(The sorry)

State of the Clients

Daniel Fett, IETF 113

There is a lack of good, modern, and universal OAuth client libraries.

- follows latest security recommendations
- feels native in the language/framework
- maintained and documented

- security features (PKCE!)
- asymmetric client authentication (MTLS?)
- OAuth 2.1? FAPI?

good, modern, universal

- not tailored towards specific vendors/APIs
- not limited to certain use cases
- configurable for various feature sets (ideally using server metadata)

Experience in Practice

There are some good libraries, but…

Experience in Practice

… most of the time: Custom implementations!

- Hard to point devs to good libraries
  - Lack of documentation/discoverability:
    - supported features set
    - client or server?
    - supported specifications
    - security recommendations followed or not?
  - Incomplete implementations (“it works for Sign-in with Google”)
  - Many unmaintained implementations

Lack of libraries → APIs need to provide request-level description of flow → “it’s just a few requests, I can implement that myself”

Experience in Practice

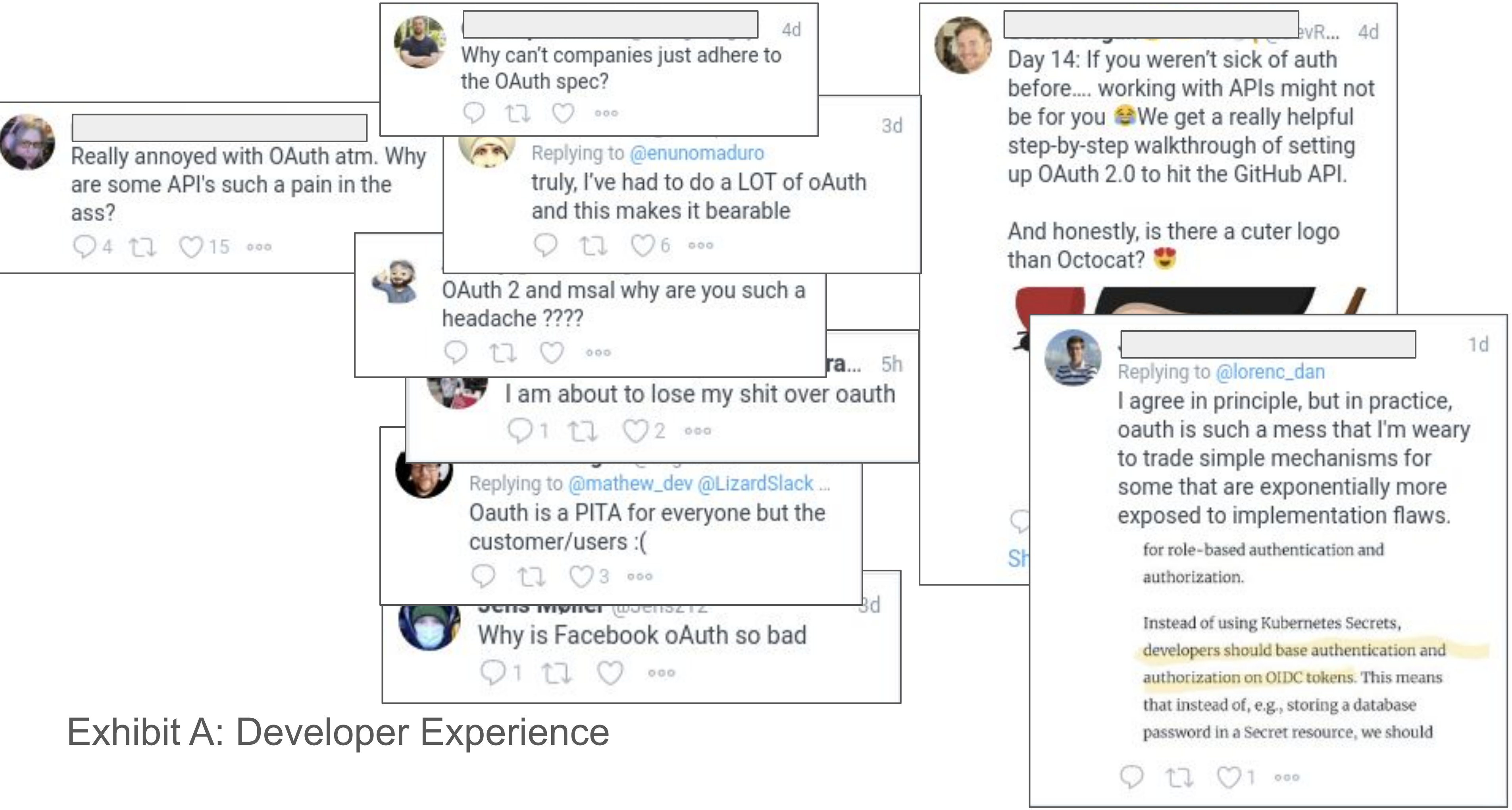
- *OAuth Configuration Hell™*
  Authz Endpoint URL? Token Endpoint URL? Userinfo Endpoint? Supported grant types? Client authentication? Security Mechanisms? …

