iRODS HTTP API v0.3.0 with OpenID Connect

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May 28-31, 2024
iRODS User Group Meeting 2024
Amsterdam, Netherlands

Updates since UGM 2023

v0.1.0

- **88 issues closed - 10 bugs, 57 enhancements**

v0.2.0

- **57 issues closed - 11 bugs, 25 enhancements**
- Simplified OIDC configuration
- Improved separation between HTTP status codes and iRODS status codes
- Improved API documentation
- Improved API usage by constraining input requirements
- Improved stability
- Configuration validation on server startup

v0.3.0

- **6 issues closed - 1 bug, 4 enhancements**
- Improved support for OIDC - Protected Resource mode
- Improved support for TLS between HTTP API and iRODS server

OAuth & OIDC in v0.3.0

- Three Major Features
  - OAuth 2.0 Confidential Client
  - Alternate User Mapping
  - HTTP API as an OAuth 2.0 Protected Resource
- Link to PR
  - https://github.com/irods/irods_client_http_api/pull/252

OAuth 2.0 Confidential Client

- OAuth 2.0 Client Authentication
  - Currently Support Password Based Authentication
  - Both **Client** and **Protected Resource** modes supported

Alternate User Mapping

- Previously required mapping in OpenID Provider
- Provide mapping in configuration file

Alternate User Mapping

```
...
"openid_connect": {
  ...
  "user_attribute_mapping": {
    "rodsBob": {
      "email": "bob@bobtopia.example",
      "sub": "a.very.real.sub",
      "phone_number": "56709"
    },
    "rodsAlice": {
      "email": "al-1s@wonderland.example",
      "sub": "a.different.sub"
    }
  }
  ...
}
...
```

User Mapping Example

Alternate User Mapping

- Protected Resource Mode
  - Map via Introspection Endpoint
- Client Mode
  - Map via OpenID Connect ID Token
- Information received dependent on configuration

