



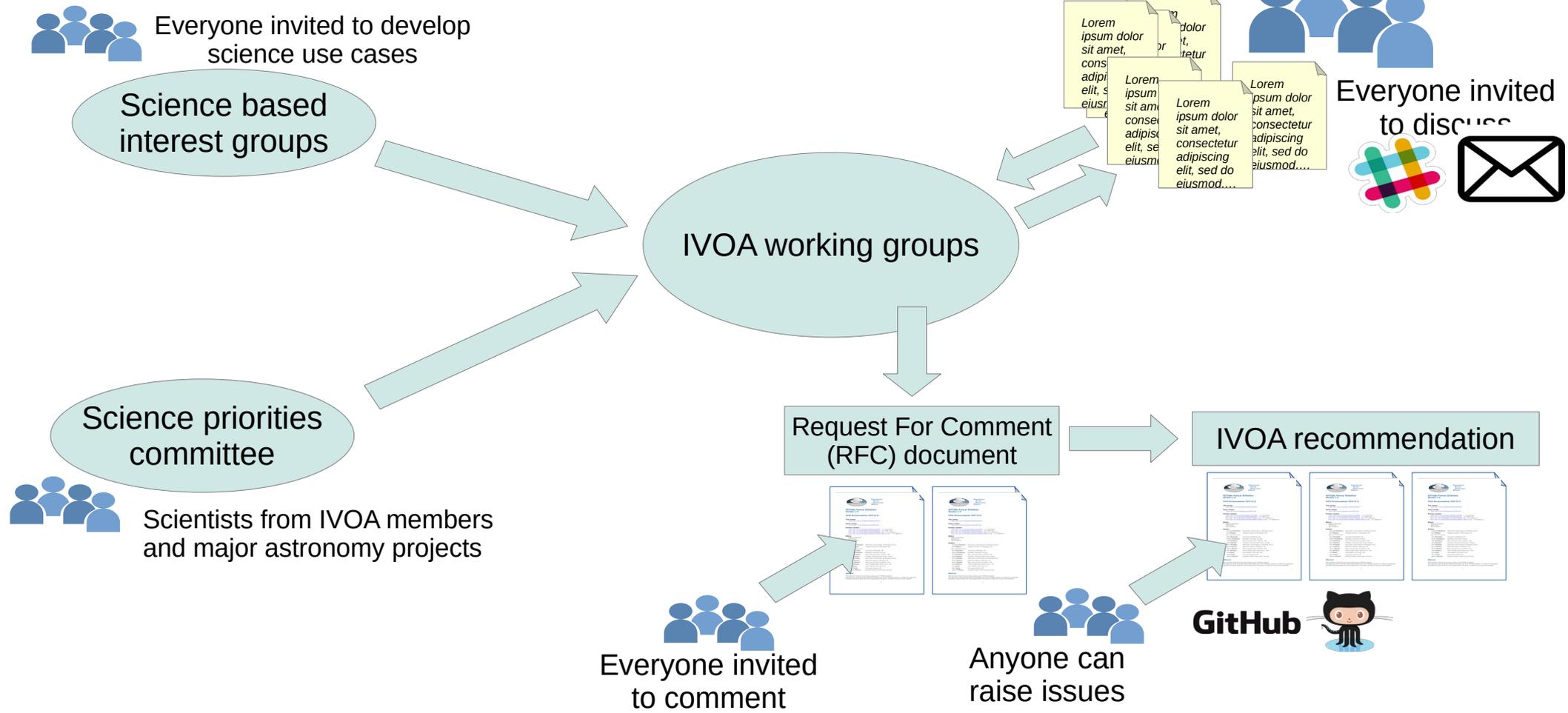
USC-C General Assembly

Trieste 9-13 March 2026

Introduction to the VO

