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# OAuth for IXP Operators

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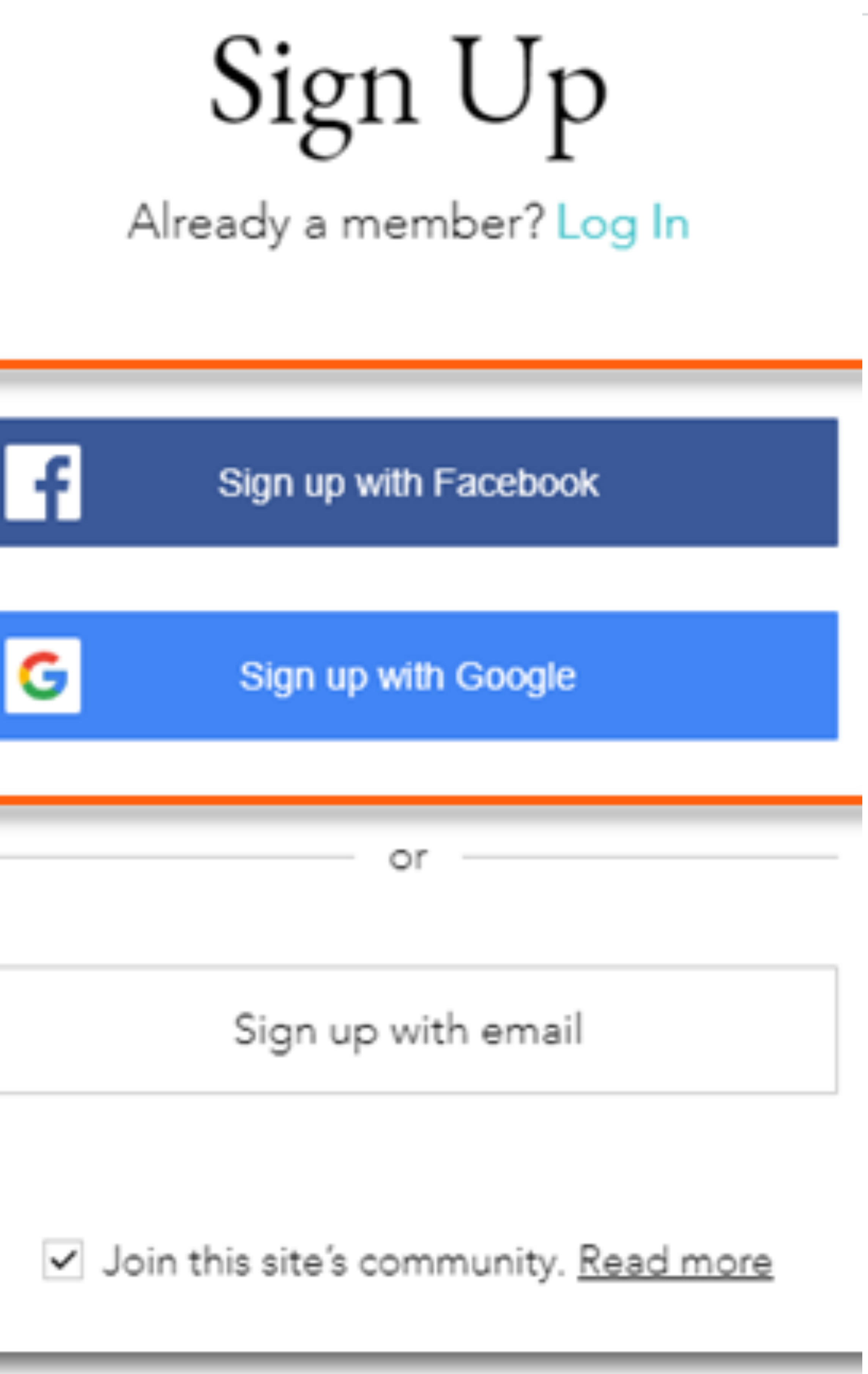
