Token Support in Rucio 33

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Introduction

• Rucio already supported coarse-grained tokens since 2019
• Our approach and goals for fine-grained tokens are described in a design document
• Release 33* is an incremental step towards those goals
• Full-chain test already conducted successfully with ATLAS Rucio, the Pilot FTS instance, and three sites (with different storage implementations)

*Rucio 33.0.0 is scheduled to be released today
Workflows

- Third-party-copy transfer
- Deletion (central)
Token Procurement

- Use of a client ID/secret pair and the client credentials flow
- Only IAM and the WLCG profile are supported right now
- Caching to maximise reuse
  - Some limitations apply (e.g. multiple clusters, concurrent requests)
Audience Claim

- Lack of consensus on how storages should handle this claim
- Rucio will use the list of hostnames from the RSE protocols
- Alternatively, a configurable string (globally)
  - E.g. https://wlcg.cern.ch/jwt/v1/any
Scope Claim

- storage.read for TPC sources
- storage.read & storage.modify for TPC destinations and deletions
  - StoRM currently requires storage.read for stat operations
- FTS also requires offline_access
- Rucio will use the list of prefixes from the RSE protocols
  - May remove a base path, if configured
Estimated Token Request Rate

• How many tokens to satisfy all operations?
  - $(|RSEs| \times 3 + 1) \times |clusters|$
  - For each RSE, there are three possible scopes, plus one token for FTS authentication, times the number of clusters

• The rate is approximately that number over the token lifetime (not controlled by Rucio)
Examples: FTS Authentication

```json
{
    "aud": "https://wlcg.cern.ch/jwt/v1/any",
    "client_id": "01234567-89ab-cdef-0123-456789abcdef",
    "exp": 1701805002,
    "iat": 1701783402,
    "iss": "https://atlas-auth.web.cern.ch/",
    "jti": "XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXXXX",
    "nbf": 1701783402,
    "scope": "fts",
    "sub": "01234567-89ab-cdef-0123-456789abcdef",
    "wlcg.ver": "1.0"
}
```
Examples: RSE Configuration

Attributes:
==========
- oidc_base_path: /eos/atlas
- oidc_support: True

Protocols:
==========

davs
   domains: {'lan': {'read': 2, 'write': 2, 'delete': 2}, 'wan': {'read': 2, 'write': 2, 'delete': 2, 'third_party_copy_read': 1, 'third_party_copy_write': 1}}
   extended_attributes: None
   hostname: eosatlas.cern.ch
   impl: rucio.rse.protocols.gfal.Default
   port: 443
   prefix: /eos/atlas/atlasscratchdisk/rucio/
   scheme: davs

root
   domains: {'lan': {'read': 1, 'write': 1, 'delete': 1}, 'wan': {'read': 1, 'write': 1, 'delete': 1, 'third_party_copy_read': 2, 'third_party_copy_write': 2}}
   extended_attributes: None
   hostname: eosatlas.cern.ch
   impl: rucio.rse.protocols.gfal.Default
   port: 1094
   prefix: //eos/atlas/atlasscratchdisk/rucio/
   scheme: root
Examples: TPC Source

```json
{
    "aud": "eosatlas.cern.ch",
    "client_id": "01234567-89ab-cdef-0123-456789abcdef",
    "exp": 1701806246,
    "iat": 1701784646,
    "iss": "https://atlas-auth.web.cern.ch/",
    "jti": "XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX",
    "nbf": 1701784646,
    "scope": "offline_access storage.read:/atlasscratchdisk/rucio/",
    "sub": "01234567-89ab-cdef-0123-456789abcdef",
    "wlcg.ver": "1.0"
}
```
Examples: TPC Destination

```
{
    "aud": "eosatlas.cern.ch",
    "client_id": "01234567-89ab-cdef-0123-456789abcdef",
    "exp": 1701806453,
    "iat": 1701784853,
    "iss": "https://atlas-auth.web.cern.ch/",
    "jti": "XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX",
    "nbf": 1701784853,
    "scope": "offline_access storage.modify:/atlasscratchdisk/rucio/
storage.read:/atlasscratchdisk/rucio/",
    "sub": "01234567-89ab-cdef-0123-456789abcdef",
    "wlcg.ver": "1.0"
}
```
Examples: Deletion

```
{
  "aud": "eosatlas.cern.ch",
  "client_id": "01234567-89ab-cdef-0123-456789abcdef",
  "exp": 1701806830,
  "iat": 1701785230,
  "iss": "https://atlas-auth.web.cern.ch/",
  "jti": "XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX",
  "nbf": 1701785230,
  "scope": "storage.modify:/atlasscratchdisk/rucio/
  storage.read:/atlasscratchdisk/rucio/",
  "sub": "01234567-89ab-cdef-0123-456789abcdef",
  "wlcg.ver": "1.0"
}
```
Questions?