

# Authentication for Non-Browser Clients: Progress

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GWS WG

IVOA Interop

Online

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`$Id: auth.tex,v 1.8 2022/04/26 13:33:09 mbt Exp $`

## Outline

- History
- Current proposal (“SSO\_next”)
- Implementation status, with examples
- Next Steps

# History

## Working towards authenticated access for non-browser clients

- Clients need to know **how** and **where** (and **whether**) to log in for authenticated access

## Previous updates:

- May 2020
  - ▷ Pat Dowler: [Authentication strawman proposal](#)
- Nov 2020
  - ▷ Brian Major: [Non-browser client authentication with OAuth2 tokens](#)
  - ▷ Mark Taylor: [Authentication Implementation Report](#)
- May 2021
  - ▷ Brian Major: [Tokens for Non-Browser Clients Updates](#)
- Nov 2021:
  - ▷ Mark Taylor: [Authentication for Non-Browser Clients: Update](#)
- Jan 2022:
  - ▷ Pat Dowler: [SSO\\_next](#) wiki page
    - **agreed specifics for client/server behaviour**

# SSO\_next Proposals

Summary ([SSO\\_next](#) wiki page, main author Pat Dowler):

- Communicate auth info using only RFC 7235-style WWW-Authenticate challenges
  - ▷ `securityMethod` elements in capabilities document no longer required
- Introduce VO-specific `ivoa_*` authentication schemes that can carry additional metadata:
  - ▷ `access_url`: where to login
  - ▷ `standard_id`: how to interact with `access_url`
- Provide authentication confirmation
  - ▷ `X-VO-Authenticated` header SHOULD appear in authenticated responses
- Specify how to determine service authentication requirements
  - ▷ `/capabilities` endpoint HEAD/BODY response is 200/401(/403) with or without WWW-Authenticate challenge(s)

Impact on standards:

1. VOSI augmented to require HTTP HEAD support for `/capabilities` endpoints
2. SSO augmented to define `ivoa_bearer`, `ivoa_cookie`, and `ivoa_x509` challenges
3. SSO `ivo://ivoa.net/sso#tls-with-password` extended to specify the form params
4. SSO challenges describe/specify response form of login endpoint (`access_url`), possibly including `x-vo-bearer` response header
5. SSO requires/recommends authenticated services to include `x-vo-authenticated` header in all authenticated responses
6. Modify VOSI to allow `/capabilities` to respond with 401 (or 403) (*also affects TAP 1.1 sec 2; & others?*)

## SSO\_next Status

- It works!
- No significant disagreements among participants
- Some minor(?) open issues:
  - How to signal/determine token scope? (*tricky*)
  - Additional auth schemes or login methods may be needed

