IETF 120
Vancouver
July 2024

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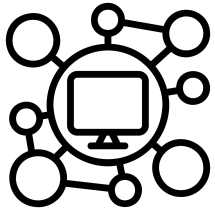
FedCM Profile for OAuth

The Problem

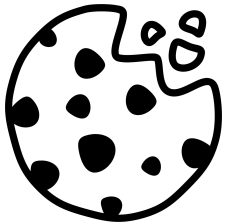
Users are being tracked around the web without their consent and without any control.

Common forms of Tracking on the Web

Link Decoration



Network Addresses

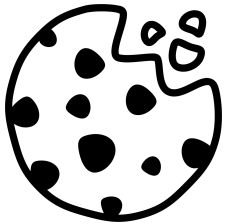


Third-Party Cookies

Fingerprinting

Common forms of Tracking on the Web

Link Decoration /
Bounce Tracking

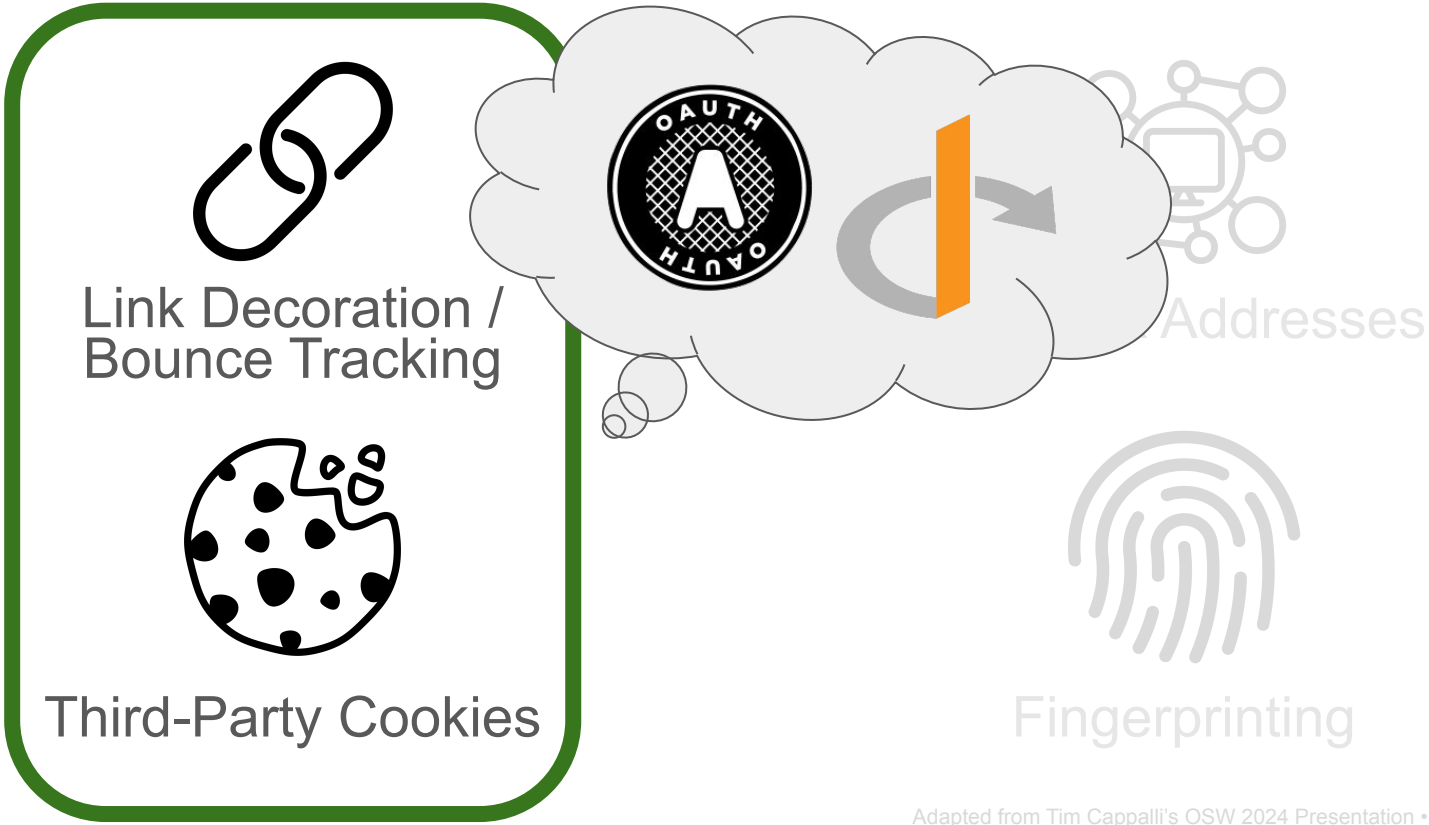


Third-Party Cookies

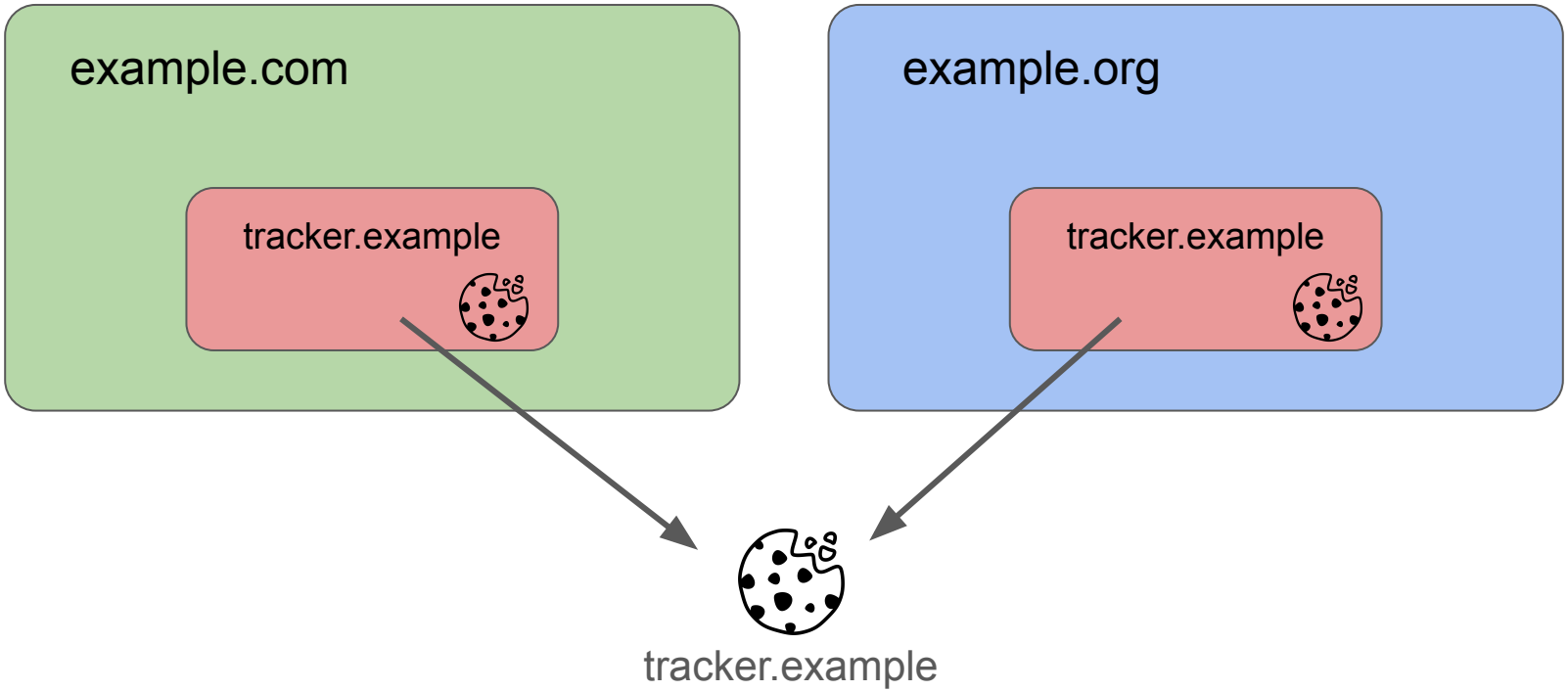
Network Addresses

Fingerprinting

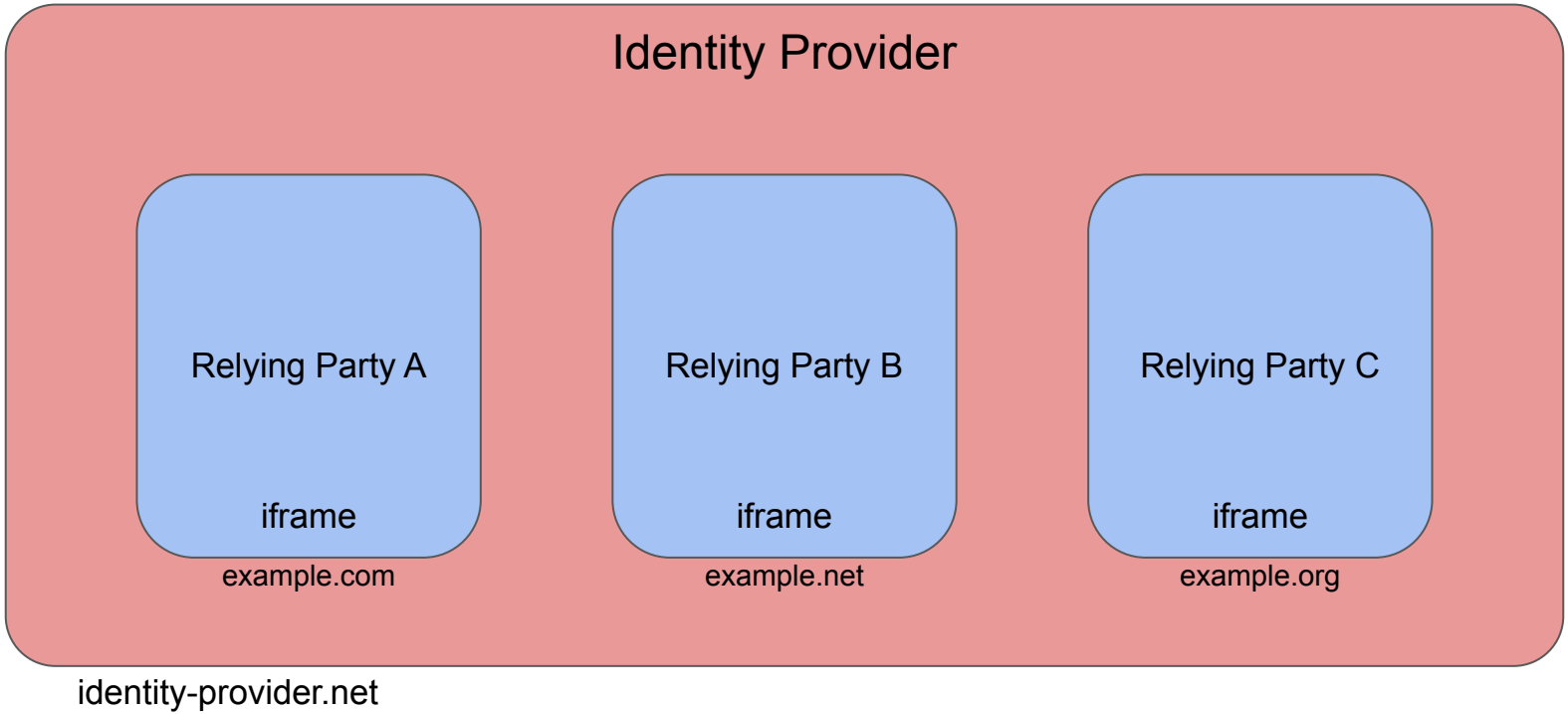
Common forms of Tracking on the Web



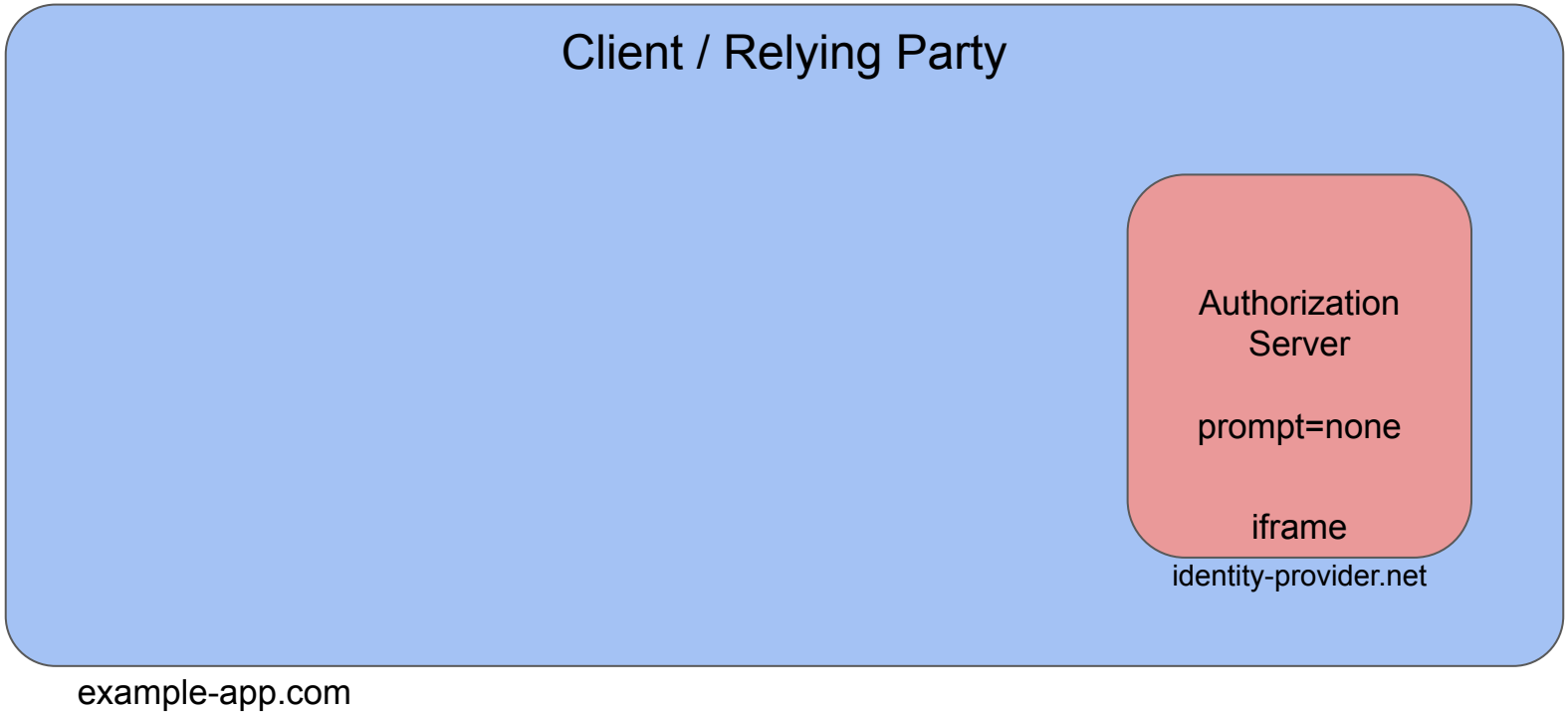