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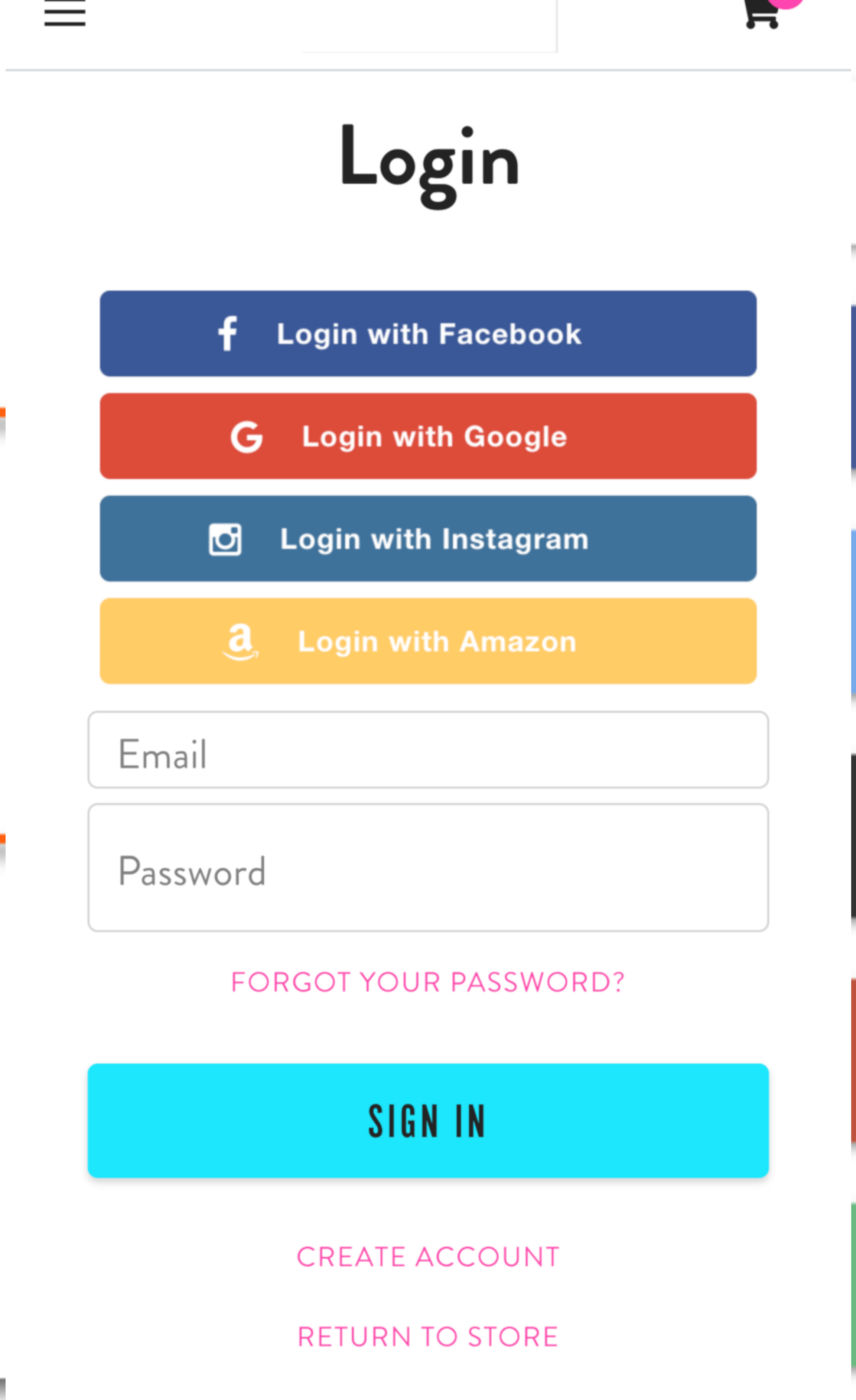
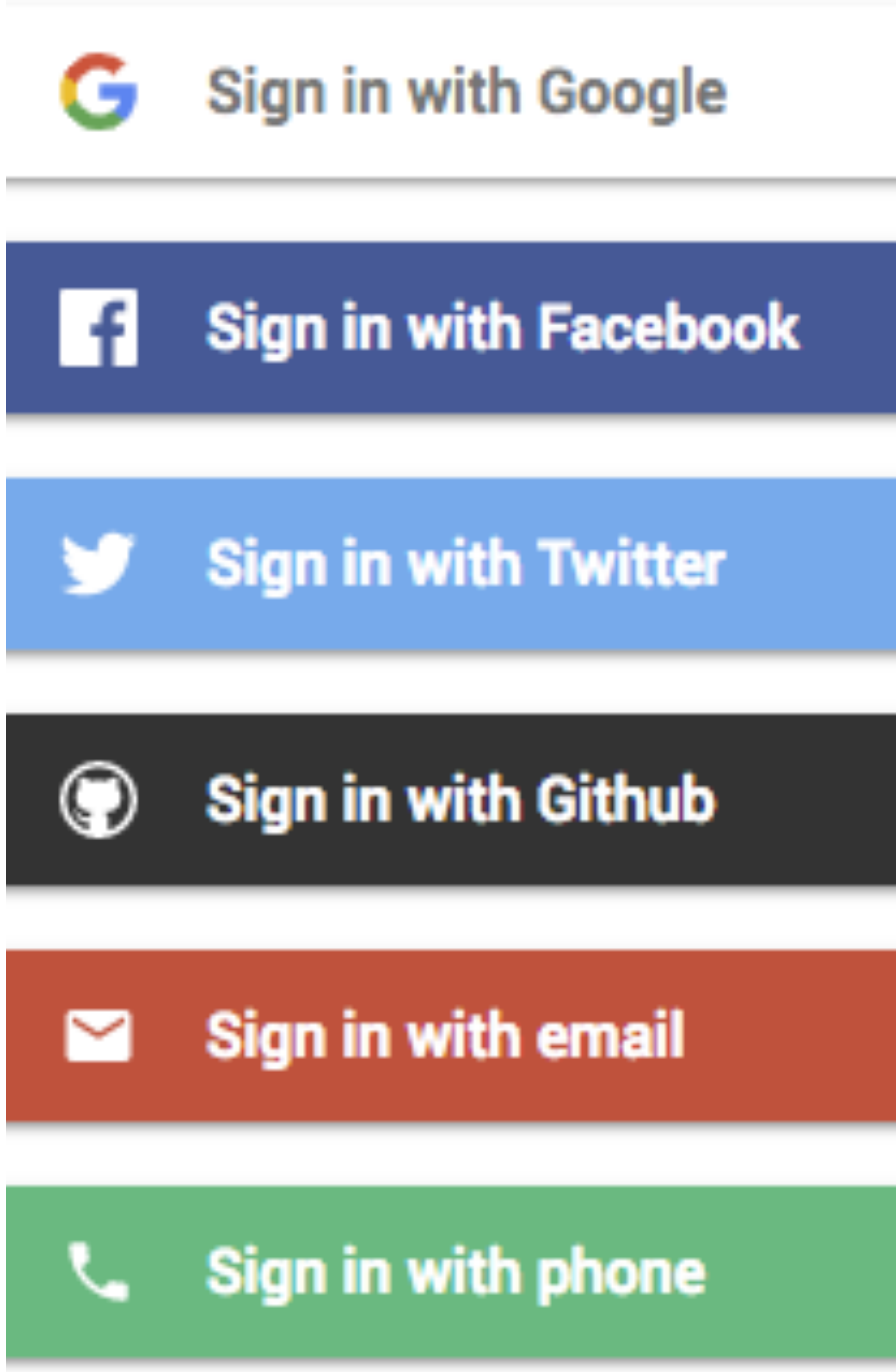