# SSO\_next Implementation

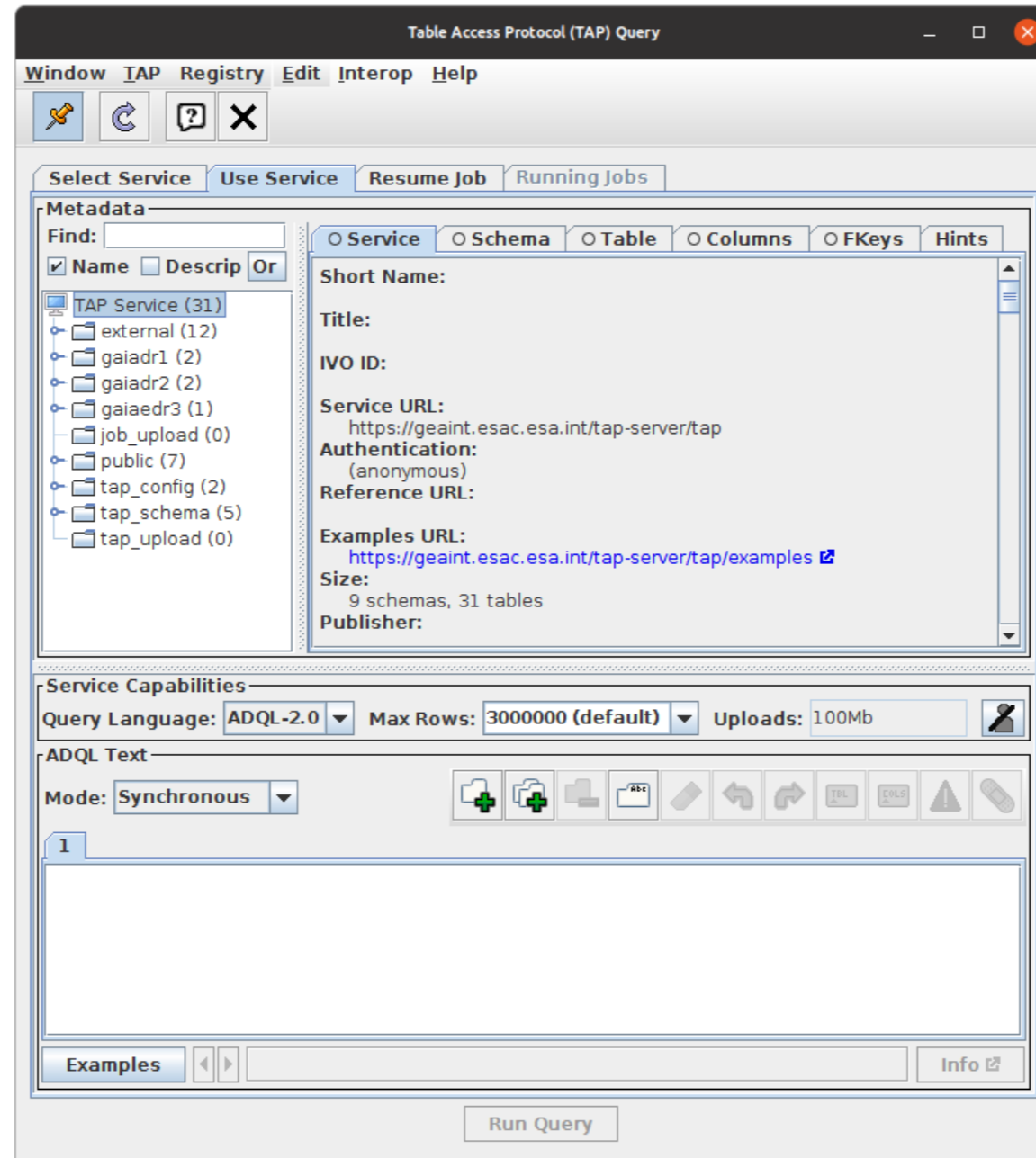
## Service implementations:

- CADC
  - ▷ Auth modes: optional
  - ▷ Auth schemes: `ivoa_bearer`, `ivoa_x509`, `Bearer`
  - ▷ Login standard\_ids: `ivo://ivoa.net/sso#tls-with-password`, `ivo://ivoa.net/sso#OpenID`  
`ivo://ivoa.net/sso#BasicAA`
- DaCHS
  - ▷ Auth modes: optional, mandatory
  - ▷ Auth schemes: `Basic`
- ESA GACS (Development version, **partial implementation**: no challenges, strange response codes, no auth confirmation)
  - ▷ Auth modes: none, optional
  - ▷ Auth schemes: `ivoa_cookie`
  - ▷ Login standard\_id: `ivo://ivoa.net/sso#tls-with-password`