Hendrik Heint, Dave Morris, Sara Bertocco

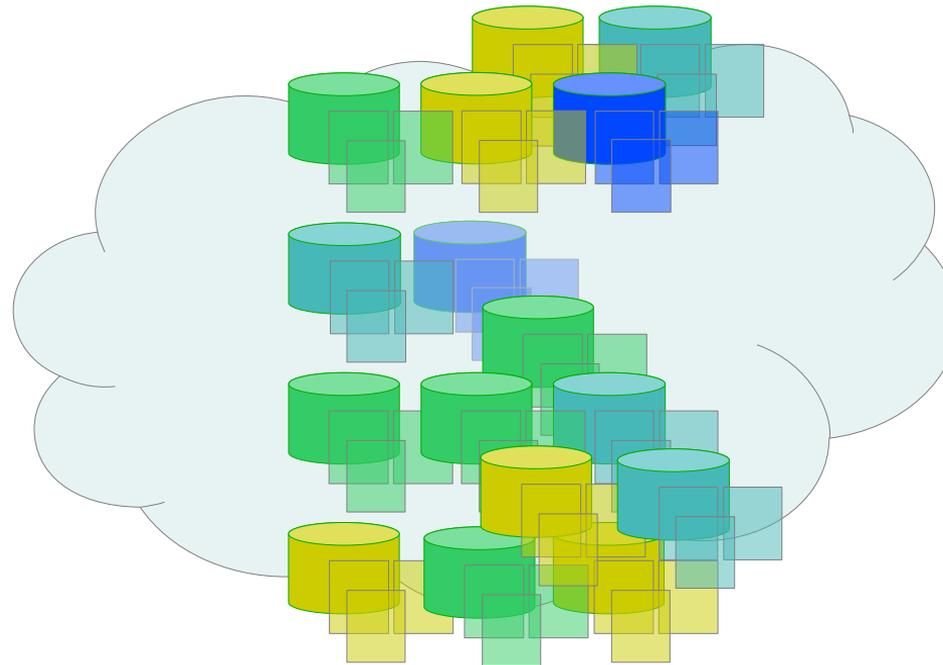






Back to Hendrik's talk



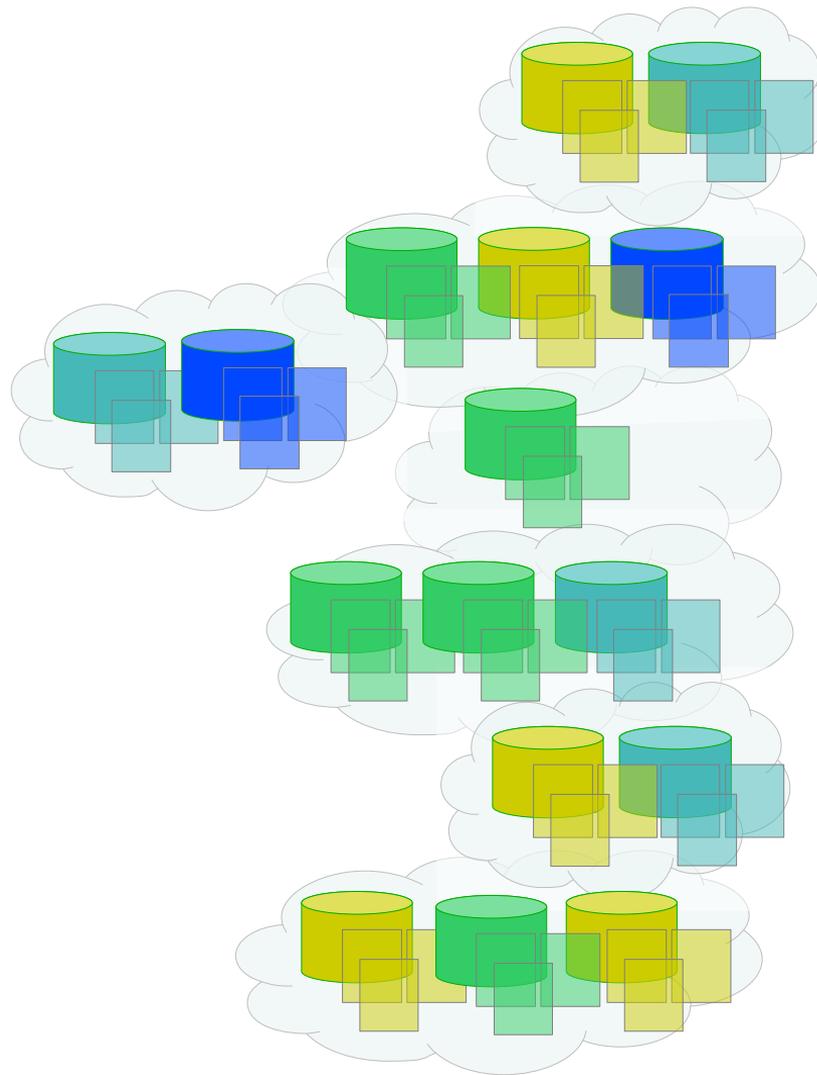