Login
Login with Facebook
Login with Google
Login with Instagram
Login with Amazon
Email
Password
FORGOT YOUR PASSWORD?
SIGN IN
CREATE ACCOUNT
RETURN TO STORE


Sign in with Google
Sign in with Facebook
Sign in with Twitter
Sign in with Github
Sign in with email
Sign in with phone

An **open protocol** to allow **secure authorization** in a **simple** and **standard** method from web, mobile and desktop applications.

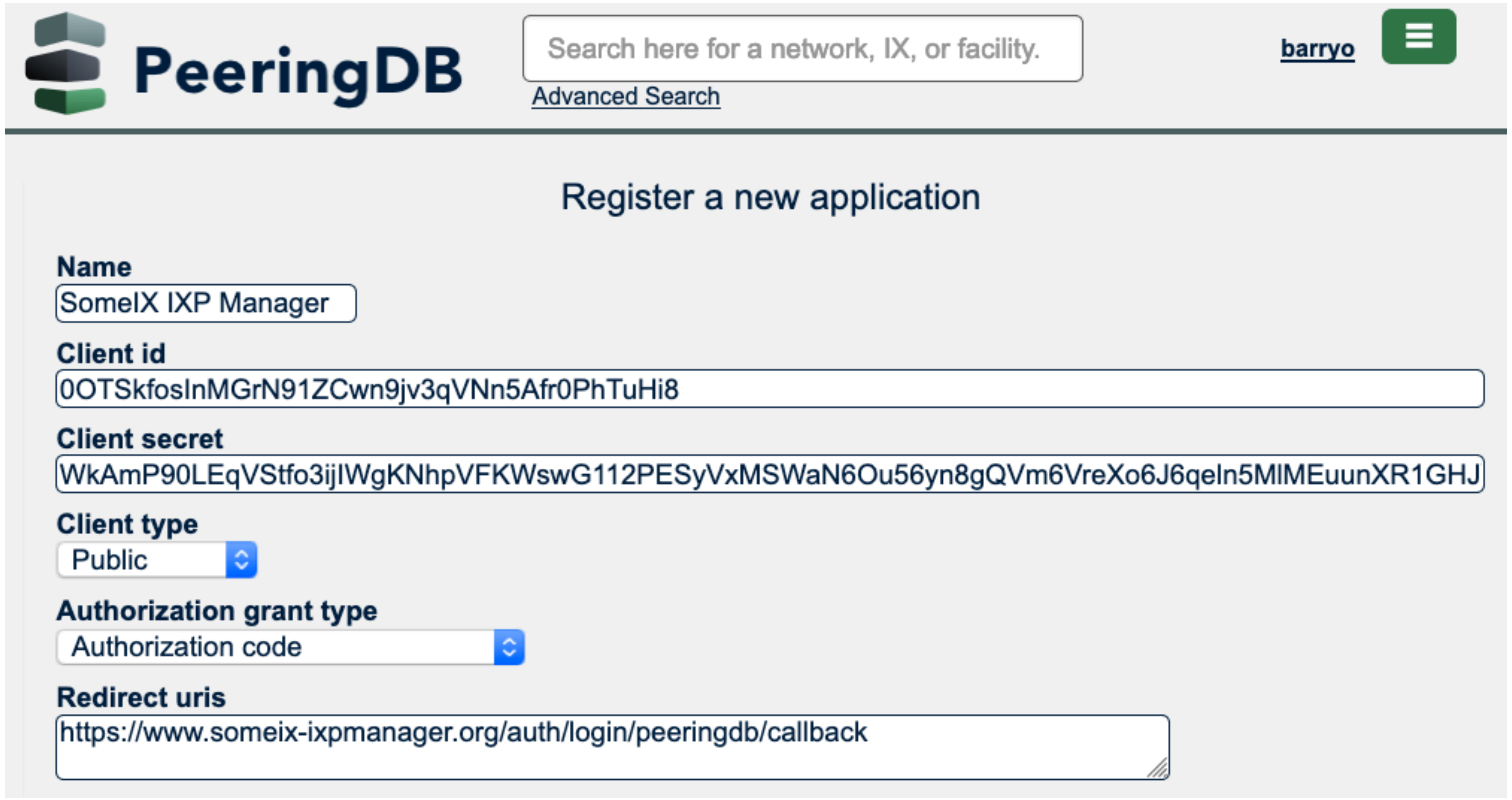
— *OAuth 2.0 Definition*

## Why is this relevant for IXP operators?

# OAuth 2.0 Roles

- The **resource owner** is the *user* - you and I.
- The **client** is the *third party application* looking for access to the *user's* account.
- The **authorization server** is that which presents the interface for the *user* to approve / deny access to the *client*.
- The **resource server** is the API server used to access the *user's* information *(often the same as the authorization server)*.

# OAuth 2.0 - IDs, Secrets and URLs



Register a new application

**Name**
SomeIX IXP Manager

**Client id**
0OTSkfosInMGrN91ZCwn9jv3qVNn5Afr0PhTuHi8

**Client secret**
WkAmP90LEqVStfo3ijIWgKNhpVFKWswG112PESyVxMSWaN6Ou56yn8gQVm6VreXo6J6qeln5MIMEuunXR1GHJ

**Client type**
Public

**Authorization grant type**
Authorization code

**Redirect uris**
https://www.someix-ixpmanager.org/auth/login/peeringdb/callback

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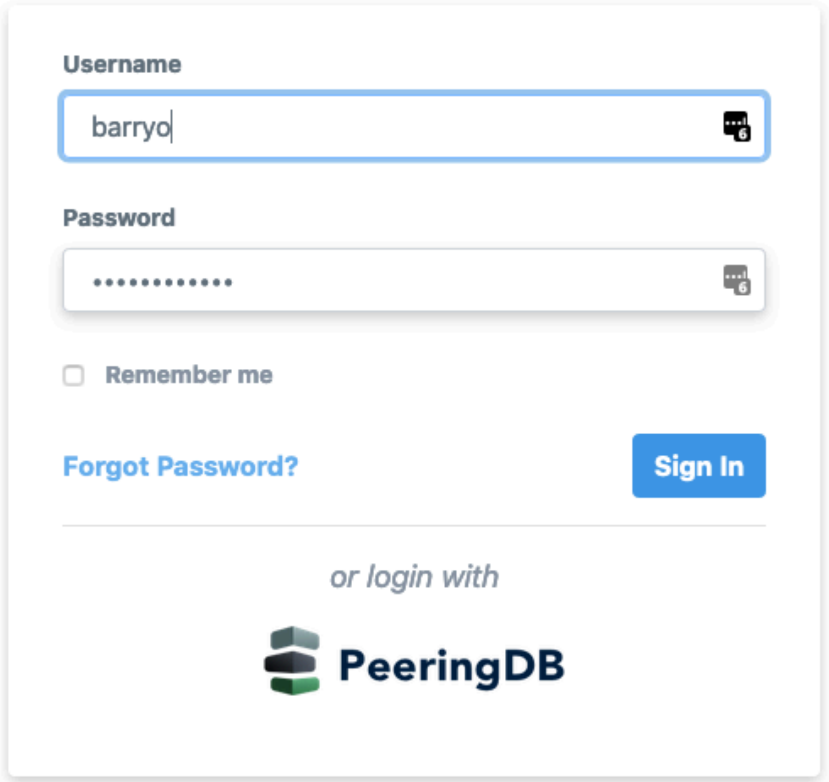
# Example OAuth Authorization Process