  → without Server Metadata: Tedious process, reduced value in using libraries

The Consequences

The Consequences

- Unnecessary fragmentation
- Slow adaption of new specs
- Developer frustration
  - “several hours of research before implementing an OAuth integration”



[redacted] 4d
Why can't companies just adhere to the OAuth spec?

[redacted]
Really annoyed with OAuth atm. Why are some API's such a pain in the ass?
4 15

3d
Replying to @enunomaduro
truly, I've had to do a LOT of oAuth and this makes it bearable
6

OAuth 2 and msal why are you such a headache ????

ra... 5h
I am about to lose my shit over oauth
1 2

Replying to @mathew_dev @LizardSlack ...
Oauth is a PITA for everyone but the customer/users :(
3

3d
Why is Facebook oAuth so bad
1

[redacted] evR... 4d
Day 14: If you weren't sick of auth before.... working with APIs might not be for you 😂We get a really helpful step-by-step walkthrough of setting up OAuth 2.0 to hit the GitHub API.

And honestly, is there a cuter logo than Octocat? 😍

[redacted] 1d
Replying to @lorenc_dan
I agree in principle, but in practice, oauth is such a mess that I'm weary to trade simple mechanisms for some that are exponentially more exposed to implementation flaws.

for role-based authentication and authorization.

Instead of using Kubernetes Secrets, developers should base authentication and authorization on OIDC tokens. This means that instead of, e.g., storing a database password in a Secret resource, we should

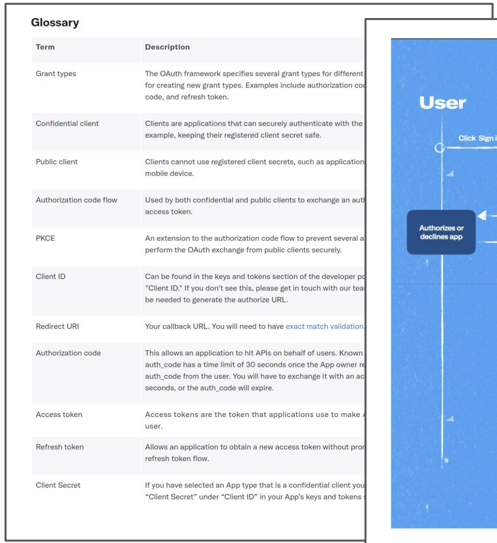
1

Exhibit A: Developer Experience

Time and Money

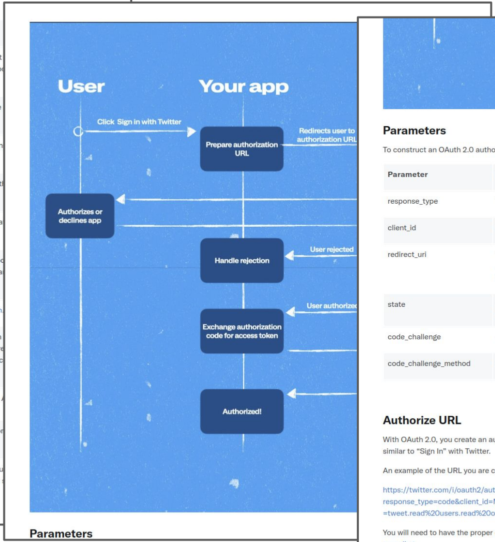
- Custom implementations are expensive
  - Some API providers maintain custom OAuth implementations in several languages
  - API providers need to explain OAuth and support developers
  - Trial and error for devs to figure out supported features of AS

E.g., twitter.com expects a fully custom implementation!

