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OAuth Client ID Scheme

https://datatracker.ietf.org/doc/draft-parecki-oauth-client-id-scheme/
draft -01

Recap

Presented draft-parecki-oauth-client-id-metadata-document at IETF 121

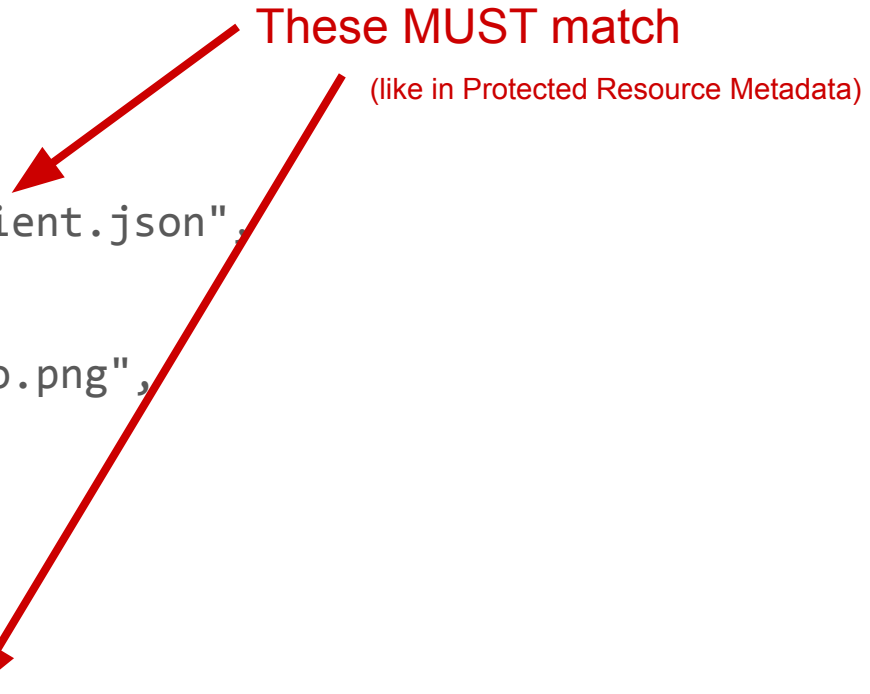
And presented Client ID Scheme at an Interim meeting in January 2025 in response to the feedback from IETF 121

Client ID Metadata Document

- The client publishes their metadata (Dynamic Client Registration vocabulary) at a URL
  - https://www.iana.org/assignments/oauth-parameters/oauth-parameters.xhtml#client-metadata
  - Doesn't have to be at a predefined path, but it should be a "stable URL", and may be displayed to the end user
- This URL is used as the Client ID in the authorization request
  - `…&client_id=https://example-app.com/client.json&scope=…`

https://datatracker.ietf.org/doc/draft-parecki-oauth-client-id-metadata-document/

Client ID Metadata Document




```
{
  "client_id": "https://example.com/client.json",
  "client_name": "Example Client",
  "client_uri": "https://example.com",
  "logo_uri": "https://example.com/logo.png",
  "redirect_uris": [
    "https://example.com/redirect"
  ]
}
```

The URL is used in an Authorization request

```
/authorize?client_id=https://example.com/client.json&...
```

https://datatracker.ietf.org/doc/draft-parecki-oauth-client-id-metadata-document/

Applicability

Pre-registration of clients is not possible when the client developer has no prior relationship with the authorization server, for example:

- Open source chat app connecting to self-hosted chat server
- Apps that connect to self-hosted services, such as Mastodon or WordPress, where there is no single central server to register the OAuth client
- “Federations” where entities can join through a trust chain but are not all pre-registered with each other.

The Potential Problem

There may be multiple ways for an AS to interpret a URL as a client identifier:

OpenID4VP `x509_san_uri`, OpenID4VP `redirect_uri`, OpenID4VP over the Digital Credentials API, OpenID Federation, W3C IndieAuth, and Client Metadata Document all use `https` URLs as the Client ID value

The resulting problems are:

- A generic AS doesn't know how to resolve metadata, and the client has no way to indicate how it expects the AS to resolve
- Potential attacks are possible if a malicious client has the ability to control the document pointed to by the URL of another client when interpreted through a different mechanism

Why not add a new parameter?