## Client implementation:

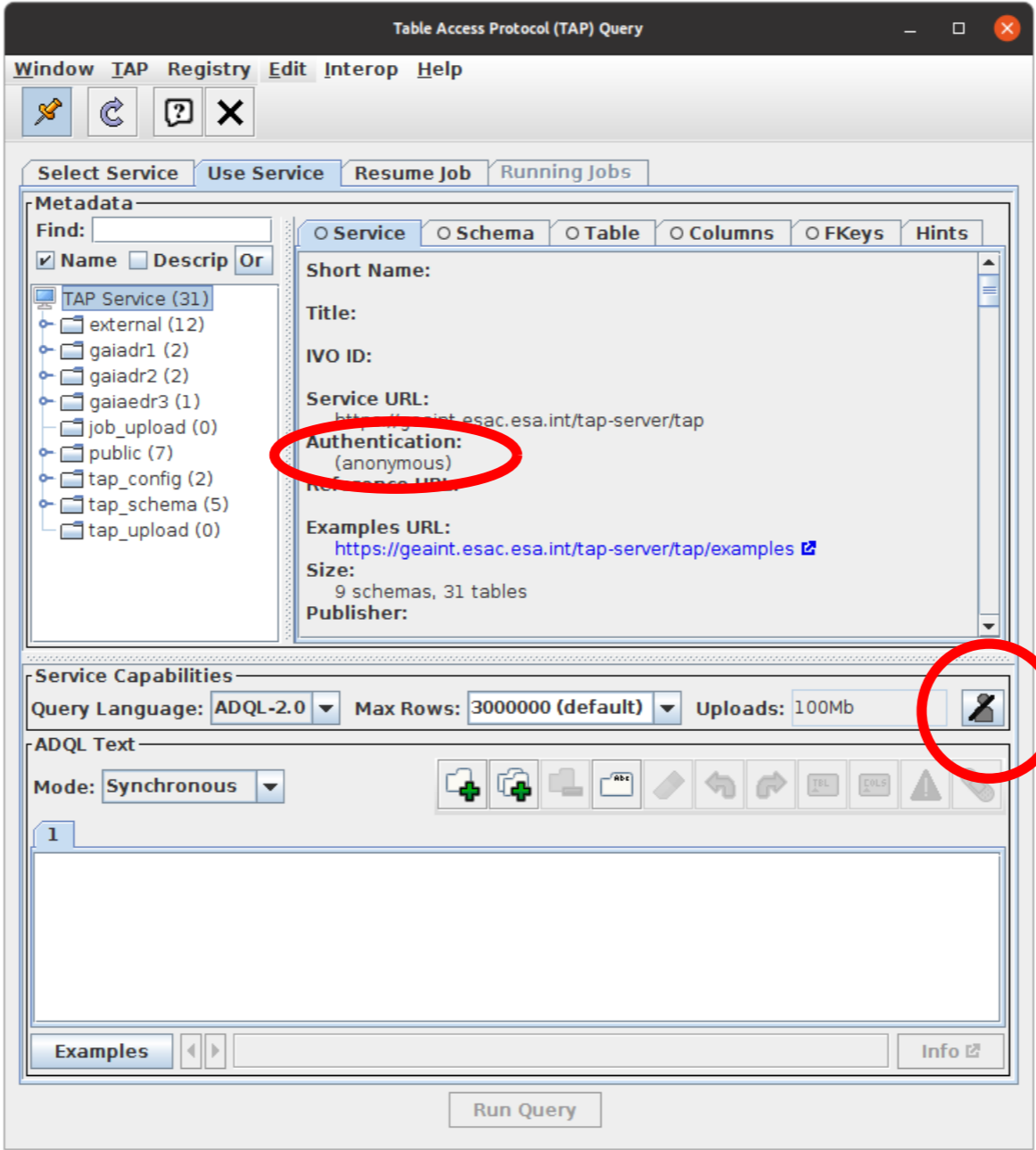
- TOPCAT prototype ([http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full\\_auth.jar](http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full_auth.jar))
  - ▷ Auth modes: none, optional, mandatory
  - ▷ Auth schemes: `ivoa_bearer`, `ivoa_cookie`
  - ▷ Login standard\_ids: `ivo://ivoa.net/sso#tls-with-password`, `ivo://ivoa.net/sso#BasicAA`
  - ▷ Some rough edges (e.g. token expiry may not be handled correctly)

# Demo



Prototype: [http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full\\_auth.jar](http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full_auth.jar)