Third-Party Cookies



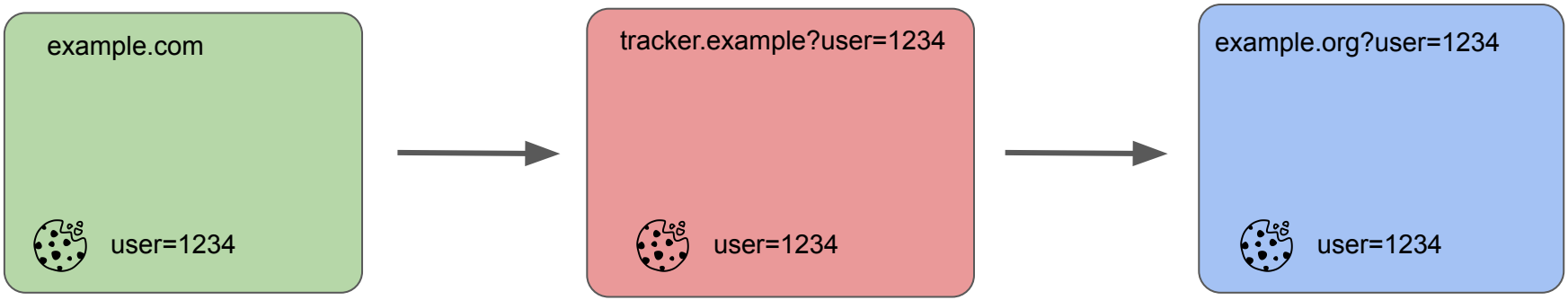
OIDC Front-Channel Logout



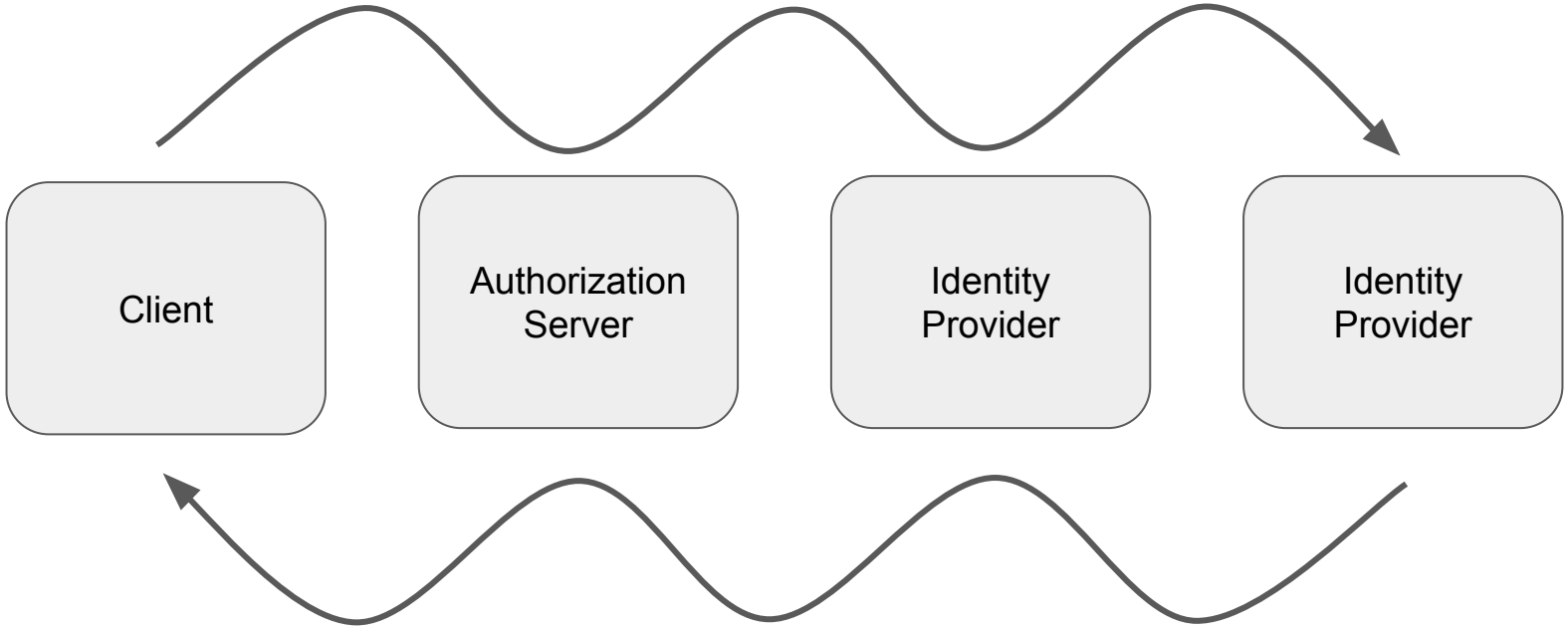
iframe silent token refresh



Link Decoration / Bounce Tracking



OAuth/OIDC/SAML rely on redirects



OAuth/OIDC/SAML redirects

These redirects are virtually indistinguishable from link decoration tracking, especially multi-hop federation

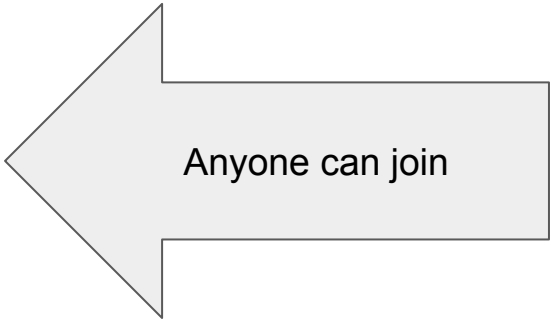
```
https://authorization-server.com/authorize
?response_type=code
&client_id=3VzsbQHnFhALpExMrhSg2E1Qx8zAA1QW
&code_challenge=o_MKLFCeQIBGDm26GgltBsioZBre2fiJ0xmHNdzUxKo
&code_challenge_method=S256
&scope=offline_access
&state=dbe329477e158127ea52
&redirect_uri=https%3A%2F%2Fexample-app.com%2Fclient
```

The Solution?