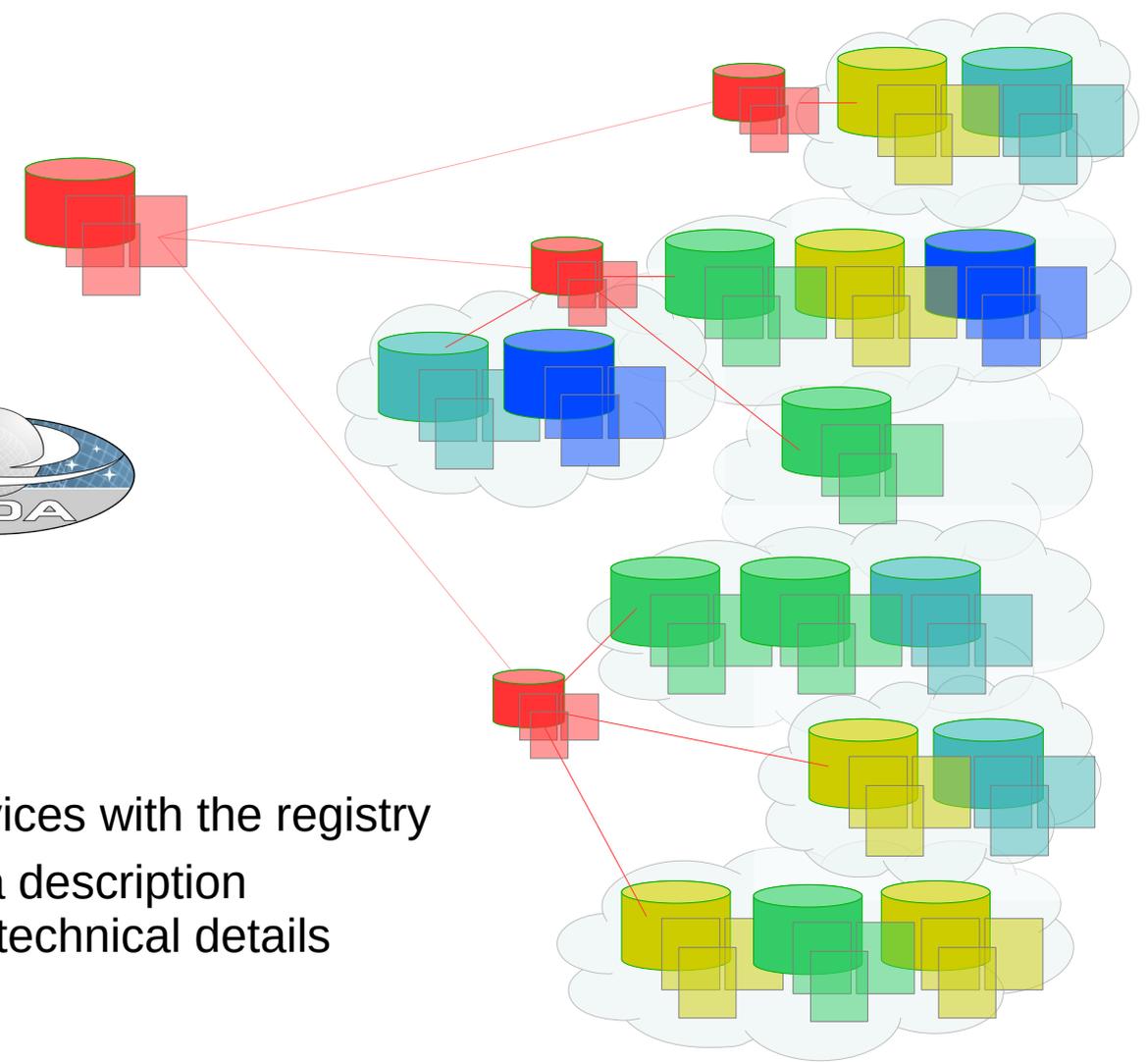
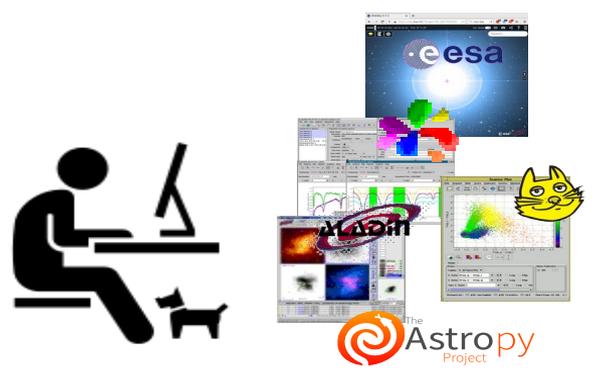
The Virtual Observatory

