Notification of Revoked Access Tokens in the ACE Framework

draft-tiloca-ace-revoked-tokens-notification-01

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Motivation

- An Access Token may be revoked, before expiration
  - Client or RS has been compromised, or decommissioned
  - Changed access policies
  - Changed ACE profile to use

- In OAuth
  - Token revocation by Client exists (RFC 7009)
  - No revocation by Resource Owner or RS
  - Not a problem, Tokens expire fast

- Different assumptions in ACE
  - E.g. RS has intermittent connectivity, Tokens don’t expire fast
  - How can the AS tell C and RS about revoked tokens?

Contribution

- New interface at the AS
  - The AS maintains one Token Revocation List (TRL) resource
  - The TRL contains the hashes of revoked, not-yet-expired tokens
  - C/RS can GET or GET-Observe from the TRL
  - C/RS retrieve only their own pertaining portion of the TRL

- Benefits
  - Complement token introspection at the AS
  - No need for new endpoints at C or RS

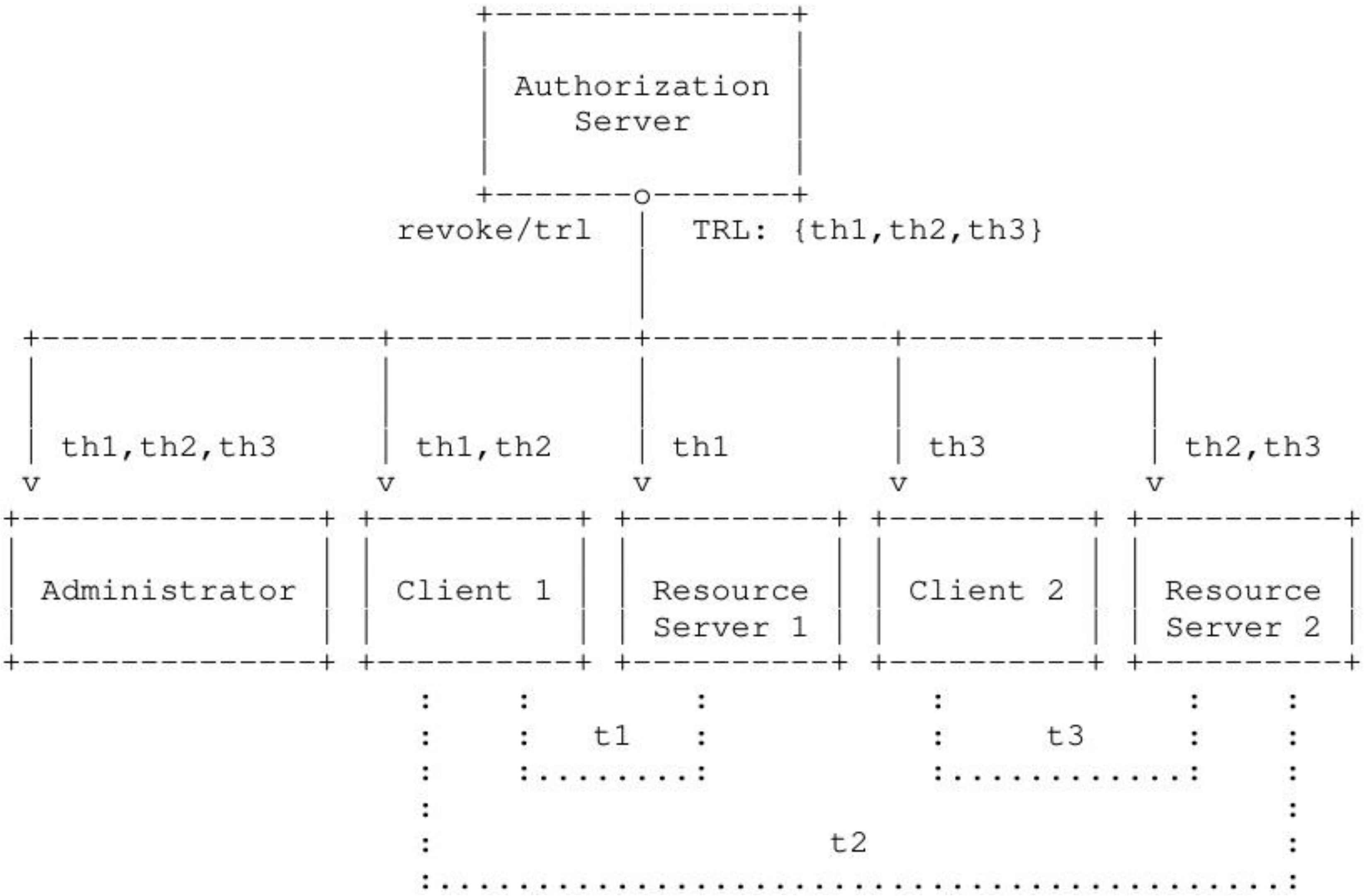
- Updates in -01 from Travis' review [1] and Jim input – Thanks!