Federated Identity Community Group @ W3C

https://www.w3.org/community/fed-id/

Started in 2021



Federated Identity Working Group @ W3C

https://www.w3.org/groups/wg/fedid/

Started in June 2024

Two Proposals

Federated Credential Management API (FedCM)

Cross-Site Cookie Access Credential (CSCAC?)

FedCM

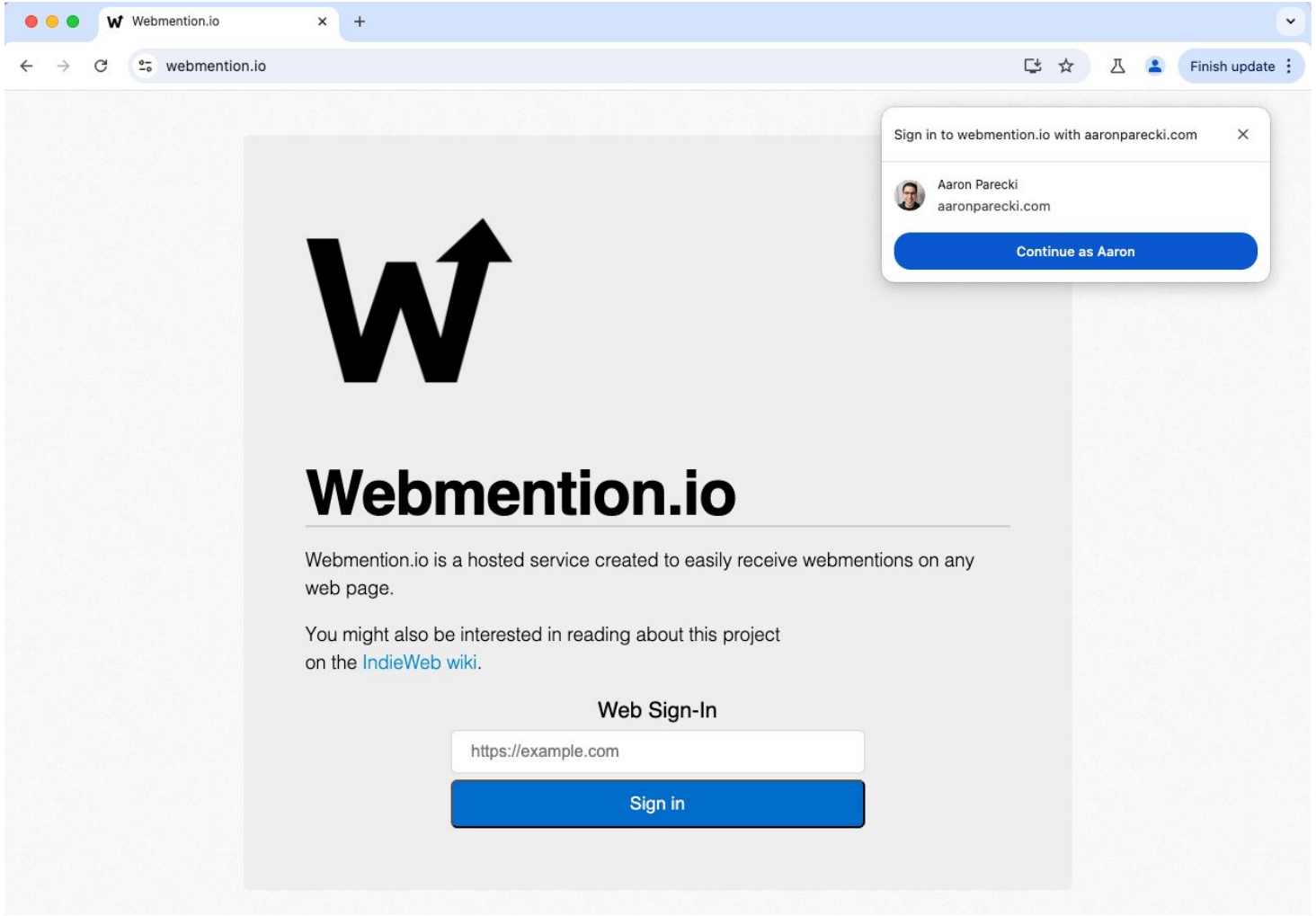
Provides a browser API to manage federated identity flows on the web.

Ensures there is *no information disclosed* between RP and IdP until the user consents.