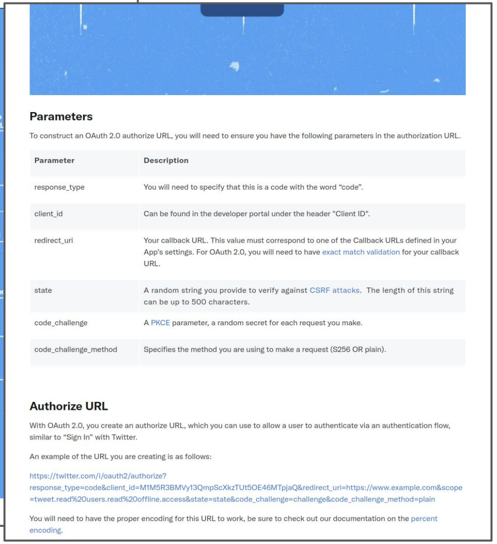


Glossary

Term	Description
Grant types	The OAuth framework specifies several grant types for different for creating new grant types. Examples include authorization co code, and refresh token.
Confidential client	Clients are applications that can securely authenticate with the example, keeping their registered client secret safe.
Public client	Clients cannot use registered client secrets, such as application mobile device.
Authorization code flow	Used by both confidential and public clients to exchange an aut access token.
PKCE	An extension to the authorization code flow to prevent several a perform the OAuth exchange from public clients securely.
Client ID	Can be found in the keys and tokens section of the developer po "Client ID." If you don't see this, please get in touch with our tea be needed to generate the authorize URL.
Redirect URI	Your callback URL. You will need to have exact match validation.
Authorization code	This allows an application to hit APIs on behalf of users. Known auth_code has a time limit of 30 seconds once the App owner re auth_code from the user. You will have to exchange it with an ac seconds, or the auth_code will expire.
Access token	Access tokens are the token that applications use to make user.
Refresh token	Allows an application to obtain a new access token without pro refresh token flow.
Client Secret	If you have selected an App type that is a confidential client you "Client Secret" under "Client ID" in your App's keys and tokens


User
Your app
Click Sign in with Twitter
Prepare authorization URL
Redirects user to authorization URL
Authorizes or declines app
User rejected
Handle rejection
User authorized
Exchange authorization code for access token
Authorized!

Parameters



Parameters

To construct an OAuth 2.0 authorize URL, you will need to ensure you have the following parameters in the authorization URL.

Parameter	Description
response_type	You will need to specify that this is a code with the word "code".
client_id	Can be found in the developer portal under the header "Client ID".
redirect_uri	Your callback URL. This value must correspond to one of the Callback URLs defined in your App's settings. For OAuth 2.0, you will need to have exact match validation for your callback URL.
state	A random string you provide to verify against CSRF attacks. The length of this string can be up to 500 characters.
code_challenge	A PKCE parameter, a random secret for each request you make.
code_challenge_method	Specifies the method you are using to make a request (S256 OR plain).