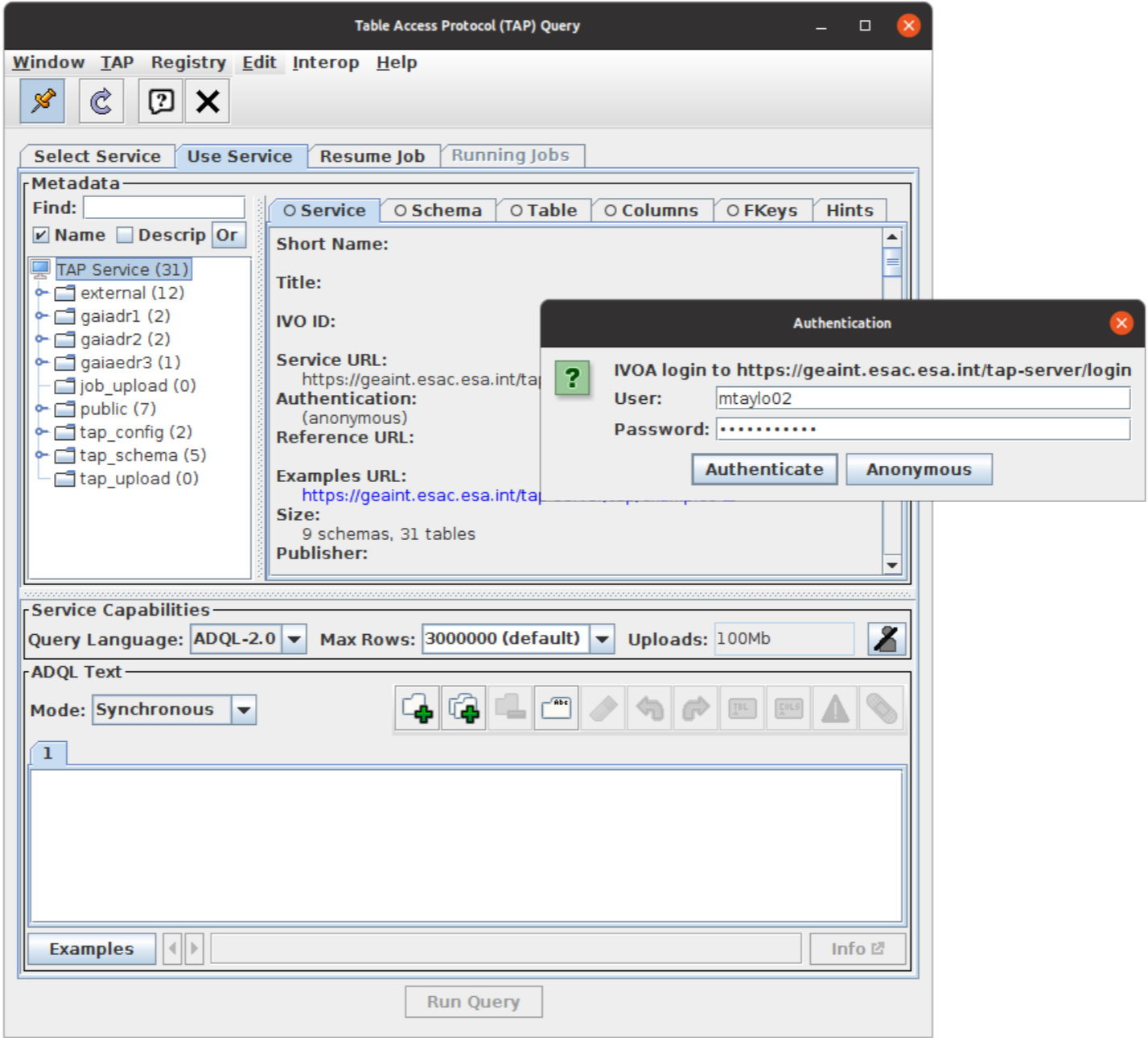
# Demo



Prototype: [http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full\\_auth.jar](http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full_auth.jar)

