FastHTML

Explanations > OAuth

OAuth

OAuth is an open standard for ‘access delegation’, commonly used as a way for Internet users to grant websites or applications access to their information on other websites but without giving them the passwords. It is the mechanism that enables “Log in with Google” on many sites, saving you from having to remember and manage yet another password. Like many auth-related topics, there’s a lot of depth and complexity to the OAuth standard, but once you understand the basic usage it can be a very convenient alternative to managing your own user accounts.

On this page you’ll see how to use OAuth with FastHTML to implement some common pieces of functionality.

In FastHTML you set up a client like `GoogleAppClient`. The client is responsible for storing the client ID and client secret, and for handling the OAuth flow. Let’s run through three examples, illustrating some important concepts across three different OAuth providers.

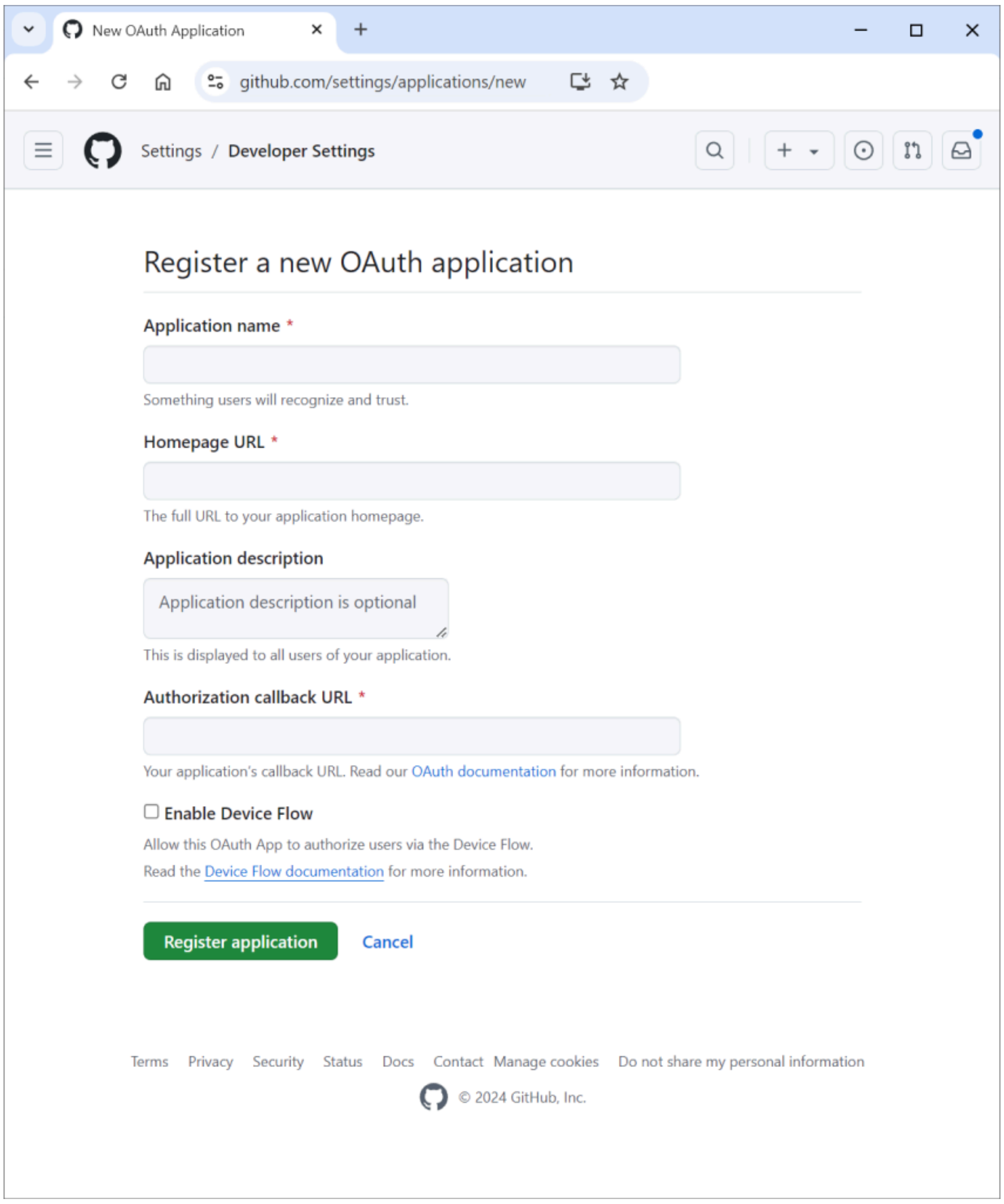
A Minimal Login Flow (GitHub)

Let’s begin by building a minimal ‘Sign in with GitHub’ flow. This will demonstrate the basic steps of OAuth.

OAuth requires a “provider” (in this case, GitHub) to authenticate the user. So the first step when setting up our app is to register with GitHub to set things up.

Go to https://github.com/settings/developers and click “New OAuth App”. Fill in the form with the following values, then click ‘Register application’.