Data from all over the world in the cloud

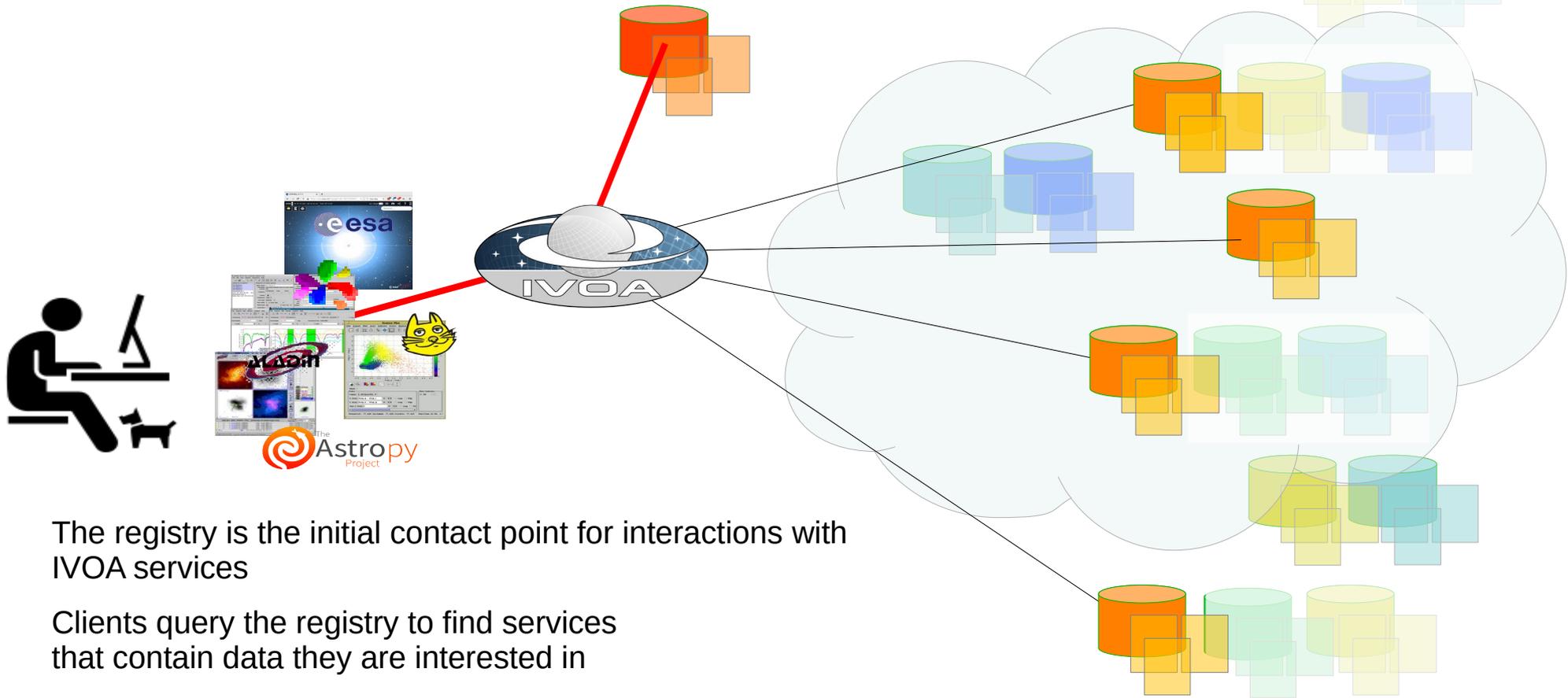


Lots of individual services each playing their part
But ... how do you know where everything is ?





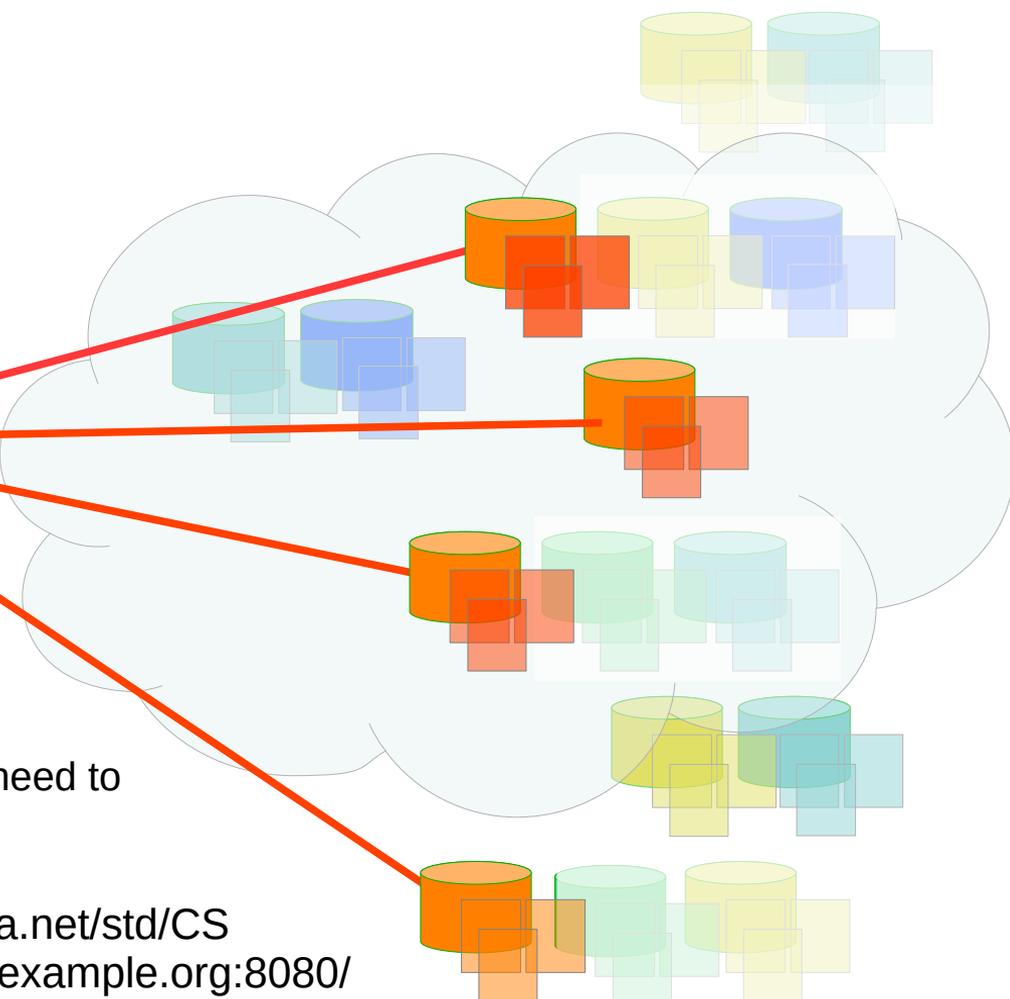
Data providers register their services with the registry
 Registration metadata includes a description
 of the data they provide and the technical details
 of how to connect