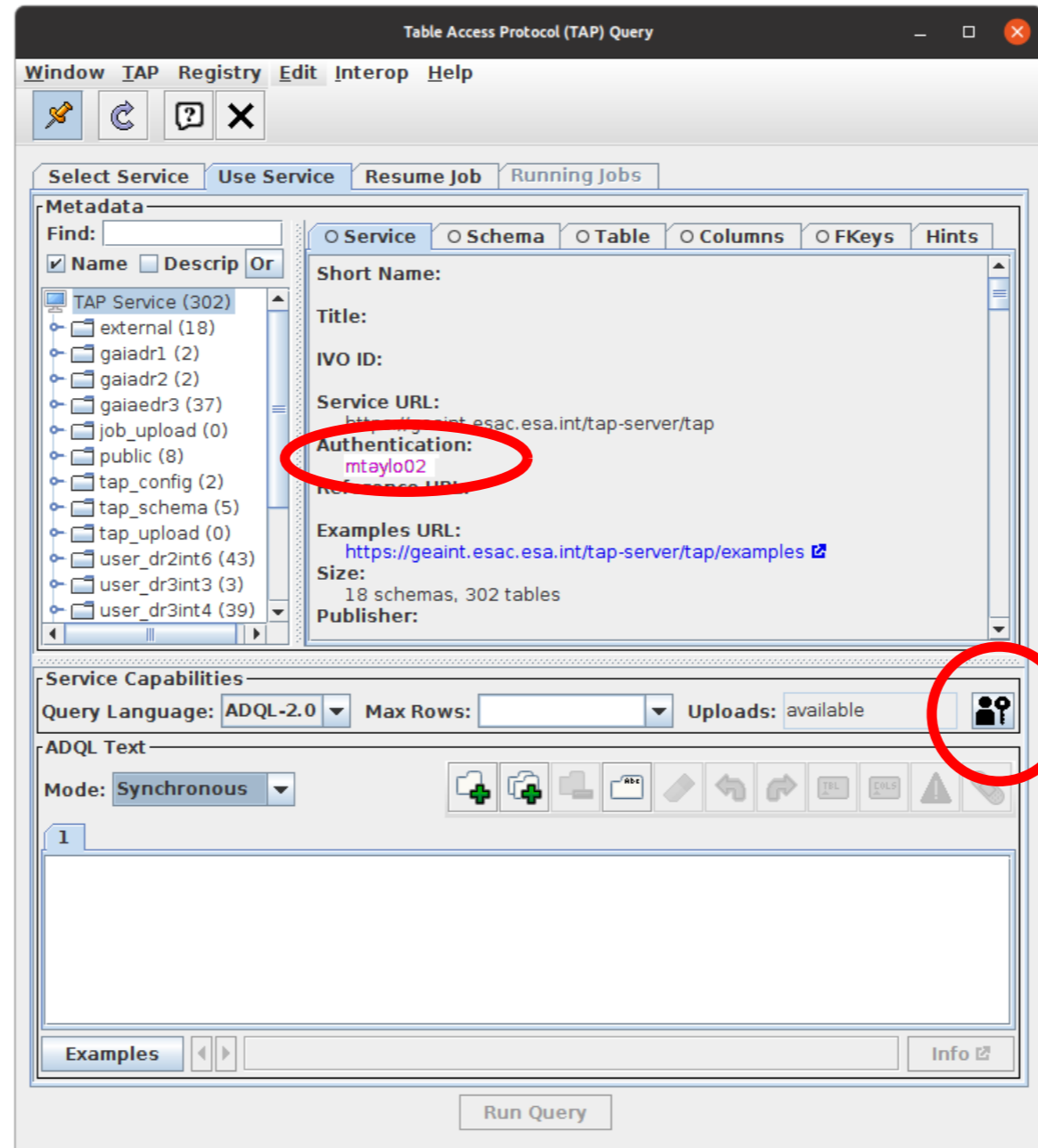


# Demo



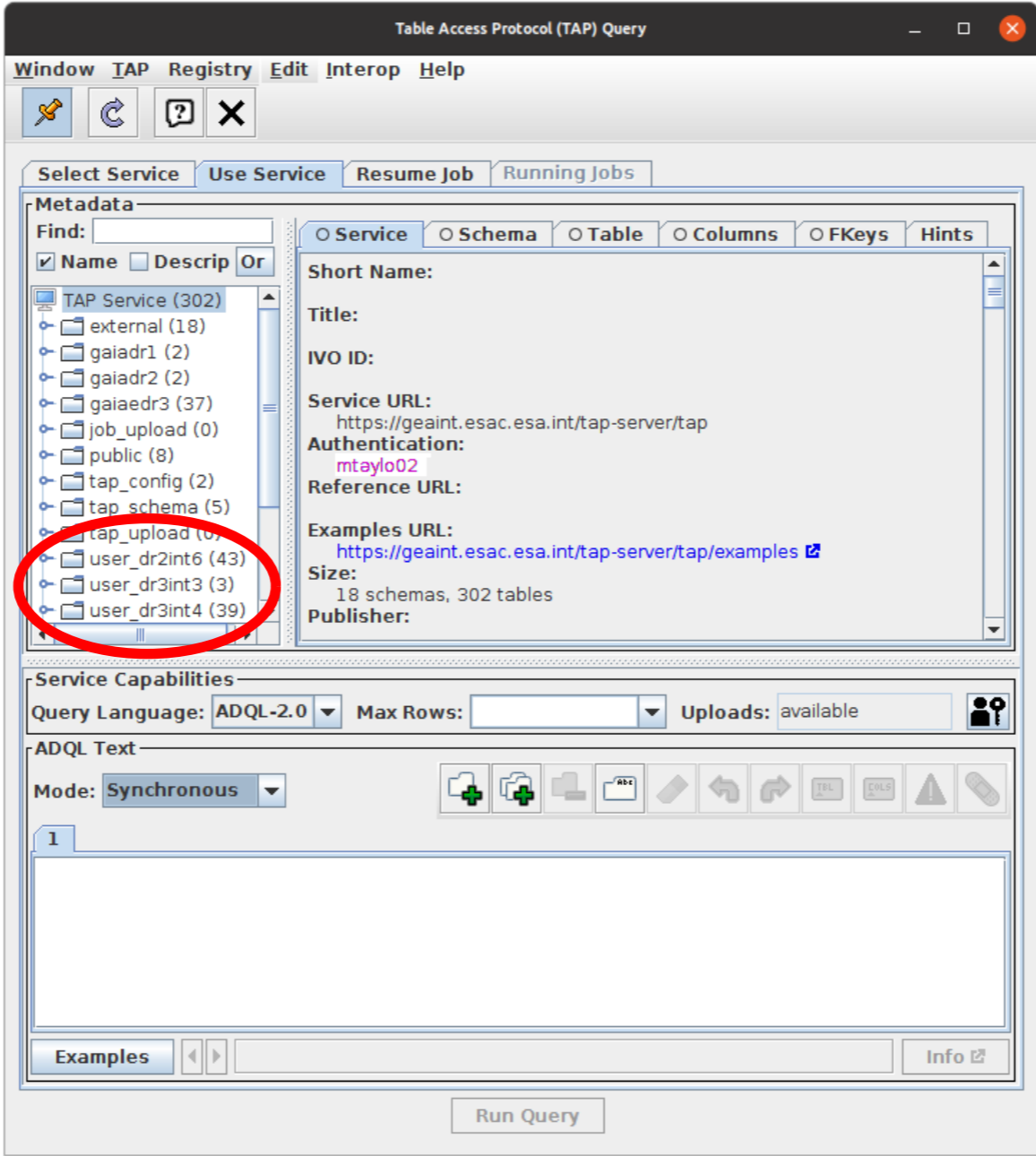
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Prototype: [http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full\\_auth.jar](http://andromeda.star.bristol.ac.uk/releases/topcat/pre/topcat-full_auth.jar)

# CADC (ivoa\_bearer)

```
% curl --head https://ws.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/argus/capabilities
```

```
HTTP/1.1 200
```

```
server: OpenCADC/cadc-rest
```

```
www-authenticate: ivoa_bearer standard_id="ivo://ivoa.net/sso#tls-with-password", access_url="https://ws-cadc.canfar.net/ac/login"
```

```
www-authenticate: ivoa_bearer standard_id="ivo://ivoa.net/sso#OpenID", access_url="https://ws-cadc.canfar.net/ac"
```

```
www-authenticate: Bearer
```

```
www-authenticate: ivoa_x509 standard_id="ivo://ivoa.net/sso#BasicAA", access_url="https://ws.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/cred/auth/priv"
```

```
www-authenticate: ivoa_x509
```

```