Authorize URL

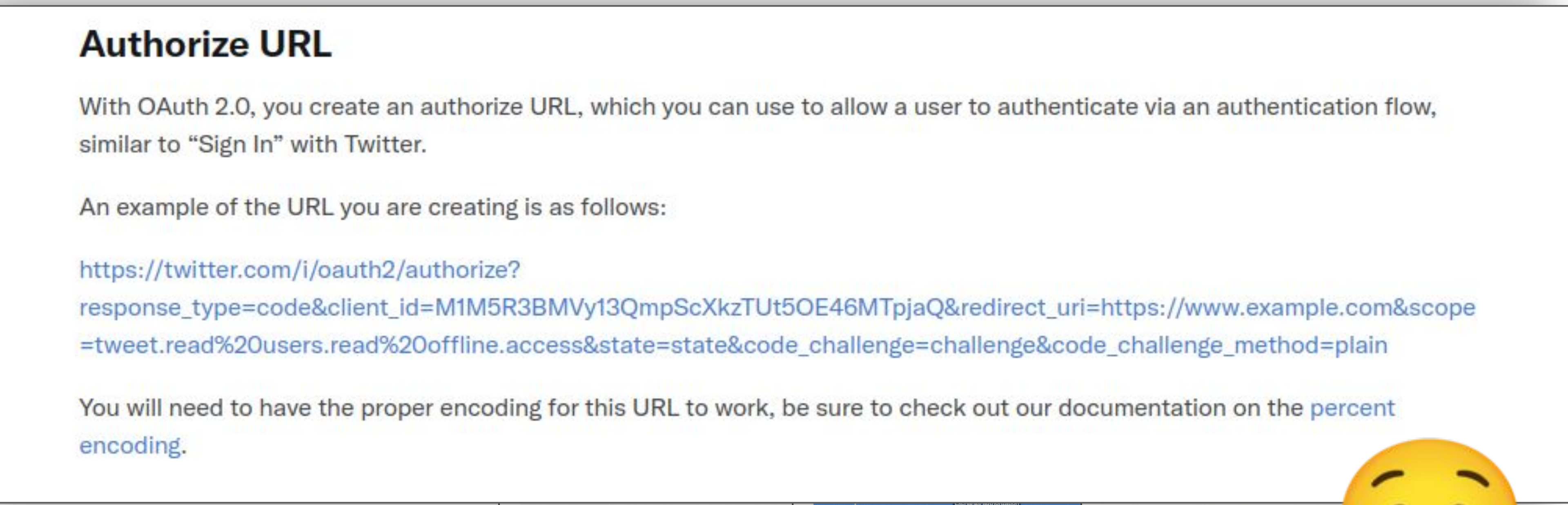
With OAuth 2.0, you create an authorize URL, which you can use to allow a user to authenticate via an authentication flow, similar to "Sign In" with Twitter.

An example of the URL you are creating is as follows:

https://twitter.com/i/oauth2/authorize?response_type=code&client_id=M1M5R3BMVy13QmpScXkzTUt5OE46MTpjaQ&redirect_uri=https://www.example.com&scope=tweet.read%20users.read%20offline.access&state=state&code_challenge=challenge&code_challenge_method=plain

You will need to have the proper encoding for this URL to work, be sure to check out our documentation on the percent encoding.

Time and Money



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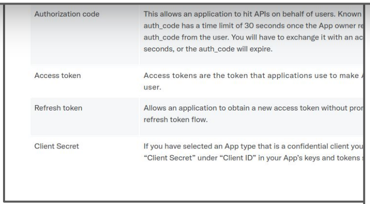

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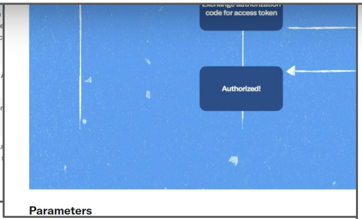

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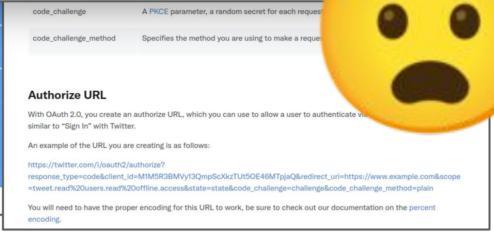

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Security

- Custom implementations are bad for security
  - Many opportunities for hidden security problems in custom implementations
  - New security recommendations are not likely to be implemented
  - Known anti-patterns are repeated
  - New security mechanisms are hard to implement