[1] https://mailarchive.ietf.org/arch/msg/ace/1UK5QuLh4kmzlH211JBtotdchfQ/

Rationale

- Token hash, as Token name/ID
  - Not ‘cti’, the Token is opaque to the Client
  - Computed as per RFC 6920, Section 6
  - Support for both CBOR and JSON transport
- Token Revocation List (TRL) at the AS
  - CBOR array of Token hashes
  - Add token hashes when Tokens are revoked
  - Remove token hashes when revoked Tokens expire
- Interaction
  - C and RS get the URL to the TRL endpoint upon registration
  - C and RS obtain only hashes of their own pertaining Tokens
  - A registered Administrator gets all Token hashes in the TRL

Protocol overview



```
                        +---------------+
                        |               |
                        | Authorization |
                        |    Server     |
                        |               |
                        +-------o-------+
                    revoke/trl  |  TRL: {th1,th2,th3}
                                |
                                |
 +-----------------+------------+------------+------------+
 |                 |            |            |            |
 |                 |            |            |            |
 | th1,th2,th3     | th1,th2    | th1        | th3        | th2,th3
 v                 v            v            v            v
+---------------+ +----------+ +----------+ +----------+ +----------+
|               | |          | |          | |          | |          |
| Administrator | | Client 1 | | Resource | | Client 2 | | Resource |
|               | |          | | Server 1 | |          | | Server 2 |
+---------------+ +----------+ +----------+ +----------+ +----------+
                     :    :        :           :            :    :
                     :    :   t1   :           :     t3     :    :
                     :    :........:           :............:    :
                     :                                           :
                     :                    t2                     :
                     :...........................................:
```