transfer-encoding: chunked
```

```
date: Mon, 25 Apr 2022 14:22:45 GMT
```

```
% curl -d username=mbt -d password=xxxx https://ws-cadc.canfar.net/ac/login -D - -s
```

```
HTTP/1.1 200
```

```
x-vo-authenticated: mbt
```

```
x-vo-bearer: ZXhwaXJ5dGltZT0xNjUxMDY5NDI2NDc1Jm51bWVyaWNJRDOwMDAwMDAwMCOw...
```

```
content-type: text/plain;charset=ISO-8859-1
```

```
content-length: 760
```

```
date: Mon, 25 Apr 2022 14:23:45 GMT
```

```
% curl -D - --header 'Authorization: Bearer ZXhwaXJ5dGltZT0xNjUxMDY5NDI2NDc1Jm51bWVyaWNJRDOwMDAwMDAwMCOw...' https://ws.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/argus/async
```

```
HTTP/1.1 200
```

```
server: OpenCADC/cadc-rest
```

```
x-vo-authenticated: mbt
```

```
content-type: text/xml
```

```
transfer-encoding: chunked
```

```
date: Mon, 25 Apr 2022 14:30:18 GMT
```

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<uws:jobs xmlns:uws="http://www.ivoa.net/xml/UWS/v1.0" xmlns:xlink="http://www.w3.org/1999/xlink" version="1.1">
```