Let's look at IXP Manager with PeeringDB.



- What happens if we click on *Login with PeeringDB*?

# Example OAuth Authorization Process

*User* clicks on *Login with PeeringDB* [1]:

1. HTTP GET request to *client* [2]: `/auth/login/peeringdb`

2. Returns a HTTP redirect response to send the *user* to [3]:

```
https://auth.peeringdb.com/oauth2/authorize/
    ?response_type=code
    &client_id=CLIENT_ID
    &redirect_uri=REDIRECT_URI
    &scope=profile+email+networks
    &state=1234zyx
```

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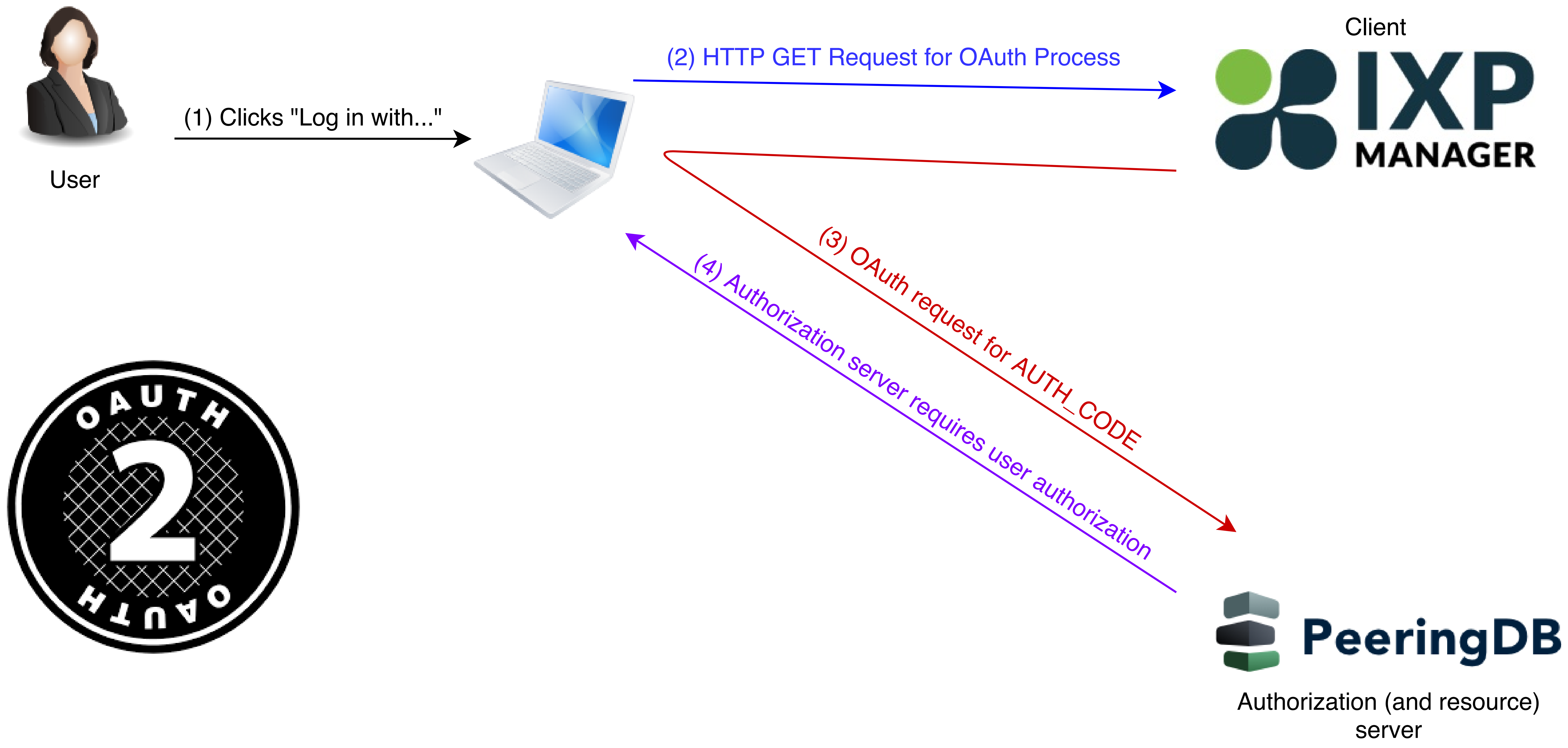
User
(1) Clicks "Log in with..."
(2) HTTP GET Request for OAuth Process
Client
IXP MANAGER
(3) OAuth request for AUTH_CODE
(4) Authorization server requires user authorization
PeeringDB
Authorization (and resource) server
OAUTH 2 OAUTH