The registry is the initial contact point for interactions with IVOA services

Clients query the registry to find services that contain data they are interested in

Search for:
“Services with neutrino data”



Registry provides clients with the information they need to contact the individual services.

capability `ivo://ivoa.net/std/CS`
 endpoint `http://cs.example.org:8080/`



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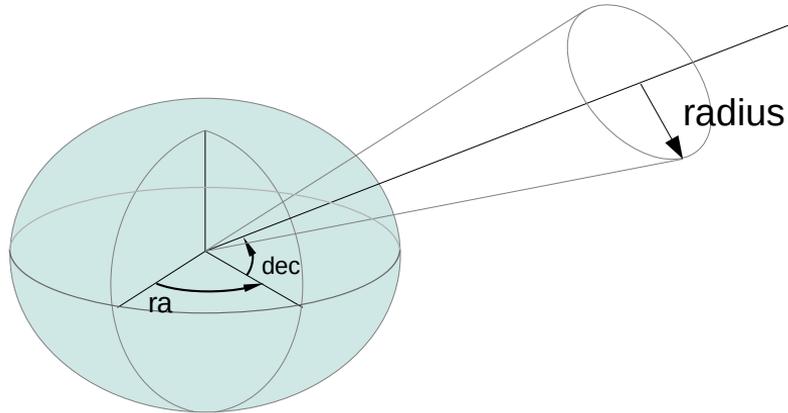


Simple Cone Search

One of the earliest services
defined by the IVOA

Version 1.0 adopted as an
IVOA recommendation in 2006

RA = 170° (deg)
DEC = 25° (deg)
SR = 30° (deg)



<https://ivoa.net/documents/latest/ConeSearch.html>

Simple Cone Search

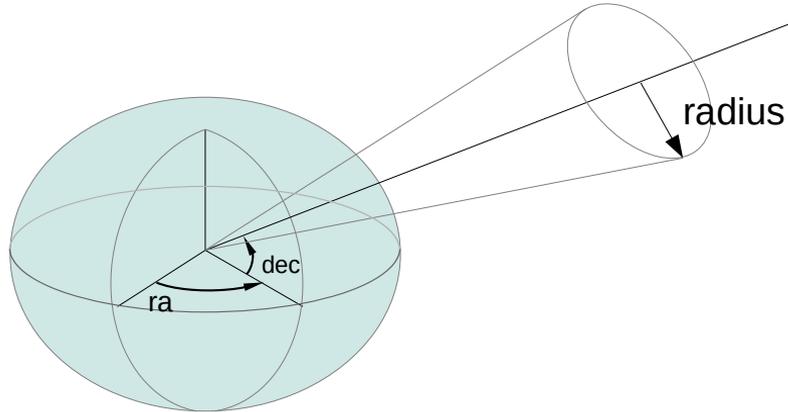
Simple HTTP GET request

<https://ivoa.example.net/cone?RA=170&DEC=25&SR=30>

RA = 170° (deg)

DEC = 25° (deg)

SR = 30° (deg)



<https://ivoa.net/documents/latest/ConeSearch.html>



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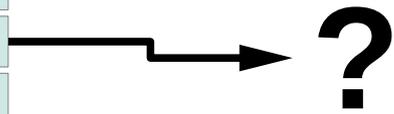


Unified Content Descriptors (UCD)