```
  <uws:jobref id="dmw3r6jh8qd7mkg0">
```

```
    ...
```

# DaCHS (Basic Auth)

```
% curl --head http://www.g-vo.org:8080/tap/capabilities
HTTP/1.1 401 Unauthorized
Server: DaCHS/2.5.5 twistedWeb/20.3.0
Date: Mon, 25 Apr 2022 14:47:42 GMT
WWW-Authenticate: Basic realm="Shangri-la"
Content-Type: text/html
```

```
% curl -u tap:xxxx http://www.g-vo.org:8080/tap/async -D - -s
HTTP/1.1 200 OK
Server: DaCHS/2.5.5 twistedWeb/20.3.0
Date: Mon, 25 Apr 2022 14:55:07 GMT
X-Vo-Authenticated: tap
Content-Type: text/xml
Content-Length: 594
```

```
<?xml-stylesheet href='/static/xsl/tap-joblist-to-html.xsl' type='text/xsl'?>
<uws:jobs version="1.1" xmlns:uws="http://www.ivoa.net/xml/UWS/v1.0" xmlns:xlink="http://www.w3.org/1999/xlink" ...
  <uws:jobref id="7qarnpw6" xlink:href="http://www.g-vo.org:8080/__system__/tap/run/async/7qarnpw6">
  ...
```

# GACS (ivoa\_cookie)

```
% curl --head https://geaint.esac.esa.int/tap-server/tap/capabilities
HTTP/1.1 500 500 ---> HTTP/1.1 200 200
Date: Mon, 25 Apr 2022 15:07:14 GMT
Server: Apache/2.4.6 (Red Hat Enterprise Linux) OpenSSL/1.0.2k-fips mod_jk/1.2.43
---> WWW-Authenticate: ivoa_cookie standard_id="ivo://ivoa.net/sso#tls-with-password", access_url="https://geaint.esac.esa.int/tap-server/login"
Connection: close
Content-Type: text/html; charset=ISO-8859-1
...
```

```
% curl -D - -d username=mtaylo02 -d password=xxxx https://geaint.esac.esa.int/tap-server/login -s -o /dev/null
HTTP/1.1 200 200
Date: Mon, 25 Apr 2022 15:08:53 GMT
Server: Apache/2.4.6 (Red Hat Enterprise Linux) OpenSSL/1.0.2k-fips mod_jk/1.2.43
---> X-VO-Authenticated: mtaylo02
Set-Cookie: JSESSIONID=108FF2B1379BEFAE6FF580BF460F3373; Path=/tap-server; Secure; HttpOnly
Transfer-Encoding: chunked
Content-Type: text/plain; charset=UTF-8
...
```

```
% curl --header 'Cookie: JSESSIONID=EOF8C393F76246A0053007468638FD19' https://geaint.esac.esa.int/tap-server/tap/async -D -
HTTP/1.1 200 200
Date: Mon, 25 Apr 2022 15:28:34 GMT
Server: Apache/2.4.6 (Red Hat Enterprise Linux) OpenSSL/1.0.2k-fips mod_jk/1.2.43
---> X-VO-Authenticated: mtaylo02
Transfer-Encoding: chunked
Content-Type: text/xml; charset=UTF-8
...
```

```
<?xml version="1.0" encoding="UTF-8"?>
<uws:jobs xmlns:uws="http://www.ivoa.net/xml/UWS/v1.0" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xs="http://www.w3.org/2001/XMLSchema" ...>
  <uws:jobref id="1650899420107I" xlink:href="https://geaint.esac.esa.int/tap-server/tap/async/1650899420107I"><uws:phase>COMPLETED</uws:phase></uws:jobref>
  ...
```

Content in magenta  
is not currently provided  
by the service  
(it's hacked in by TOPCAT)

# Next Steps

## Standardisation:

- Draft next SSO version (*Brian is on it!* <https://github.com/ivoa-std/SSO/>)
- Draft changes to other affected standards (VOSI, TAP, others?)

## Implementation:

- Server
  - ▷ GACS updates to implement cookies properly soon?
  - ▷ Anybody else?
- Client
  - ▷ TOPCAT implementation ready for public release?
  - ▷ Provide TOPCAT's Auth library for third parties?

## Open questions:

- Token scope (where else is authentication info valid?)
- Other Auth schemes or login methods required?
- Other issues arising from experience?