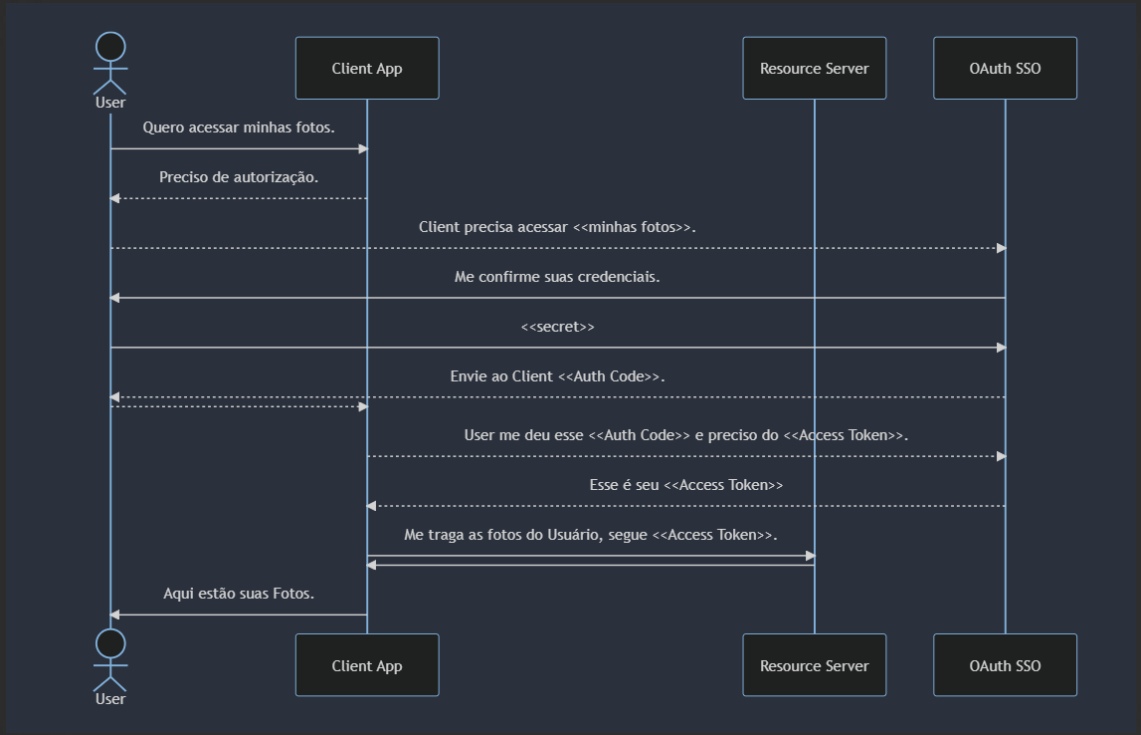
A Sociedade do OAuth

Clients

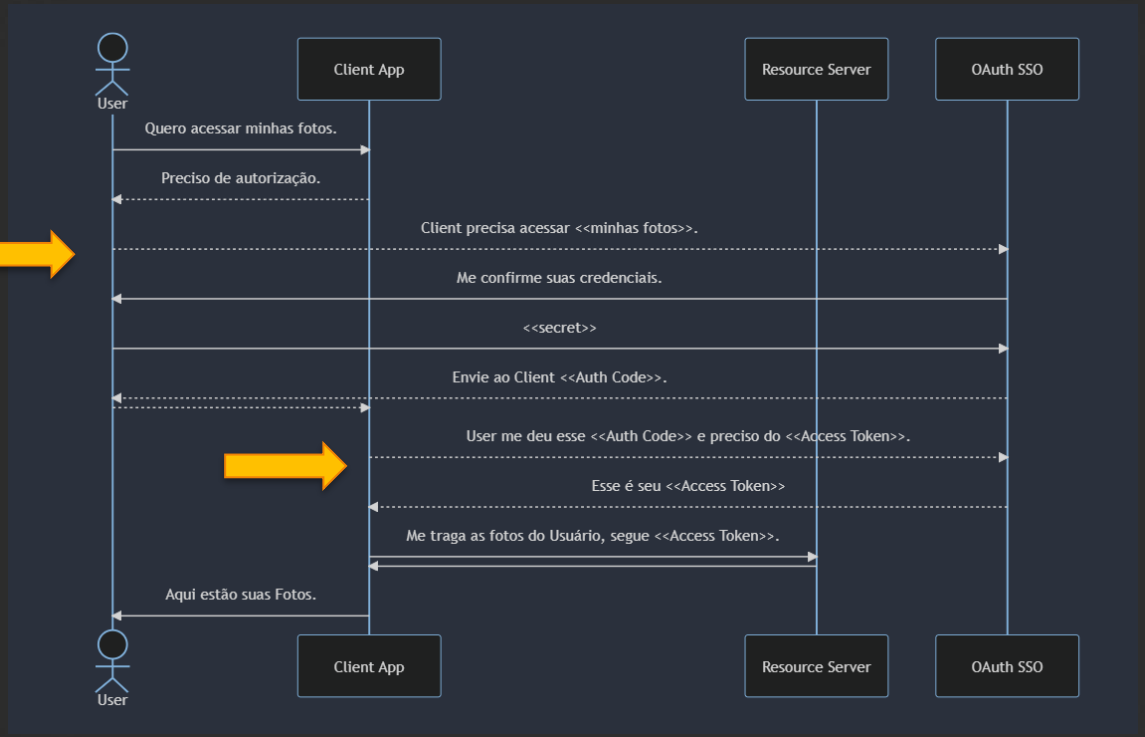
Público

Confidencial

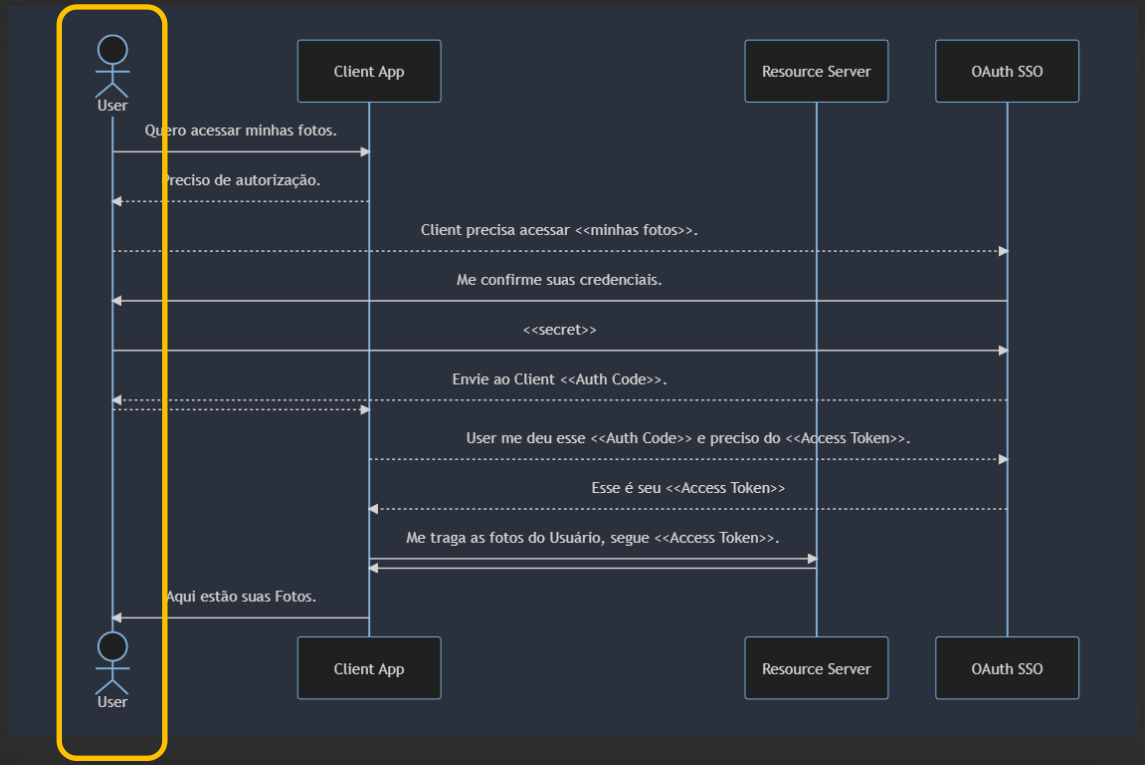
Authorization Flow



Authorization Flow



Authorization Flow



Authorization Flow

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```
5
6   export function startAuthorizationFlow({
7     authorizationUrl,
8     clientId,
9     redirectUri
10  }) {
11    const params = new URLSearchParams();
12    params.set('response_type', 'code');
13    params.set('client_id', clientId);
14    params.set('redirect_uri', redirectUri);
15    return `${authorizationUrl}?${params.toString()}`;
16  }
17
```

Response_type:

- code
- id_token
- token
- none

<https://openid.net/specs/oauth-v2-multiple-response-types-1_0.html#ResponseTypesAndModes>

redirect_uri

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```
https://example.com/dashboard
```