Different data providers have a different table structures

Data provider #1

| column name |
|-------------|
| RA |
| Decl |
| ID |
| |
| |



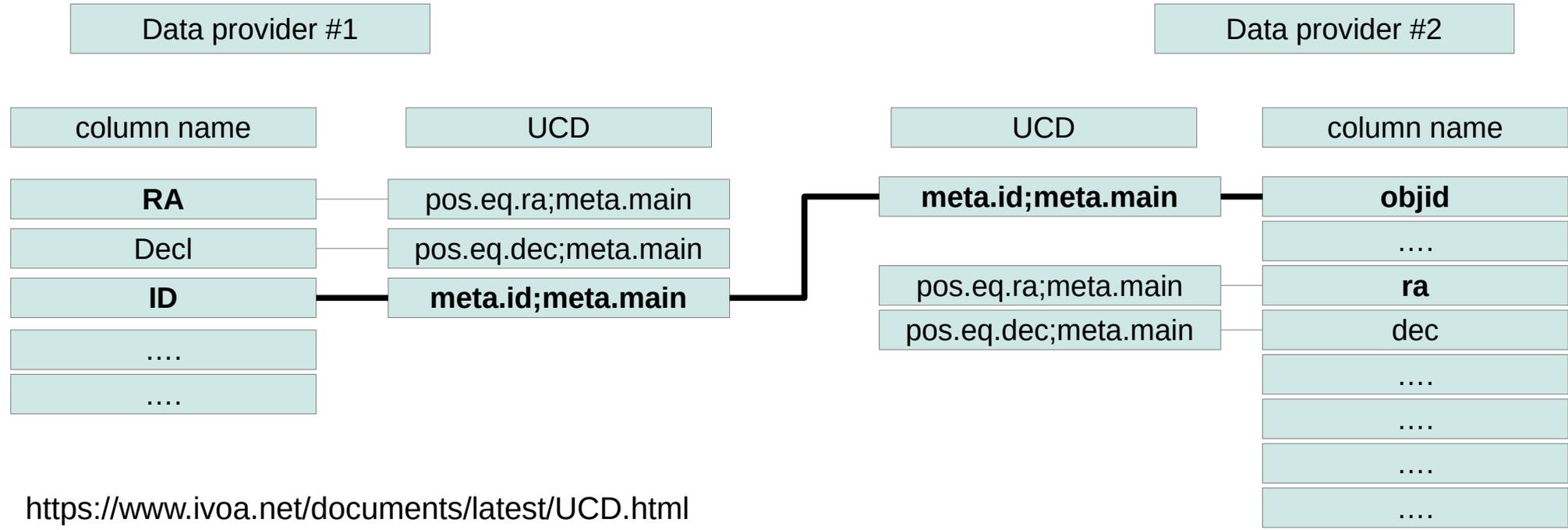
Data provider #2

| column name |
|-------------|
| objid |
| |
| ra |
| dec |
| |
| |
| |
| |



Unified Content Descriptors (UCD)

TAP schema and UCDs enable **clients** to figure out the mapping



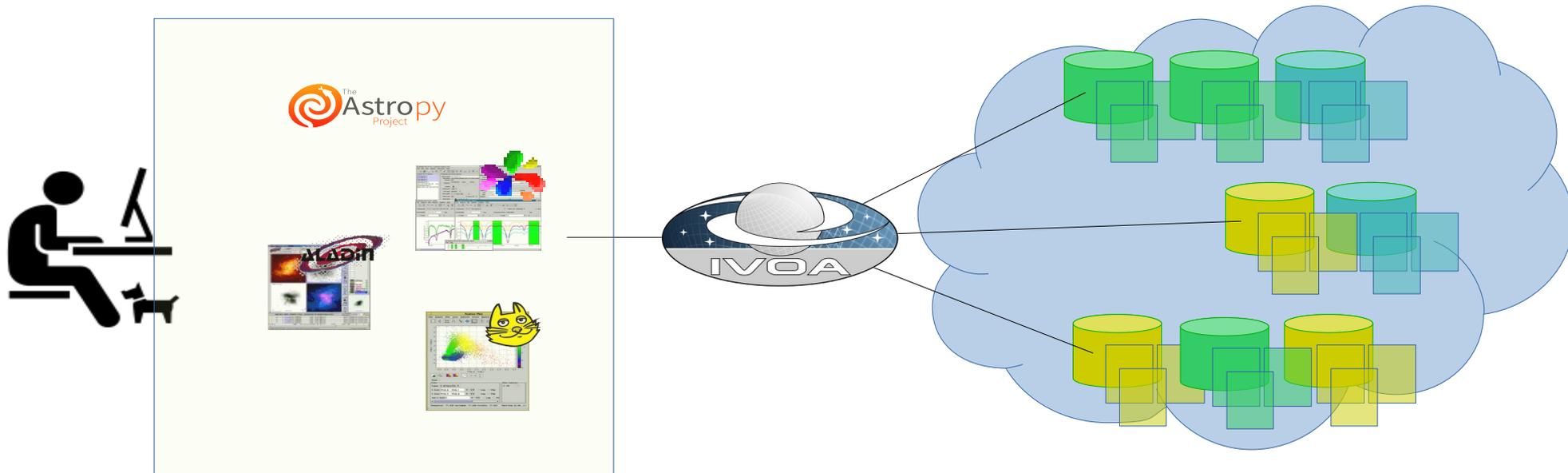
<https://www.ivoa.net/documents/latest/UCD.html>