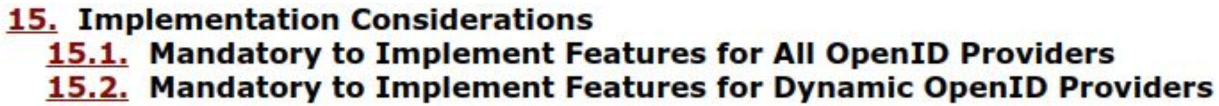
- [Li et al., 2014]
  60 chinese clients, **more than half** vulnerable to CSRF
- [Yang et al., 2016]
  Out of 405 clients, **55%** do not handle `state` (CSRF protection) correctly
- [Shebab et al., 2015]
  25% of OAuth clients in Alexa Top 10000 vulnerable to CSRF
- [Chen et al., 2014]
  89 of 149 mobile clients vulnerable to one or more attacks
- [Wang et al., 2013]
  Vulnerabilities in Facebook PHP SDK and other OAuth SDKs
- [Sun et al., 2012]
  96 Clients, **almost all** vulnerable to one or more attacks

Let’s discuss solutions!

Proposal 1: Set a Goal

There should be defined levels of support for OAuth libraries.

- Based upon existing profiles and specs, like OAuth 2.1 or FAPI 2.0
- Or other profiles, like in OpenID Connect (+ some security requirements):



15. Implementation Considerations
15.1. Mandatory to Implement Features for All OpenID Providers
15.2. Mandatory to Implement Features for Dynamic OpenID Providers

→ Provide library developers with a clear set of features to support in order to achieve interoperability.

Proposal 2: Make Metadata Mandatory

OAuth Server Metadata [RFC8414]

- enables libraries to automatically configure themselves, including
  - security mechanisms,
  - endpoints,
  - supported grant types,
- thereby drastically reducing development time and cost for clients,
- increasing the value of using libraries, and
- increasing adoption of new security features.

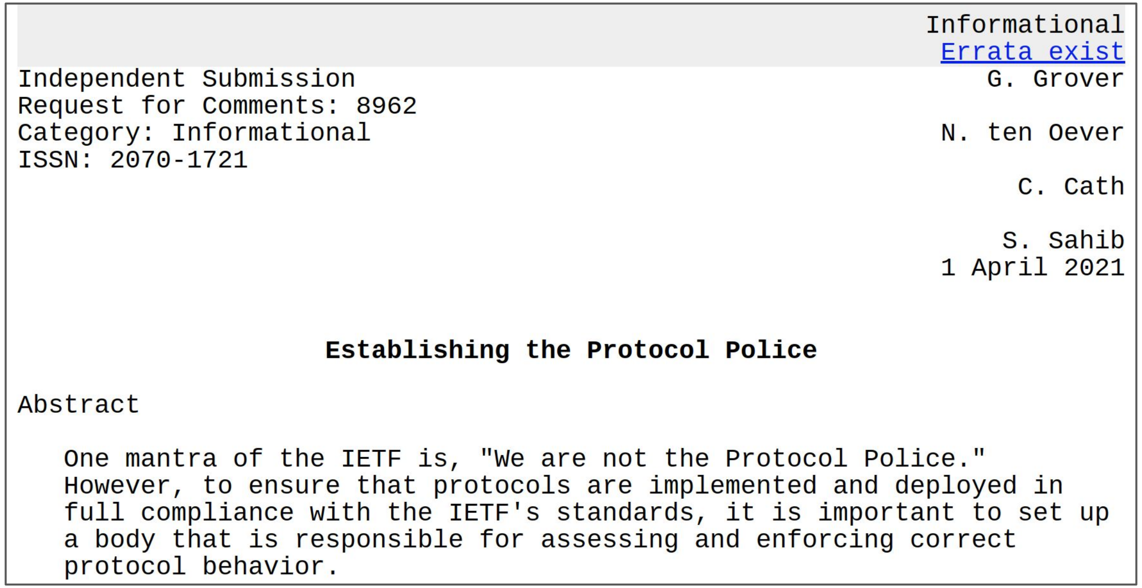
It should be mandatory in OAuth 2.1 and should be expected in any new OAuth ecosystem.

Proposal 3: Conformance Tests

Based upon defined profiles, provide conformance tests.

Who could do that?

Who would finance that?



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                    Establishing the Protocol Police

Abstract

   One mantra of the IETF is, "We are not the Protocol Police."
   However, to ensure that protocols are implemented and deployed in
   full compliance with the IETF's standards, it is important to set up
   a body that is responsible for assessing and enforcing correct
   protocol behavior.
```

Other ideas?

The End.