`/authorize?client_id=https://example.com/metadata.json&client_id_scheme=foo…`

This was previously proposed in OpenID4VP, but eventually determined it would cause more problems than it would solve.

https://github.com/openid/OpenID4VP/issues/124

(For example, how would this be extended for RFC9068 access tokens? Defining the `client_id_scheme` there may also lead to confusion attacks for systems that don’t support the parameter. See the thread above for more.)

Why not define a new parameter for each type?

e.g. `client_url` instead of `client_id`

`/authorize?`**`client_url`**`=https://example.com/metadata.json...`

- Breaks compatibility with OAuth, since `client_id` would not be present anywhere
- All client and server libraries would need to be updated to support the new parameter and not require the old parameter
- Would need to define a new claim in RFC 9068 access tokens
- Anywhere client ID is used elsewhere would need to be renamed to avoid the same confusion attacks (e.g. the `aud` claim in OpenID Connect ID tokens)
- Each client ID method would need its own parameter instead of `client_id`: `client_url=, did=, verifier_attestation=, ...`

Client ID Scheme defined by OpenID for Verifiable Presentations

https://openid.net/specs/openid-4-verifiable-presentations-1_0.html#section-5.10

Introduces a namespace for Client IDs, with “clever” exceptions for `https` and `did`

`<client_id_scheme>:<client_id_value>`

```
"redirect_uri:https://client.example.org/cb",
"https://federation-verifier.example.com",
"did:example:123#1",
"verifier_attestation:verifier.example",
"x509_san_dns:client.example.org",
"x509_san_uri:https://client.example.org/cb",
"web-origin:https://verifier.example.com"
```

scheme value

Client ID Scheme defined by OpenID for Verifiable Presentations

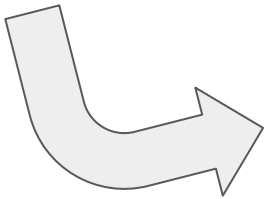
Client ID Scheme	Client ID Value
redirect_uri	https://client.example.org/cb
https	//federation-verifier.example.com
did	example:123#1
verifier_attestation	verifier.example
x509_san_dns	client.example.org
x509_san_uri	https://client.example.org/cb
web-origin	https://verifier.example.com

- Not actually a URI (breaks URI parsers #376)
- Inconsistent use of scheme vs value, special casing for `https` and `did`

https://github.com/openid/OpenID4VP/pull/401#issuecomment-2648740662

OpenID for Verifiable Presentations PR #401

Client ID Scheme	Client ID Value
redirect_uri	https://client.example.org/cb
https	//federation-verifier.example.com
did	example:123#1
verifier_attestation	verifier.example
x509_san_dns	client.example.org
x509_san_uri	https://client.example.org/cb
web-origin	https://verifier.example.com



Client ID Scheme	Client ID Value
redirect_uri	https://client.example.org/cb
openid_federation	https://federation-verifier.example.com
decentralized_identifier	did:example:123#1
verifier_attestation	verifier.example
x509_san_dns	client.example.org
x509_san_uri	https://client.example.org/cb
web-origin	https://verifier.example.com

+ allows a default scheme so OpenID Federation can keep using plain URLs

Default Client Identifier Schemes

“If a `:` character is present in the Client Identifier but the value preceding it is not a recognized and supported Client Identifier Scheme value, the Wallet (Authorization Server) MAY treat the Client Identifier as having a default Client Identifier Scheme.”

https://github.com/openid/OpenID4VP/pull/401

Proposal

Define **Client ID Scheme** as an IETF draft
https://datatracker.ietf.org/doc/draft-parecki-oauth-client-id-scheme/

With the exception for default Client ID Scheme as previously described, and an AS can use only one default Client ID Scheme.

This creates the building block that can then be used by

- OpenID Federation
  - https://openid.net/specs/openid-federation-1_0.html
- OpenID for Verifiable Presentations
  - https://openid.github.io/OpenID4VP/openid-4-verifiable-presentations-wg-draft.html
- Client Metadata Documents
  - https://datatracker.ietf.org/doc/draft-parecki-oauth-client-id-metadata-document/

Then, update OpenID4VP and Client Metadata Documents to reference the Client ID Scheme draft.