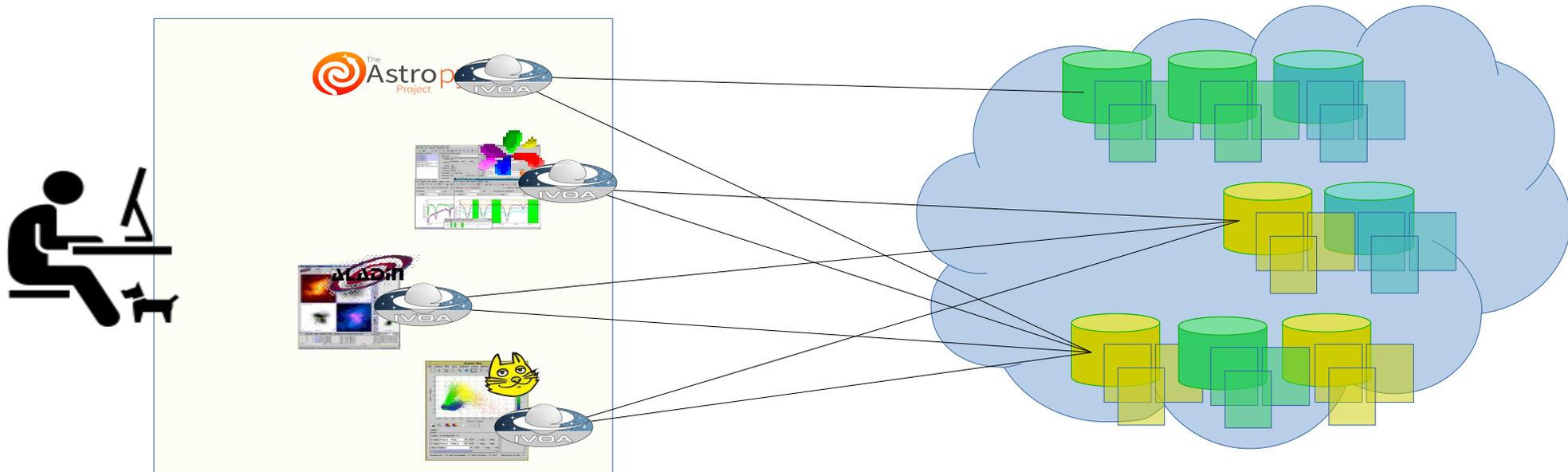
Back to Hendrik's talk





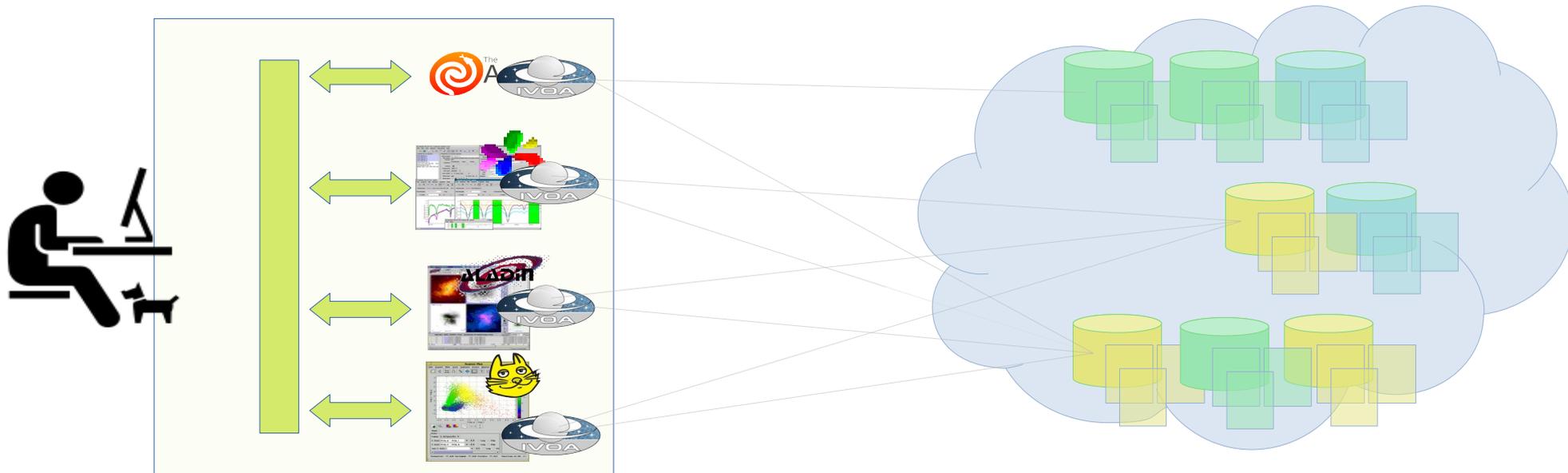
The Virtual Observatory

All the data from the cloud available on your desktop



All the data from the cloud to each desktop app

Each application maintains its own connection to the VO



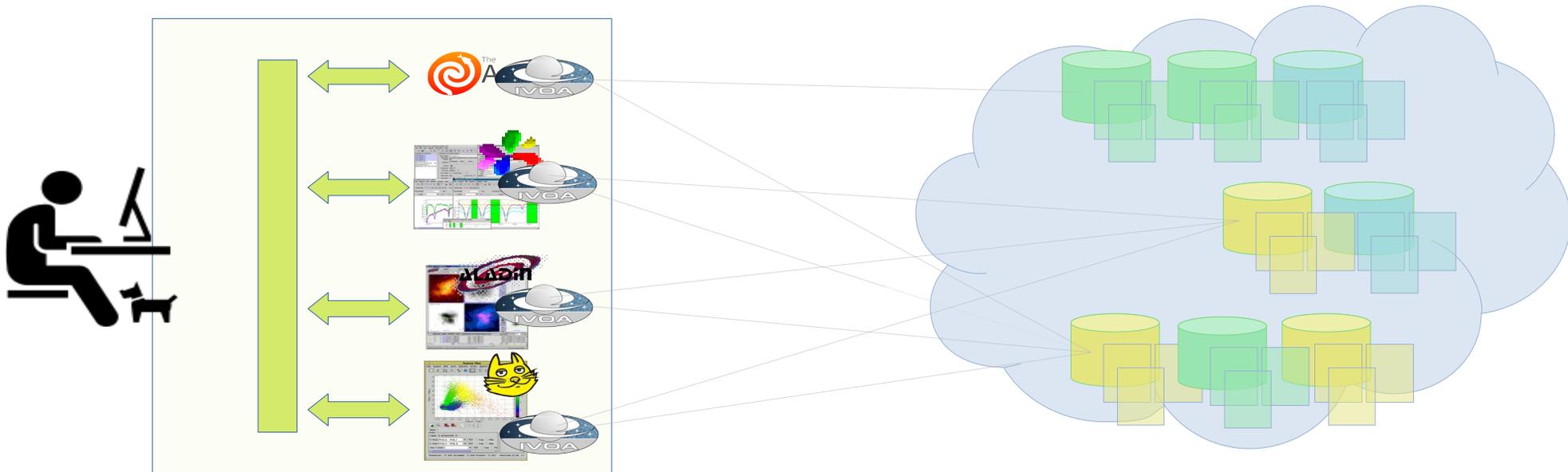
SAMP is a message bus within your local computer

Applications can use SAMP to send messages to each other

```
table.load.votable <http://example.org/.../table.vot>
```

```