FedCM

Note: I use RP/Client interchangeably here. RP is OIDC/FedCM terminology, Client is OAuth terminology

- User starts at RP/Client
- The RP initiates the FedCM API
  - The user sees a prompt and consents to use an account at an IdP
- The browser (not the RP/Client!) sends requests to the IdP endpoints
- The browser returns data from the IdP to the RP/Client


Webmention.io
webmention.io
Finish update
Sign in to webmention.io with aaronparecki.com
Aaron Parecki
aaronparecki.com
Continue as Aaron
Webmention.io
Webmention.io is a hosted service created to easily receive webmentions on any web page.
You might also be interested in reading about this project on the IndieWeb wiki.
Web Sign-In
https://example.com
Sign in

FedCM Client/RP

```
const identityCredential = await navigator.credentials.get({
  identity: {
    context: "signin",
    providers: [
      {
        configURL: "https://authorization-server.com/fedcm/config.json",
        clientId: "C1234567890",
        params: {...}
      },
    ],
  },
}).catch(e => {
  console.log(e);
});
```

Browser fetches FedCM IdP Config

No cookies, no `Origin`, no `Referer`

```
GET /fedcm/config.json
Host: authorization-server.com
Accept: application/json
Sec-Fetch-Dest: webidentity
```

```
{
  "accounts_endpoint": "/fedcm/accounts.php",
  "client_metadata_endpoint": "/fedcm/client_metadata.php",
  "id_assertion_endpoint": "/fedcm/assertion.php",
  "disconnect_endpoint": "/fedcm/disconnect.php",
  "revocation_endpoint": "/fedcm/revoke.php",
  "login_url": "/fedcm/login.php",
  "branding": {
    "background_color": "blue",
    "color": "0xFFEEAA",
    "icons": [{
        "url": "https://authorization-server.com/fedcm/icon.ico",
        "size": 25
    }]
  }
}
```

Browser fetches Accounts endpoint

IdP cookies, no `Origin`, no `Referer`, no redirects

```
GET /fedcm/accounts.php
Host: authorization-server.com
Accept: application/json
Cookie: IdPCookie123456
Sec-Fetch-Dest: webidentity
```

```
{
    "accounts": [
        {
            "id": "1",
            "given_name": "Aaron",
            "name": "Aaron Parecki",
            "email": "aaron@parecki.com",
            "picture": "https://aaronparecki.com/images/profile.jpg"
        },
        …
    ]
}
```

Browser fetches Client Metadata endpoint at IdP

No cookies, RP `Origin`, no redirects

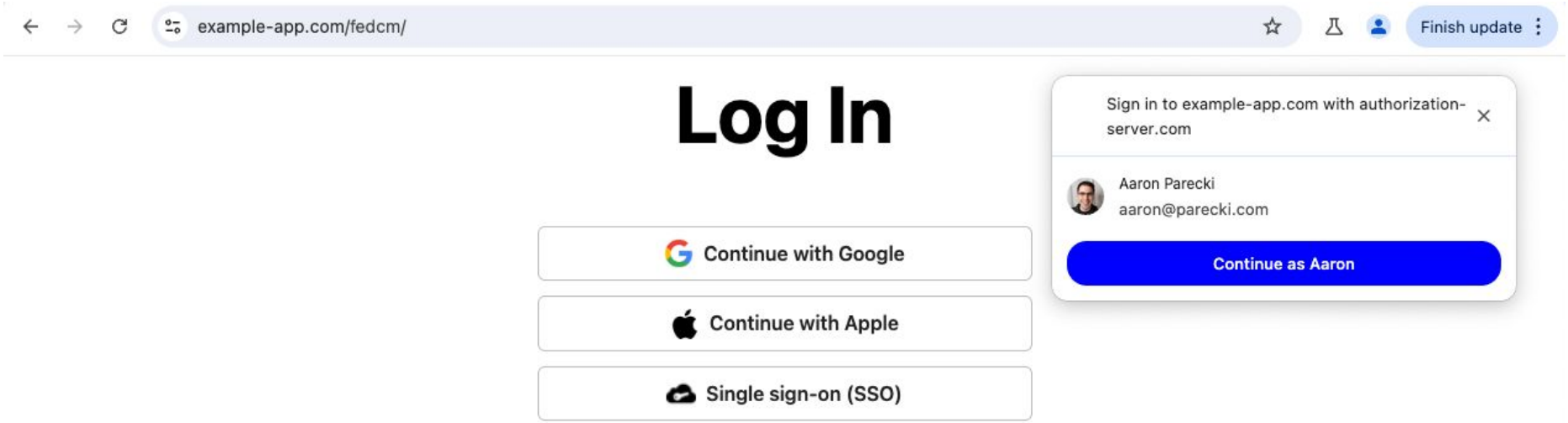
```
GET /fedcm/client_metadata.php?client_id=C1234567890
Host: authorization-server.com
Accept: application/json
Sec-Fetch-Dest: webidentity
```

```
{
    "privacy_policy_url": "https://example-app.com/privacy_policy.html",
    "terms_of_service_url": "https://example-app.com/terms_of_service.html"
}
```

Yes, this seems backwards.

This is the browser fetching the client metadata that has been pre-registered at the IdP.

See Issue #581 to allow RPs to provide their own metadata when they are not pre-registered.


example-app.com/fedcm/
Finish update
Log In
Continue with Google
Continue with Apple
Single sign-on (SSO)
Sign in to example-app.com with authorization-server.com
Aaron Parecki
aaron@parecki.com
Continue as Aaron

Browser fetches Identity Assertion endpoint

IdP cookies, RP `Origin`, no redirects

```
POST /fedcm/assertion.php
Host: authorization-server.com
Accept: application/json
Cookie: IdPCookie123456
Origin: https://example-app.com/
Content-type: application/x-www-form-urlencoded
Sec-Fetch-Dest: webidentity

account_id=1&
client_id=C1234567890&
disclosure_text_shown=true&
(custom params included, TBD)
```

```
{
    "token": "(ARBITRARY STRING)"
}
```

Cross-Site Cookie Access Credential

Provides a browser API to enable a website to make a string available to another origin after prompting the user.