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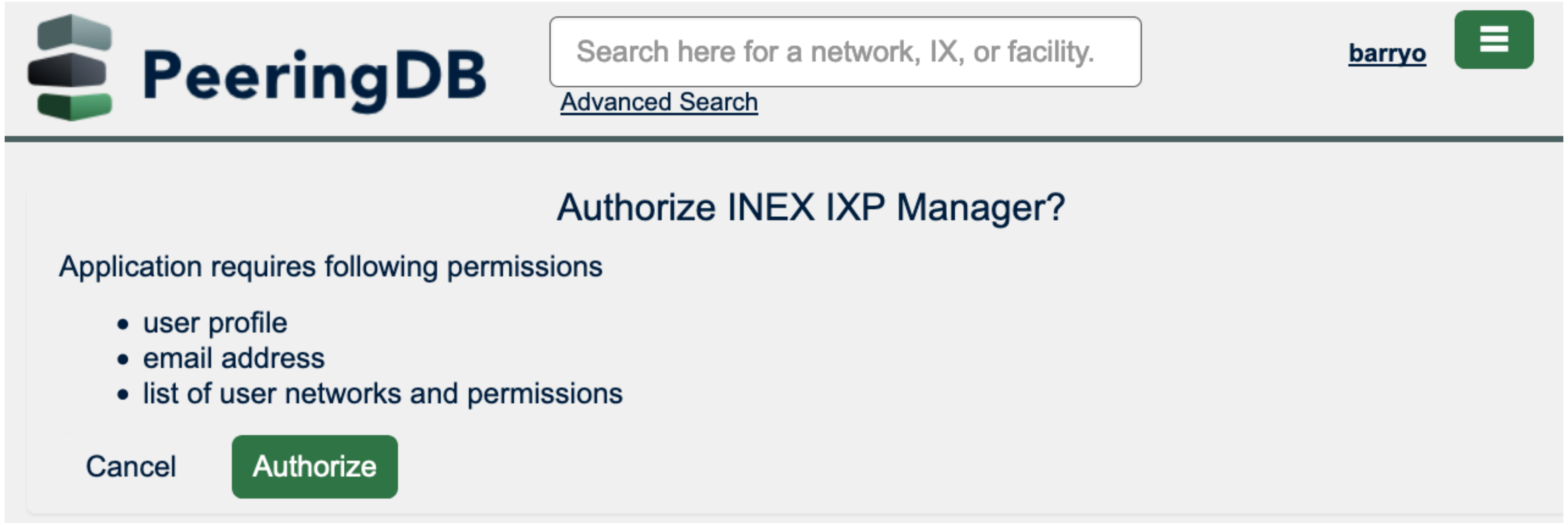
# Example OAuth Authorization Process



Authorize INEX IXP Manager?

Application requires following permissions

- user profile
- email address
- list of user networks and permissions

Asked to authorize **INEX's** IXP Manager [4].
*(And note the requested scopes)*

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# Example OAuth Authorization Process

If the *user* clicks authorize [5], the authorization service redirects back via the (verified) redirect URL [6] with an authorization code:

```
https://www.someix-ixpmanager/auth/login/peeringdb/callback
            ?code=AUTH_CODE
            &state=1234zyx
```

1. Use of SSL mandatory.

2. Redirect URL must match what was registered for the *client*.

3. Client must compare received state to what was sent.

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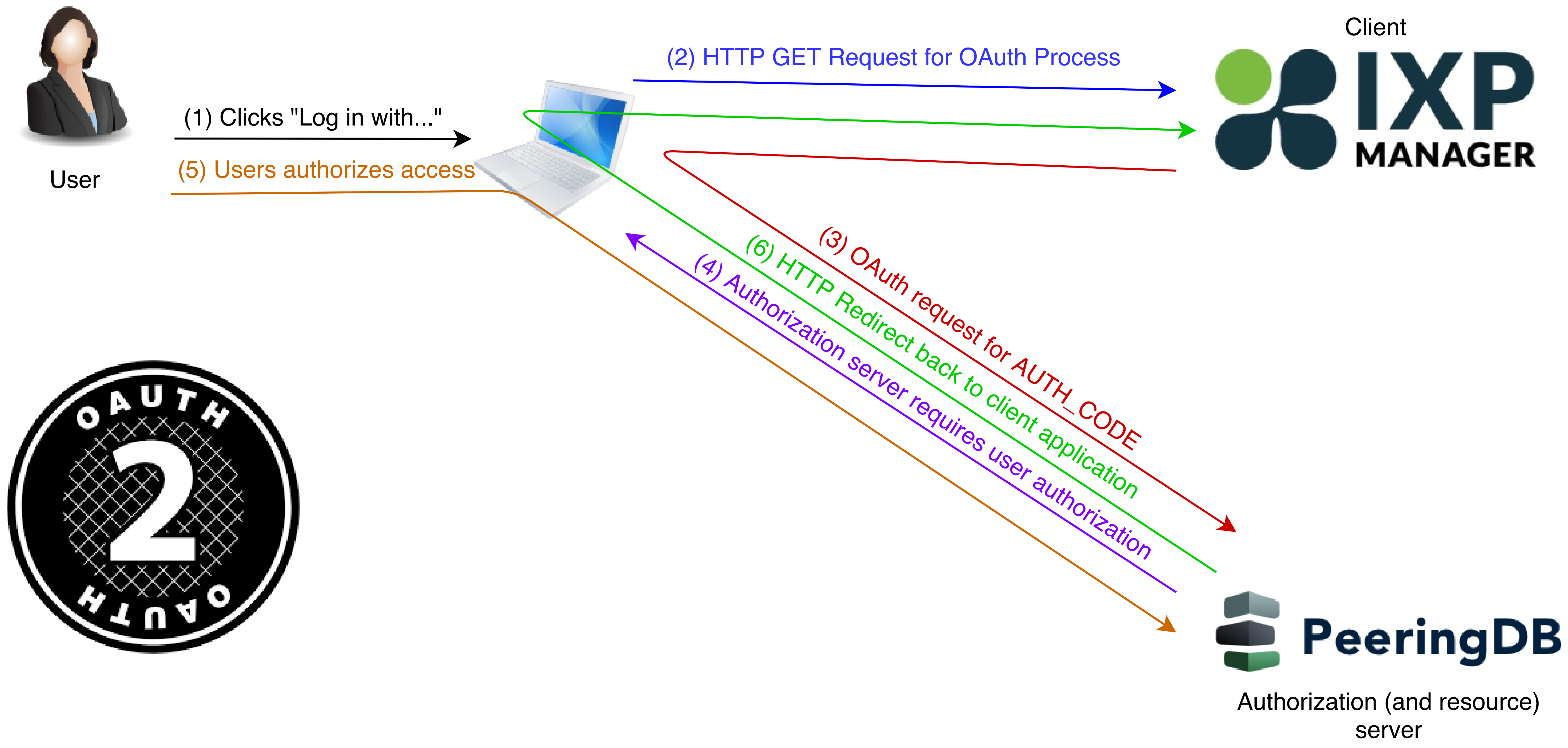
User
(1) Clicks "Log in with..."
(5) Users authorizes access
(2) HTTP GET Request for OAuth Process
Client
IXP MANAGER
(3) OAuth request for AUTH_CODE
(6) HTTP Redirect back to client application
(4) Authorization server requires user authorization
PeeringDB
Authorization (and resource) server
OAUTH 2