<https://sec.okta.com/articles/2021/02/stealing-oauth-tokens-open-redirects>

redirect_uri

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`https://example.com/dashboard`

`https://example.com/login?redirect=https://example.com/dashboard`

<https://sec.okta.com/articles/2021/02/stealing-oauth-tokens-open-redirects>

redirect_uri

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```
https://auth.com?...&redirect_uri=https://example.com/login?redirect=https://example.com/dashboard
```

<https://sec.okta.com/articles/2021/02/stealing-oauth-tokens-open-redirects>

redirect_uri

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```
https://auth.com?...&redirect_uri=https://example.com/login?redirect=https://attacker.com
```

OPEN REDIRECT ATTACK

<https://sec.okta.com/articles/2021/02/stealing-oauth-tokens-open-redirects>

state


```
5
6   export function startAuthorizationFlow({
7     authorizationUrl,
8     clientId,
9     redirectUri,
10    state
11  }) {
12    const params = new URLSearchParams();
13    params.set('response_type', 'code');
14    params.set('client_id', clientId);
15    params.set('redirect_uri', redirectUri);
16    params.set('state', state);
17    return `${authorizationUrl}?${params.toString()}`;
18  }
19
```

Um valor opaco para o cliente registrar sua sessão.

<https://www.ietf.org/archive/id/draft-ietf-oauth-v2-1-08.html#section-4.1.1>

scope


```
5
6   export function startAuthorizationFlow({
7     authorizationUrl,
8     clientId,
9     redirectUri,
10    state,
11    scope
12  }) {
13    const params = new URLSearchParams();
14    params.set('response_type', 'code');
15    params.set('client_id', clientId);
16    params.set('redirect_uri', redirectUri);
17    params.set('state', state);
18    params.set('scope', scope);
19    return `${authorizationUrl}?${params.toString()}`;
20  }
21
```

- profile
- openid
- email
- roles
- publish_photo
- publish_post
- accounts
- invoices
- full_access

<https://www.ietf.org/archive/id/draft-ietf-oauth-v2-1-08.html#access-token-scope>


OAKLEY

csrf

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CROSS-SITE REQUEST FORGERY

<https://en.wikipedia.org/wiki/Cross-site_request_forgery>

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CROSS-SITE REQUEST FORGERY

https://snap.com/publish

<https://en.wikipedia.org/wiki/Cross-site_request_forgery>

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CROSS-SITE REQUEST FORGERY

https://snap.com/publish

https://auth.com?cliente_id=snap&...

<https://en.wikipedia.org/wiki/Cross-site_request_forgery>

csrf

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CROSS-SITE REQUEST FORGERY

https://snap.com/publish

https://auth.com?cliente_id=snap&...

https://snap.com/oauth?code=attackercode&...

<https://en.wikipedia.org/wiki/Cross-site_request_forgery>

pkce


```
5
6   export function startAuthorizationFlow({
7     authorizationUrl,
8     clientId,
9     redirectUri,
10    state,
11    scope,
12    codeChallenge,
13    codeChallengeMethod = 'S256'
14  }) {
15    const params = new URLSearchParams();
16    params.set('response_type', 'code');
17    params.set('client_id', clientId);
18    params.set('redirect_uri', redirectUri);
19    params.set('state', state);
20    params.set('scope', scope);
21    if (!!codeChallenge) {
22      params.set('code_challenge_method', codeChallengeMethod);
23      params.set('code_challenge', codeChallenge);
24    }
25    return `${authorizationUrl}?${params.toString()}`;
26  }
27
```

code_challenge_method

- plain
- S256

<https://www.rfc-editor.org/rfc/rfc7636.txt>

pkce

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```
31
32  export async function generatePkcePair(): Promise<[string, string]> {
33    const codeVerifier = await generateRandomString();
34    const codeVerifierHash = await sha256(codeVerifier).then(buffer => base64URLEncode(buffer));
35    return [codeVerifier, codeVerifierHash];
36  }
37
```

<https://www.rfc-editor.org/rfc/rfc7636.txt>

pkce

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```
4
5   const PKCE_DICT = 'ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789-._~';
6
7   export async function generateRandomString(size: number = 128) {
8     const buffer = new Uint8Array(128);
9     crypto.getRandomValues(buffer);
10    return Array.from(buffer).map(x => PKCE_DICT[x % 64]).join('');
11  }
12
```