IdP

```
navigator.credentials.store({
  identity: {
    id: "user1",
    effectiveQueryURL: ["https://example-app.com"],
    uiHint: {
      name: "Aaron Parecki",
      iconURL: "https://authorization-server.com/photos/user1.jpg"
    }
    token: dataToBeSharedWithRP,
  }
});
```

RP

```
let credential = await navigator.credentials.get({
  identity: {
    providers: [{
      loginURL: "https://authorization-server.com/login"
    }]
  }
});

// User sees prompt

console.log(credential.token)
```

OAuth Profile for FedCM

https://github.com/aaronpk/oauth-fedcm-profile

Not yet an I-D, this is more of an implementation guide until FedCM stabilizes and adds the necessary features.

Has been prototyped by myself and Filip.

OAuth Profile for Cross-Site Cookie Access Credential

Not yet shipped with UI in Firefox Nightly, and

did not have time to prototype this before IETF 120.

OAuth Profile for FedCM

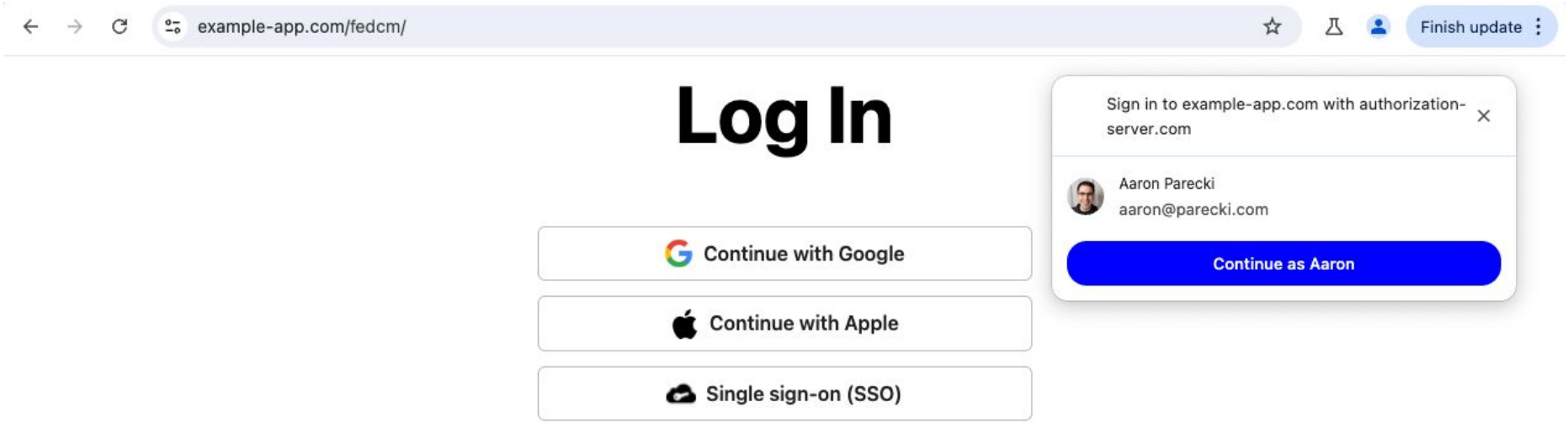
- Send OAuth request parameters in “params”
- Receive an authorization code from the Identity Assertion endpoint
- Exchange authorization code for access token as you normally would, outside of FedCM

Notes

- This pattern enables confidential clients and extensions like PAR
- No redirects, roughly equivalent to prompt=none

OAuth Client using FedCM

```
const identityCredential = await navigator.credentials.get({
  identity: {
    context: "signin",
    providers: [
      {
        configURL: "https://authorization-server.com/fedcm/config.json",
        clientId: "C1234567890",
        params: {
          "response_type": "code",
          "scope": "photos:read photos:write",
          "code_challenge": "OT8ahiSvW_c6g35YPG2Jz9X8tlZbHfNFCVuAft94bB0",
          "code_challenge_method": "S256"
        }
      },
    ],
  },
}).catch(e => {
  console.log(e);
});
```


example-app.com/fedcm/
Finish update
Log In
Continue with Google
Continue with Apple
Single sign-on (SSO)
Sign in to example-app.com with authorization-server.com
Aaron Parecki
aaron@parecki.com
Continue as Aaron

Browser fetches Identity Assertion endpoint

IdP cookies, RP `Origin`, no redirects

```
POST /fedcm/assertion.php
Host: authorization-server.com
Accept: application/json
Cookie: IdPCookie123456
Origin: https://example-app.com/
Content-type: application/x-www-form-urlencoded
Sec-Fetch-Dest: webidentity

account_id=1&
client_id=C1234567890&
disclosure_text_shown=true&
param_response_type=code&
param_scope=photos:read+photos:write&
param_code_challenge=OT8ahiSvW_c6g35YPG2Jz9X8tlZbHfNFCVuAft94bB0&
param_code_challenge_method=S256
```


```
{
    "token": "(OAUTH AUTHORIZATION CODE)"
}
```