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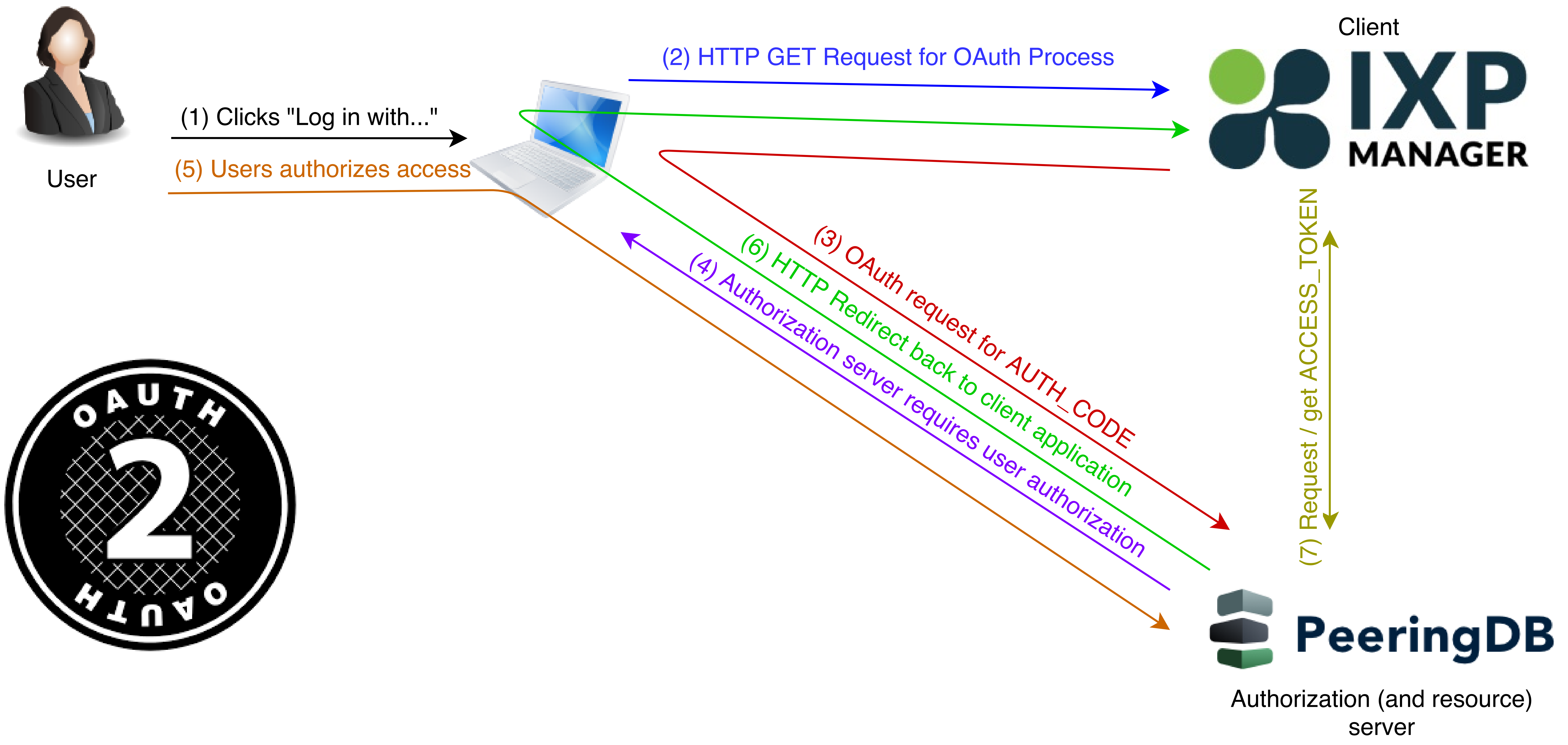
## Example OAuth Authorization Process

In the background, the *client* now uses the `code=AUTH_CODE` received to get an access token via a POST request to the *authorization server* [7].

```
https://auth.peeringdb.com/oauth2/token/
    ?grant_type=authorization_code
    &code=AUTH_CODE
    &redirect_uri=REDIRECT_URI
    &client_id=CLIENT_ID
    &client_secret=CLIENT_SECRET
```



Client
User
(1) Clicks "Log in with..."
(5) Users authorizes access
(2) HTTP GET Request for OAuth Process
IXP MANAGER
(3) OAuth request for AUTH_CODE
(6) HTTP Redirect back to client application
(4) Authorization server requires user authorization
(7) Request / get ACCESS_TOKEN
PeeringDB
Authorization (and resource) server