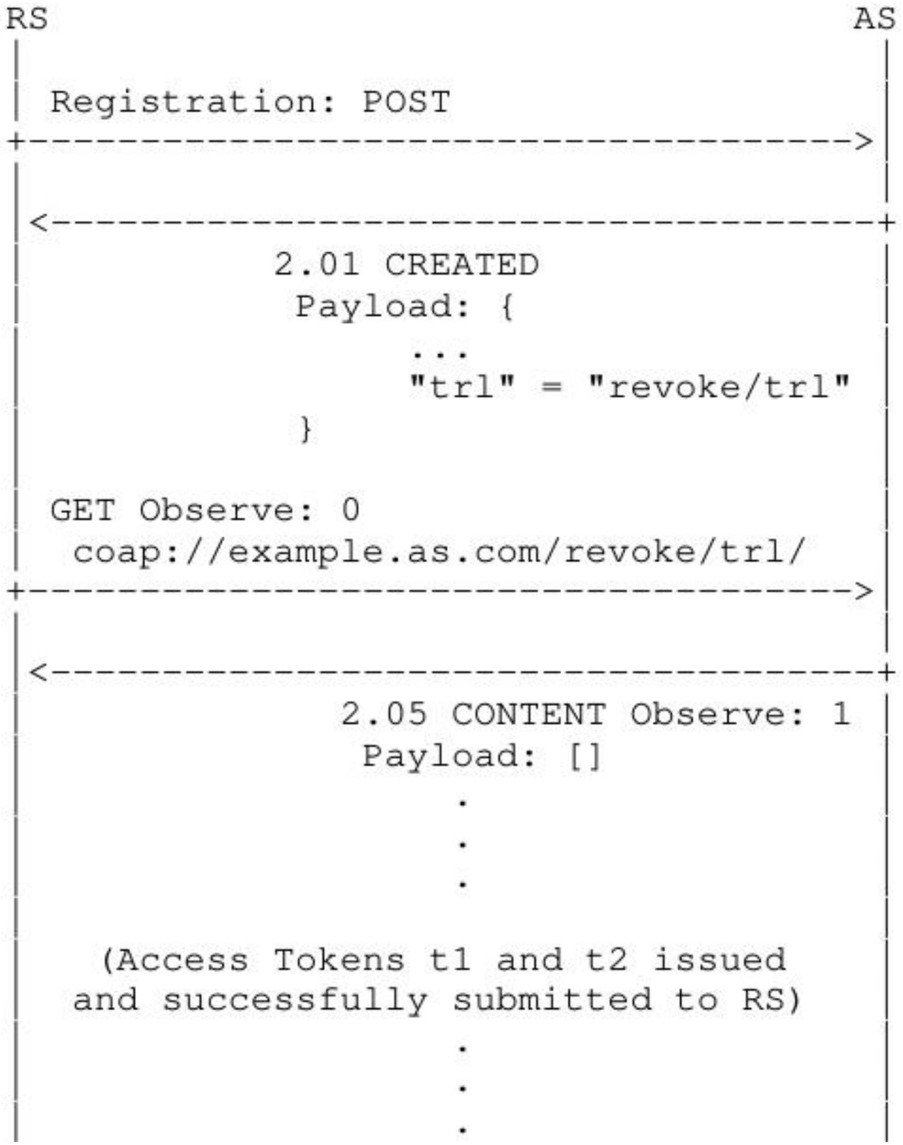
Two types of TRL queries

- Common features
  - Limited to the portion of the TRL pertaining the requester
  - TRL filtering based on authenticated identity of the requester (secure session)

- **Full query – *GET [Observe: 0] example_as/revoke/trl***
  - Request for all pertaining token hashes in the TRL
  - Return a CBOR array, with the Token hashes as elements

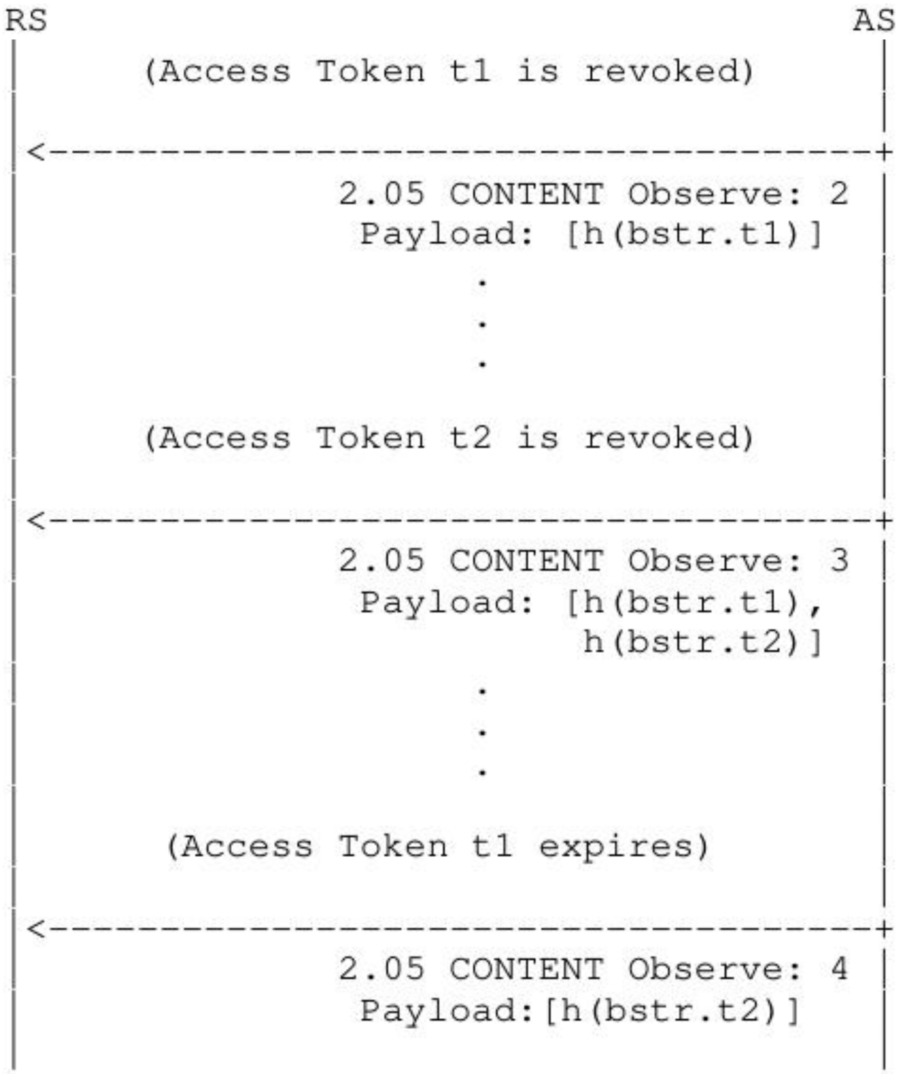
- **Diff query – *GET [Observe: 0] example_revoke/trl?diff=true[&N=3]***
  - Request for the latest N updates to the pertaining portion of the TRL list
  - Build N entries as CBOR maps. Each entry refers to an update and has:
    - A field “deleted”, with a CBOR array of Token hashes as element.
    - A field “added”, with a CBOR array of Token hashes as element.
  - Return a CBOR array with the N entries as element, in reverse chronological order
  - Work in progress to make it simpler and more efficient – Thanks Carsten!