- Application name: Your app name
- Homepage URL: http://localhost:8000 (or whatever URL you’re using - you can change this later)
- Authorization callback URL: http://localhost:8000/auth_redirect (you can modify this later too)


New OAuth Application
github.com/settings/applications/new
Settings / Developer Settings

Register a new OAuth application

Application name *

Something users will recognize and trust.

Homepage URL *

The full URL to your application homepage.

Application description

Application description is optional

This is displayed to all users of your application.

Authorization callback URL *

Your application's callback URL. Read our OAuth documentation for more information.

☐ Enable Device Flow

Allow this OAuth App to authorize users via the Device Flow.
Read the Device Flow documentation for more information.

Register application
Cancel
Terms Privacy Security Status Docs Contact Manage cookies Do not share my personal information
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After you register, you'll see a screen where you can view the client ID and generate a client secret. Store these values in a safe place. You'll use them to create a `GitHubAppClient` object in FastHTML.

This `client` object is responsible for handling the parts of the OAuth flow which depend on direct communication between your app and GitHub, as opposed to interactions which go through the user's browser via redirects.

Here is how to setup the client object:

```
client = GitHubAppClient(
    client_id="your_client_id",
    client_secret="your_client_secret"
)
```

You should also save the path component of the authorization callback URL which you provided on registration.

This route is where GitHub will redirect the user's browser in order to send an authorization code to your app. You should save only the URL's path component rather than the entire URL because you want your code to work automatically in deployment, when the host and port part of the URL change from `localhost:8000` to your real DNS name.

Save the special authorization callback path under an obvious name:

```
auth_callback_path = "/auth_redirect"
```

Note

It's recommended to store the client ID, and secret, in environment variables, rather than hardcoding them in your code.

When the user visit a normal page of your app, if they are not already logged in, then you'll want to redirect them to your app's login page, which will live at the `/login` path. We accomplish that by using this piece of "beforeware", which defines logic which runs before other work for all routes except ones we specify to be skipped:

```
def before(req, session):
    auth = req.scope['auth'] = session.get('user_id', None)
    if not auth: return RedirectResponse('/login', status_code=303)
    counts.xtra(name=auth)
bware = Beforeware(before, skip=['/login', auth_callback_path])
```

We configure the beforeware to skip `/login` because that's where the user goes to login, and we also skip the special authorization callback path because that is used by OAuth itself to receive information from GitHub.

It's only at your login page that we start the OAuth flow. To start the OAuth flow, you need to give the user a link to GitHub's login for your app. You'll need the `client` object to generate that link, and the client object will in turn need the full authorization callback URL, which we need to build from the authorization callback path, so it is a multi-step process to produce this GitHub login link.

Here is an implementation of your own `/login` route handler. It generates the GitHub login link and presents it to the user:

```
@app.get('/login')
def login(request)
    redir = redir_url(request,auth_callback_path)
    login_link = client.login_link(redir)
    return P(A('Login with GitHub', href=login_link))
```

Once the user follows that link, GitHub will ask them to grant permission to your app to access their GitHub account. If they agree, GitHub will redirect them back to your app's authorization callback URL, carrying an authorization code which your app can use to generate an access token. To receive this code, you need to set up a route in FastHTML that listens for requests at the authorization callback path. For example:

```
@app.get(auth_callback_path)
def auth_redirect(code:str):
    return P(f"code: {code}")
```

This authorization code is temporary, and is used by your app to directly ask the provider for user information like an access token.

To recap, you can think of the exchange so far as:

- User to us: “I want to log in with you, app.”
- Us to User: “Okay but first, here’s a special link to log in with GitHub”
- User to GitHub: “I want to log in with you, GitHub, to use this app.”
- GitHub to User: “OK, redirecting you back to the app’s URL (with an auth code)”
- User to Us: “Hi again, app. Here’s the GitHub auth code you need to ask GitHub for info about me” (delivered via `/auth_redirect?code=...`)

The final steps we need to implement are as follows:

- Us to GitHUb: “A user just gave me this auth code. May I have the user info (e.g., an access token)?”
- GitHub to us: “Since you have an auth code, here’s the user info”

It’s critical for us to derive the user info from the auth code immediately in the authorization callback, because the auth code may be used only once. So we use it that once in order to get information like an access token, which will remain valid for longer.

To go from the auth code to user info, you use `info = client.retr_info(code,redirect_uri)`. From the user info, you can extract the `user_id`, which is a unique identifier for the user:

```
@app.get(auth_callback_path)
def auth_redirect(code:str, request):
    redir = redir_url(request, auth_callback_path)
    user_info = client.retr_info(code, redir)
    user_id = info[client.id_key]
    return P(f"User id: {user_id}")
```

But we want the user ID not to print it but to remember the user.

So let us store it in the `session` object, to remember who is logged in:

```
@app.get(auth_callback_path)
def auth_redirect(code:str, request, session):
    redir = redir_url(request, auth_callback_path)
    user_info = client.retr_info(code, redir)
    user_id = user_info[client.id_key] # get their ID
    session['user_id'] = user_id # save ID in the session
    return RedirectResponse('/', status_code=303)
```

The session object is derived from values visible to the user’s browser, but it is cryptographically signed so the user can’t read it themselves. This makes it safe to store even information we don’t want to expose to the user.