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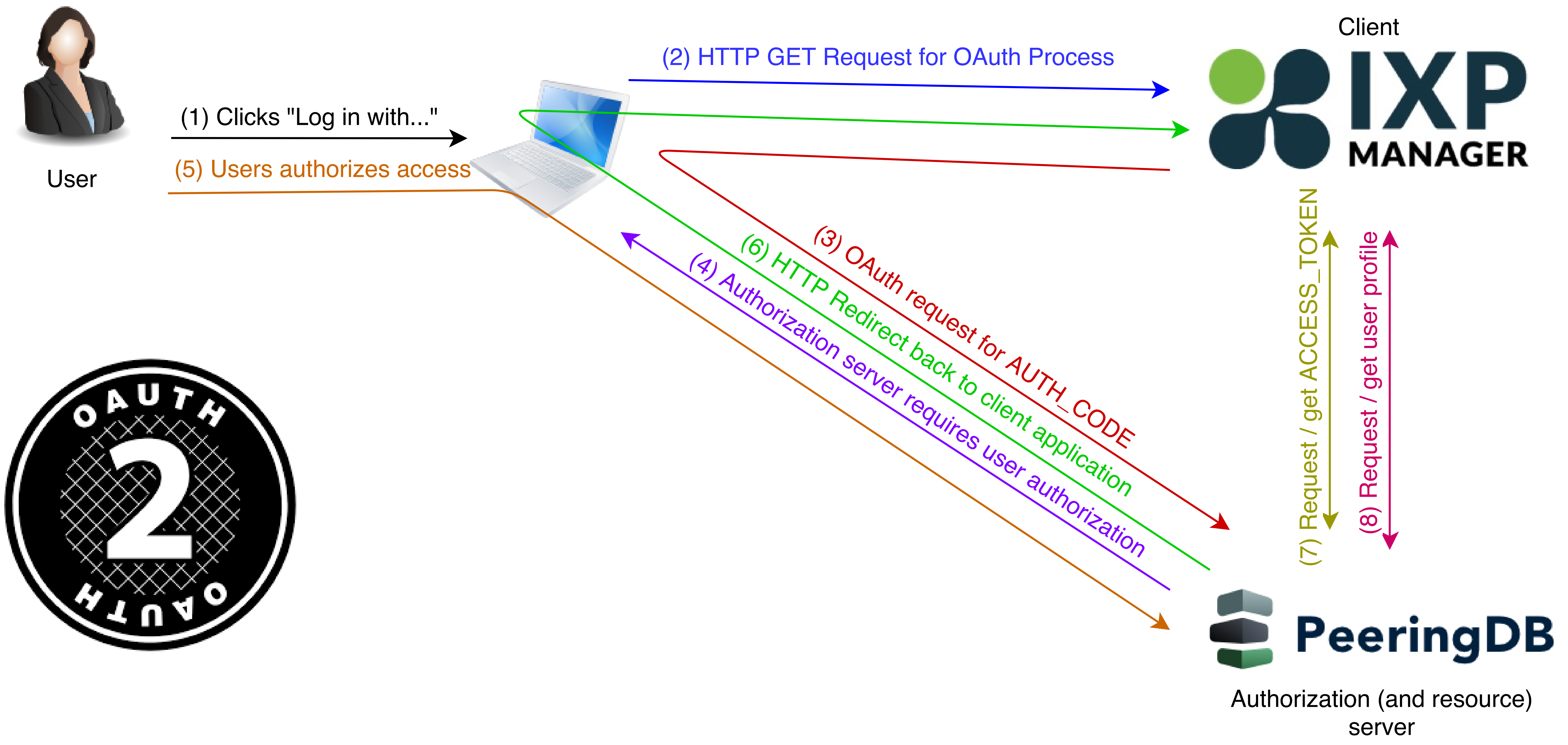
## Example OAuth Authorization Process

Once the *client* has an *access token*, it can request *user* information with the *scope(s)* that it has been authorized for via HTTP GET [8].

```
https://auth.peeringdb.com/profile/v1


HTTP Headers:
    Authorization: Bearer ACCESS_TOKEN
```



User
(1) Clicks "Log in with..."
(5) Users authorizes access
(2) HTTP GET Request for OAuth Process
Client
IXP MANAGER
(3) OAuth request for AUTH_CODE
(6) HTTP Redirect back to client application
(4) Authorization server requires user authorization
(7) Request / get ACCESS_TOKEN
(8) Request / get user profile
OAUTH 2 OAUTH
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Authorization (and resource) server

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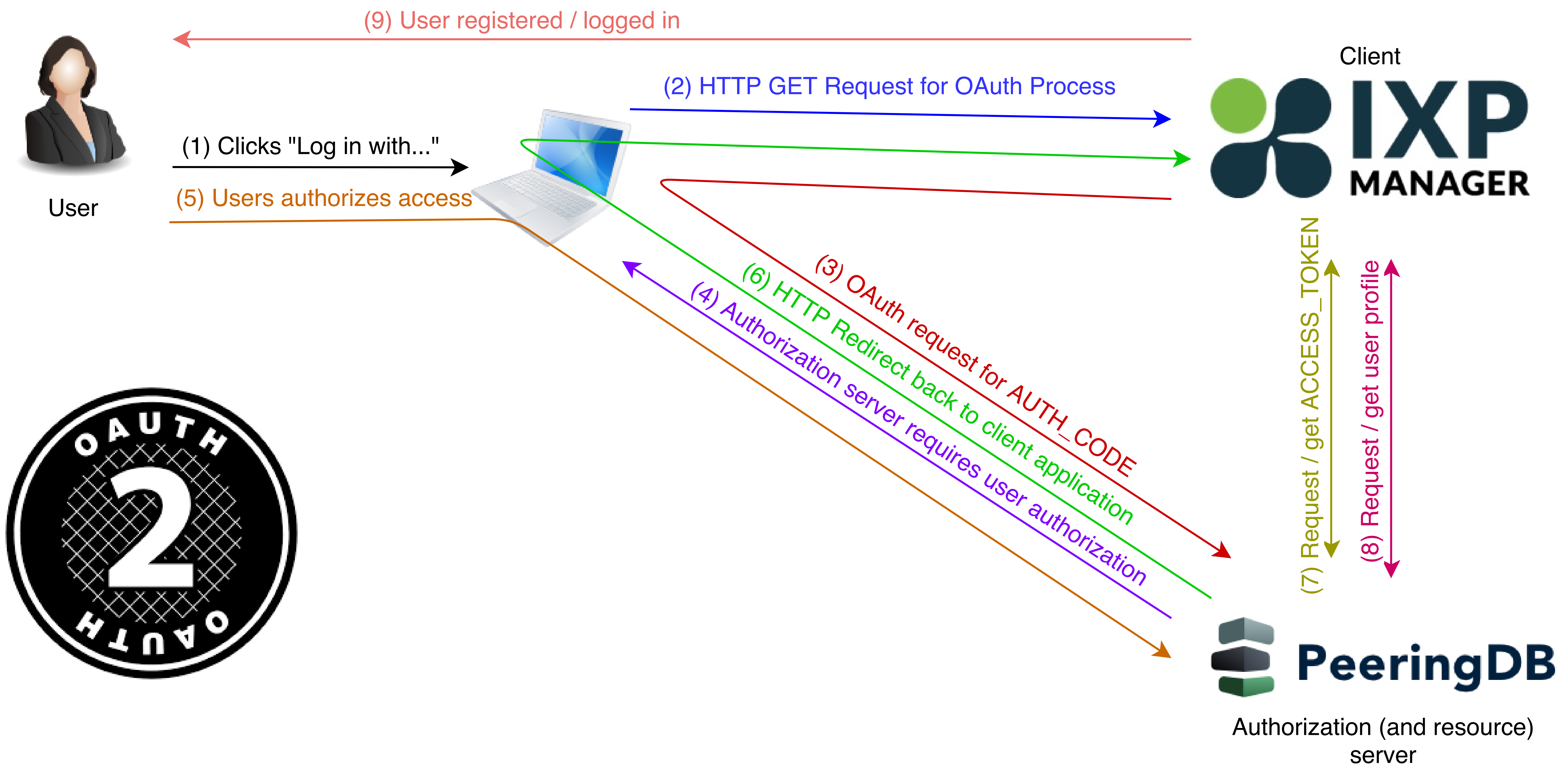