Example



```
RS                                       AS
 |                                        |
 | Registration: POST                     |
 +--------------------------------------->|
 |                                        |
 |<---------------------------------------+
 |           2.01 CREATED                 |
 |            Payload: {                  |
 |                 ...                    |
 |                 "trl" = "revoke/trl"   |
 |            }                           |
 |                                        |
 | GET Observe: 0                         |
 |  coap://example.as.com/revoke/trl/     |
 +--------------------------------------->|
 |                                        |
 |<---------------------------------------+
 |              2.05 CONTENT Observe: 1   |
 |               Payload: []              |
 |                    .                   |
 |                    .                   |
 |                    .                   |
 |                                        |
 |   (Access Tokens t1 and t2 issued      |
 |  and successfully submitted to RS)     |
 |                    .                   |
 |                    .                   |
 |                    .                   |
```

Example (ctd.)



```
RS                                      AS
 |      (Access Token t1 is revoked)     |
 |                                       |
 |<--------------------------------------+
 |              2.05 CONTENT Observe: 2  |
 |               Payload: [h(bstr.t1)]   |
 |                     .                 |
 |                     .                 |
 |                     .                 |
 |      (Access Token t2 is revoked)     |
 |                                       |
 |<--------------------------------------+
 |              2.05 CONTENT Observe: 3  |
 |               Payload: [h(bstr.t1),   |
 |                         h(bstr.t2)]   |
 |                     .                 |
 |                     .                 |
 |                     .                 |
 |       (Access Token t1 expires)       |
 |                                       |
 |<--------------------------------------+
 |              2.05 CONTENT Observe: 4  |
 |               Payload:[h(bstr.t2)]    |
 |                                       |
```

Summary

- Notification of revoked Access Token
  - GET or GET-Observe; full query and diff query
  - Complement token introspection at the AS
  - No need for new endpoints on Clients and Resource Servers

- Version -01 incorporates:
  - Review from Travis Spencer
  - Input and comments from Jim

- Next steps
  - Submit version -02 before the cut-off
  - Address review of version -01 from Carsten [1] – Thank you!

[1] https://mailarchive.ietf.org/arch/msg/ace/ZoEJ6DulqJQcaMRrOdGkmbeFwwk/

Thank you!

Comments/questions?