<https://www.rfc-editor.org/rfc/rfc7636.txt>

pkce

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```
15
16  export function base64URLEncode(buffer: ArrayBuffer) {
17    return btoa(Array.from(new Uint8Array(buffer)).map(bytes => String.fromCharCode(bytes)).join(''))
18      .replace(/\+/g, '-')
19      .replace(/\//g, '_')
20      .replace(/=+$/, '');
21  }
22
23  export async function sha256(phrase: string): Promise<ArrayBuffer> {
24    const encoder = new TextEncoder();
25    const buffer = encoder.encode(phrase);
26    return crypto.subtle.digest('SHA-256', buffer);
27  }
28
```

<https://www.rfc-editor.org/rfc/rfc7636.txt>

pkce


```
5
6   export function startAuthorizationFlow({
7     authorizationUrl,
8     clientId,
9     redirectUri,
10    state,
11    scope,
12    codeChallenge,
13    codeChallengeMethod = 'S256'
14  }) {
15    const params = new URLSearchParams();
16    params.set('response_type', 'code');
17    params.set('client_id', clientId);
18    params.set('redirect_uri', redirectUri);
19    params.set('state', state);
20    params.set('scope', scope);
21    if (!!codeChallenge) {
22      params.set('code_challenge_method', codeChallengeMethod);
23      params.set('code_challenge', codeChallenge);
24    }
25    return `${authorizationUrl}?${params.toString()}`;
26  }
27
```

code_challenge_method

- plain
- S256

<https://www.rfc-editor.org/rfc/rfc7636.txt>

Token Request

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```
24
25  export async function fetchAccessTokenByAuthCode({
26    authCode, clientId, codeVerifier, redirectUri, tokenUrl
27  }): Promise<AccessTokenResponse> {
28    const body = new URLSearchParams();
29    body.set('client_id', clientId);
30    body.set('grant_type', 'authorization_code');
31    body.set('code', authCode);
32    body.set('redirect_uri', redirectUri);
33
34    if (codeVerifier) {
35      body.set('code_verifier', codeVerifier);
36    }
37
38    return fetch(tokenUrl, {
39      headers: { 'Content-Type': 'application/x-www-form-urlencoded;charset=UTF-8' },
40      body,
41      method: 'POST'
42    })
43      .then(handleOAuthErrorResponse)
44      .then(asJsonResponse);
45  }
```

grant_type

- authorization_code
- client_credentials
- refresh_token
- urn:ietf:params:oauth:grant-type:device_code

<https://www.ietf.org/archive/id/draft-ietf-oauth-v2-1-08.html#section-4.1>

Token Response

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```
12
13  export interface AccessTokenResponse {
14    access_token: string,
15    refresh_token?: string,
16    token_type: string,
17    expires_in: number,
18    refresh_expires_in?: number,
19    scope?: string,
20    session_state?: string,
21    id_token?: string
22  }
23
```

<https://www.ietf.org/archive/id/draft-ietf-oauth-v2-1-08.html#section-4.1>

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E quando não houver Browser?

Device Flow

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```
37
38  export async function startDeviceAuthorizationFlow({
39    clientId, deviceUrl, scope
40  }): Promise<DeviceAuthorizationResponse> {
41    const body = new URLSearchParams();
42    body.set('client_id', clientId);
43    body.set('scope', scope);
44    return fetch(deviceUrl, {
45      headers: { 'Content-Type': 'application/x-www-form-urlencoded;charset=UTF-8' },
46      body,
47      method: 'POST'
48    })
49      .then(handleOAuthErrorResponse)
50      .then(asJsonResponse);
51  }
52
```

<https://www.rfc-editor.org/rfc/rfc8628.txt>

Device Flow Response

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```
25
26  export interface DeviceAuthorizationResponse {
27    device_code: string;
28    user_code: string;
29    verification_uri: string;
30    interval: number;
31    expires_in: number;
32  }
33
```

<https://www.rfc-editor.org/rfc/rfc8628.txt>

Token Request

THE DEVELOPER'S CONFERENCE