Alternate User Mapping

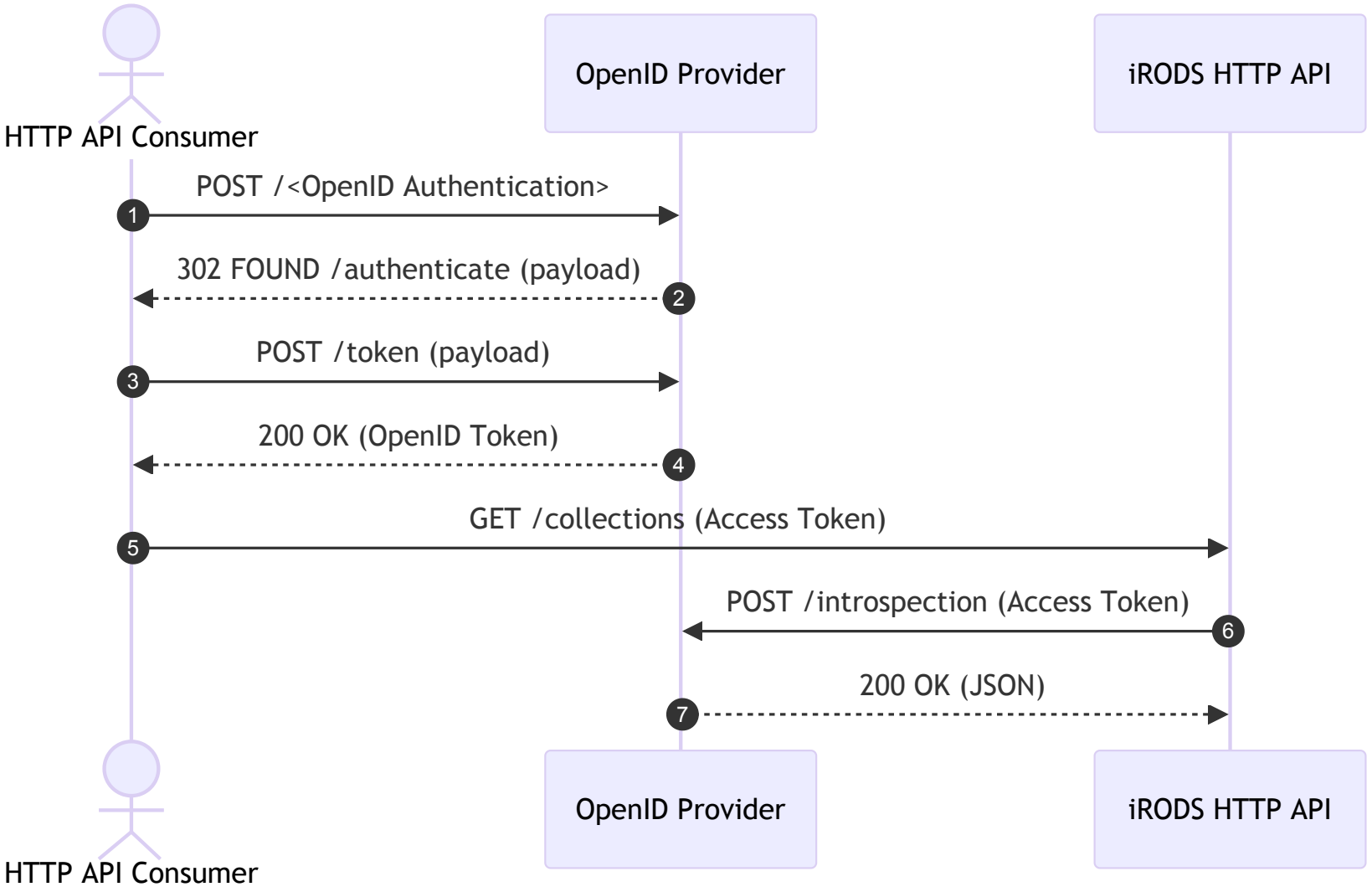
```
{
  "active": true,
  "client_id": "l238j323ds-23ij4",
  "username": "jdoe",
  "scope": "read write dolphin",
  "sub": "Z5O3upPC88QrAjx00dis",
  "aud": "https://protected.example.net/resource",
  "iss": "https://server.example.com/",
  "exp": 1419356238,
  "iat": 1419350238,
  "extension_field": "twenty-seven"
}
```

Token Introspection Example

HTTP API as an OAuth 2.0 Protected Resource

- Removes HTTP API from OAuth authentication flows
  - Simplifies Code Executed
  - Streamlines Integration with OpenID Provider
- Only handle Access Token
- Currently Supports OAuth 2.0 Introspection Endpoint

HTTP API as an OAuth 2.0 Protected Resource



Example of Protected Resource Communications

Draft Specifications

- OAuth 2.0 Security Best Practices Draft (Work in Progress)
  - Resource Owner Password Credentials MUST NOT be used
- OAuth 2.1 Draft (Work in Progress)
  - Resource Owner Password Credentials Omitted
  - Removal of Implicit Grant

References

- OAuth 2.0
  - https://www.rfc-editor.org/rfc/rfc6749
- OpenID Connect Core
  - https://openid.net/specs/openid-connect-core-1_0.html
- OpenID Connect Client Discovery
  - http://openid.net/specs/openid-connect-discovery-1_0.html
- OAuth 2.1 Draft
  - https://datatracker.ietf.org/doc/html/draft-ietf-oauth-v2-1-11
- OAuth 2.0 Security Best Current Practice Draft
  - https://datatracker.ietf.org/doc/html/draft-ietf-oauth-security-topics-27
- OAuth 2.0 Token Introspection
  - https://datatracker.ietf.org/doc/html/rfc7662

Future Work

High Priority

- Make write operation web-friendly
- Log client IP or other identifier(s) to distinguish users in log output

Medium Priority

- Externalize OIDC user mapping
- Update to use 4.3.2 GenQuery2 API
- Implement missing iRODS API operations

Considering

- Status / Cancellation operations for active transfers
- Extending the lifetime of Basic Authentication tokens on use
- Using API documentation generation tool

Thank you!

Questions?