JS client or app backend fetches Token Endpoint

No restrictions on cross-origin requests at this point

```
POST /oauth/token
Host: authorization-server.com
Accept: application/json
Content-type: application/x-www-form-urlencoded

grant_type=authorization_code&
client_id=C1234567890&
code=(authorization code)&
code_verifier=a6128783714cfda1d388e2e98b6ae8221ac31aca31959e59512c59f5
```

```
{
   "access_token": "2YotnFZFEjr1zCsicMWpAA",
   "token_type": "Bearer",
   "expires_in": 3600,
   "refresh_token": "tGzv3JOkF0XG5Qx2TlKWIA"
}
```

Recap

- Send OAuth request parameters in “params”
- Receive an authorization code from the Identity Assertion endpoint
- Exchange authorization code for access token as you normally would, outside of FedCM

Notes

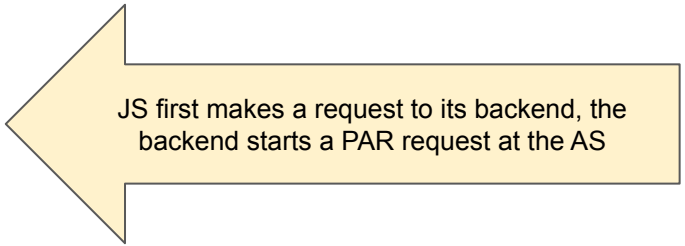
- This pattern enables confidential clients and extensions like PAR
- No redirects, roughly equivalent to prompt=none

https://github.com/aaronpk/oauth-fedcm-profile

OAuth Client using FedCM with PAR

```
const loginChallengeResponse = await fetch("/auth/fedcm-start", {
  method: "POST"
});
const loginChallenge = await loginChallengeResponse.json();


const identityCredential = await navigator.credentials.get({
  identity: {
    context: "signin",
    providers: [
      {
        configURL: "https://authorization-server.com/fedcm/config.json",
        clientId: loginChallenge.client_id,
        params: {
          "request": loginChallenge.request
        }
      },
    ],
  },
}).catch(e => {
  console.log(e);
});
```



FedCM Open Questions/Issues

- #319 Multiple IdP Support
- #240 “Any” IdP Support - enable RPs to accept any IdP of specific types
- #581 Allow RPs to provide their own ToS and privacy policy URLs
- #580 Allow IdPs to verify using DNS instead of .well-known at eTLD+1
- #578 Allow IdPs to return arbitrary JSON instead of just a “token” string
- #556 Passing arbitrary parameters to the assertion endpoint

Feedback Request

W3C WG wants feedback on the "params" feature (issue #556)

Params JS API

```
let {token} = await navigator.credentials.get({
  identity: {
    providers: [{
      configURL: "https://idp.example/fedcm.json",
      clientId: "63993123b3b56",
      loginHint: "previous@user.com",
      // Parameters that need to be passed from the RP to the IdP
      // but that don't play any role with the browser.
      params: {
        "response_type": "code",
        "scope": "photos:read photos:write",
        "code_challenge": "OT8ahiSvW_c6g35YPG2Jz9X8tlZbHfNFCVuAft94bB0",
        "code_challenge_method": "S256"
      }
    }],
  }
});
```

Option 1 - Prefix Custom Parameters (Current Implementation)

```
POST /fedcm_assertion_endpoint HTTP/1.1
Host: idp.example
Origin: https://rp.example/
Content-Type: application/x-www-form-urlencoded
Cookie: 0x23223
Sec-Fetch-Dest: webidentity

account_id=123
&client_id=63993123b3b56
&disclosure_text_shown=false
&param_response_type=code
&param_scope=photos:read+photos:write
&param_code_challenge=OT8ahiSvW_c6g35YPG2Jz9X8tlZbHfNFCVuAft94bB0
&param_code_challenge_method=S256
```

FedCM Parameters

Custom Parameters

Option 2 - Prefix FedCM Parameters

```
POST /fedcm_assertion_endpoint HTTP/1.1
Host: idp.example
Origin: https://rp.example/
Content-Type: application/x-www-form-urlencoded
Cookie: 0x23223
Sec-Fetch-Dest: webidentity

fedcm_account_id=123
&fedcm_client_id=63993123b3b56
&fedcm_disclosure_text_shown=false
&response_type=code
&scope=photos:read+photos:write
&code_challenge=OT8ahiSvW_c6g35YPG2Jz9X8tlZbHfNFCVuAft94bB0
&code_challenge_method=S256
```

FedCM Parameters

Custom Parameters

Option 3 - JSON Request

```
POST /fedcm_assertion_endpoint HTTP/1.1
Host: idp.example
Origin: https://rp.example/
Content-Type: application/json
Cookie: 0x23223
Sec-Fetch-Dest: webidentity

{
  "fedcm": {
    "account_id": "123",
    "client_id": "63993123b3b56",
    "disclosure_text_shown": false
  },
  "oauth": {
    "response_type": "code",
    "scope": "photos:read photos:write",
    "code_challenge": "OT8ahiSvW_c6g35YPG2Jz9X8tlZbHfNFCVuAft94bB0",
    "code_challenge_method": "S256"
  }
}
```

FedCM Parameters

Custom Parameters

Note: This will trigger a CORS pre-flight check!