(9) User registered / logged in
Client
(2) HTTP GET Request for OAuth Process
IXP MANAGER
(1) Clicks "Log in with..."
User
(5) Users authorizes access
(3) OAuth request for AUTH_CODE
(6) HTTP Redirect back to client application
(4) Authorization server requires user authorization
(7) Request / get ACCESS_TOKEN
(8) Request / get user profile
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## Example OAuth Authorization Process

**Remember, from a *user* perspective, this is usually two clicks.**

1. **Click *Login with PeeringDB*** [1]
   - browser gets redirected to PeeringDB asking for *user* permission [2,3,4].
2. **Grant permission** [5]
   - browser gets redirected back to client from authorization server [6]
   - client receives `AUTH_CODE` which is exchanges for an `ACCESS_TOKEN` [6,7]
   - client uses `ACCESS_TOKEN` to get user information [8]
   - client creates and/or logs user in
3. User logged into client application. [9]

# Sample User Profile from PeeringDB

```
{
  "id": 9999,
  "name": "Barry O'Donovan",
  "given_name": "Barry",
  "family_name": "O'Donovan",
  "email": "barry.odonovan@inex.ie",
  "verified_user": true,
  "verified_email": true,
  "networks": [
    {
      "perms": 15, "asn": 65500, "name": "Acme Net", "id": 9999
    }, {
      "perms": 15, "asn": 65501, "name": "Example Net", "id": 9998
    }
  ]
}
```

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# IXP Manager Verification (1/2)

How does IXP Manager validate & use user detail from PeeringDB?

- data structure okay (user details present, network(s) present)?
- user has `verified_user` and `verified_email` with PeeringDB?
- at least one of the networks are IX members?
- load (by PeeringDB ID) or create user object in IXP Manager
- created user is a read-only user by default

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# IXP Manager Verification (2/2)

- remove any user/network associations in IXP Manager that previously came from PeeringDB but are no longer present in the new PeeringDB network list
- add any new user/network associations (only if a *normal peering network* that is current, connected and hasn't requested PeeringDB OAuth be disabled for them)

Then either:

- if no user/network associations at end of process, delete user;
- otherwise log user in.

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## Do We Trust PeeringDB?

## So Do We Trust PeeringDB?

This is a reasonably small industry where the significant human actors are well known.

So yes, we trust PeeringDB 😄

## What Are the Risks?

1. OAuth protocol is well understood, widely used and sound.
2. IXP Manager and PeeringDB use well established libraries for OAuth server / client.
3. Implementation issues?

## What's the Exposure

To my mind, not a lot:

- Port details, IP addressing, NOC details (available via IX-F Export, PeeringDB, IX website)
- Traffic graphs, peer to peer graphs
- Again, read-only access by default
- Again, absolutely no superadmin access via OAuth

## INEX's Experience with PeeringDB OAuth

- Launched August 29th, 2019
- 26 new users created since
  - 17 via PeeringDB, 2 by member admins, 5 by ops team
  - i.e. 65% of new users required no other actor
- Feedback has been 100% positive
  - no member has requested an opt-out

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## IXP Manager Support

- Released in IXP Manager v5.2.0 on September 20th
- Enabling PeeringDB OAuth is really easy[1]:

1. Register your IXP Manager instance as an OAuth application on PeeringDB.
2. Add configuration elements to `.env`:

```
AUTH_PEERINGDB_ENABLED=true
PEERINGDB_OAUTH_CLIENT_ID="xxx"
PEERINGDB_OAUTH_CLIENT_SECRET="xxx"
PEERINGDB_OAUTH_REDIRECT="https://www.my-ixpmanager-url.com/auth/login/peeringdb/callback"
```

[1] https://docs.ixpmanager.org/features/peeringdb-oauth/

## References

- IXP Manager documentation for enabling PeeringDB Oauth
- PeeringDB OAuth 2.0 Documentation
- OAuth 2.0 Community Site, rfc6749, rfc6750, rfc6819
- OAuth 2 Simplified - excellent blog post.
- Laravel Socialite and Laravel Passport (via oauth2-server)
- Python Django Oauth Toolkit (via OAuthLib)

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THANK YOU

## Any Questions?