For larger quantities of data, we’d want to save that information in a database and use the session to hold keys to lookup information from that database.

Here’s a minimal app that puts all these pieces together. It uses the user info to get the user_id. It stores that in the session object. It then uses the user_id as a key into a database, which tracks how frequently every user has hit an increment button.

```python
import os
from fasthtml.common import *
from fasthtml.oauth import GitHubAppClient, redir_url

db = database('data/counts.db')
counts = db.t.counts
if counts not in db.t: counts.create(dict(name=str, count=int), pk='name')
Count = counts.dataclass()

# Auth client setup for GitHub
client = GitHubAppClient(os.getenv("AUTH_CLIENT_ID"),
                         os.getenv("AUTH_CLIENT_SECRET"))
auth_callback_path = "/auth_redirect"

def before(req, session):
    # if not logged in, we send them to our login page
    # logged in means:
    # - 'user_id' in the session object,
    # - 'auth' in the request object
    auth = req.scope['auth'] = session.get('user_id', None)
    if not auth: return RedirectResponse('/login', status_code=303)
    counts.xtra(name=auth)
bware = Beforeware(before, skip=['/login', auth_callback_path])

app = FastHTML(before=bware)

# User asks us to Login
@app.get('/login')
def login(request):
    redir = redir_url(request,auth_callback_path)
    login_link = client.login_link(redir)
    # we tell user to login at github
    return P(A('Login with GitHub', href=login_link))

# User comes back to us with an auth code from Github
@app.get(auth_callback_path)
def auth_redirect(code:str, request, session):
    redir = redir_url(request, auth_callback_path)
    user_info = client.retr_info(code, redir)
    user_id = user_info[client.id_key] # get their ID
    session['user_id'] = user_id # save ID in the session
    # create a db entry for the user
    if user_id not in counts: counts.insert(name=user_id, count=0)
    return RedirectResponse('/', status_code=303)

@app.get('/')
def home(auth):
    return Div(
        P("Count demo"),
        P(f"Count: ", Span(counts[auth].count, id='count')),
        Button('Increment', hx_get='/increment', hx_target='#count'),
        P(A('Logout', href='/logout'))
    )
```

```
@app.get('/increment')
def increment(auth):
    c = counts[auth]
    c.count += 1
    return counts.upsert(c).count

@app.get('/logout')
def logout(session):
    session.pop('user_id', None)
    return RedirectResponse('/login', status_code=303)

serve()
```

Some things to note:

- The `before` function is used to check if the user is authenticated. If not, they are redirected to the login page.
- To log the user out, we remove the user ID from the session.
- Calling `counts.xtra(name=auth)` ensures that only the row corresponding to the current user is accessible when responding to a request. This is often nicer than trying to remember to filter the data in every route, and lowers the risk of accidentally leaking data.
- In the `auth_redirect` route, we store the user ID in the session and create a new row in the `user_counts` table if it doesn't already exist.

You can find more heavily-commented version of this code in the oauth directory in fasthtml-example, along with an even more minimal example. More examples may be added in the future.

Revoking Tokens (Google)

When the user in the example above logs out, we remove their user ID from the session. However, the user is still logged in to GitHub. If they click 'Login with GitHub' again, they'll be redirected back to our site without having to log in again. This is because GitHub remembers that they've already granted our app permission to access their account. Most of the time this is convenient, but for testing or security purposes you may want a way to revoke this permission.

As a user, you can usually revoke access to an app from the provider's website (for example, https://github.com/settings/applications). But as a developer, you can also revoke access programmatically - at least with some providers. This requires keeping track of the access token (stored in `client.token["access_token"]` after you call `retr_info`), and sending a request to the provider's revoke URL:

```
auth_revoke_url = "https://accounts.google.com/o/oauth2/revoke"
def revoke_token(token):
    response = requests.post(auth_revoke_url, params={"token": token})
    return response.status_code == 200 # True if successful
```

Not all providers support token revocation, and it is not built into FastHTML clients at the moment.

Using State (Hugging Face)

Imagine a user (not logged in) comes to your AI image editing site, starts testing things out, and then realizes they need to sign in before they can click “Run (Pro)” on the edit they’re working on. They click “Sign in with Hugging Face”, log in, and are redirected back to your site. But now they’ve lost their in-progress edit and are left just looking at the homepage! This is an example of a case where you might want to keep track of some additional state. Another strong use case for being able to pass some uniqie state through the OAuth flow is to prevent something called a CSRF attack. To add a state string to the OAuth flow, you can use `client.login_link_with_state(state)` instead of `client.login_link()`, like so:

```
# in login page:
link = A('Login with GitHub', href=client.login_link_with_state(state='current_prompt:

# in auth_redirect:
@app.get('/auth_redirect')
def auth_redirect(code:str, session, state:str=None):
    print(f"state: {state}") # Use as needed
    ...
```

The state string is passed through the OAuth flow and back to your site.

A Work in Progress

This page (and OAuth support in FastHTML) is a work in progress. Questions, PRs, and feedback are welcome!

Report an issue