```
55
56  export async function fetchAccessTokenByDeviceCode({
57    clientId, deviceCode, tokenUrl
58  }): Promise<AccessTokenResponse> {
59    const body = new URLSearchParams();
60
61    body.set('client_id', clientId);
62    body.set('grant_type', 'urn:ietf:params:oauth:grant-type:device_code');
63    body.set('device_code', deviceCode);
64
65    return fetch(tokenUrl, {
66      headers: { 'Content-Type': 'application/x-www-form-urlencoded;charset=UTF-8' },
67      body,
68      method: 'POST'
69    })
70      .then(handleOAuthErrorResponse)
71      .then(asJsonResponse);
72  }
```

<https://www.ietf.org/archive/id/draft-ietf-oauth-v2-1-08.html#section-4.1>

Error Response

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```
5
6   export interface OAuthErrorResponse {
7     error: string,
8     error_description?: string,
9     error_uri?: string,
10    state?: string
11  }
12
```

error
- slow_down
- authorization_pending

<https://www.rfc-editor.org/rfc/rfc8628.txt>

Token Response

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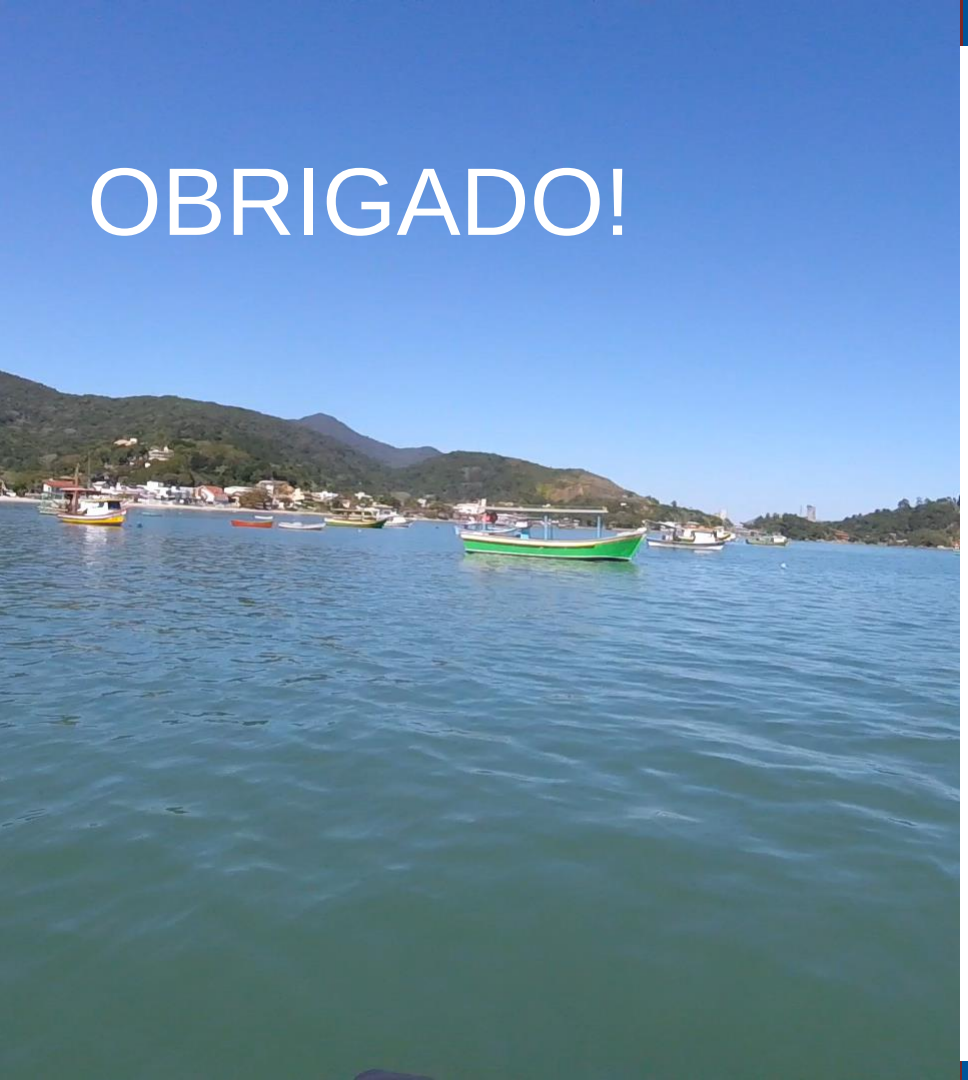
```
12
13  export interface AccessTokenResponse {
14    access_token: string,
15    refresh_token?: string,
16    token_type: string,
17    expires_in: number,
18    refresh_expires_in?: number,
19    scope?: string,
20    session_state?: string,
21    id_token?: string
22  }
23
```

<https://www.ietf.org/archive/id/draft-ietf-oauth-v2-1-08.html#section-4.1>

OBRIGADO!



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https://github.com/maxandriani/tdc-2023-oauth
https://twitter.com/maxandriani
https://www.instagram.com/maxandriani

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