image.load.fits <http://example.org/.../image.fits>
```

```
coord.pointAt.sky <ra,dec>
```



Messages can be sent to specific applications

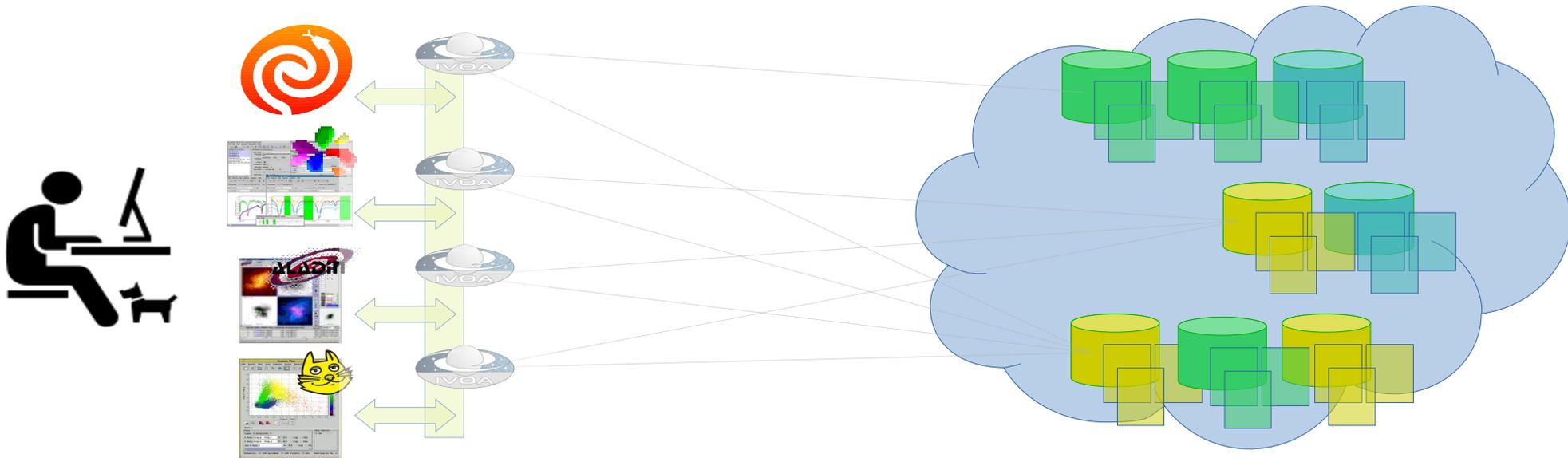
Send to Aladin:

`image.load.fits <http://example.org/.../image.fits>`

Or broadcast to all listeners

Send to all:

`coord.pointAt.sky <ra,dec>`



The Virtual Observatory

If we have done our job right, all the details disappear
 All the data from the cloud appears to be one big
 dataset accessible through your desktop



Back to Hendrik's talk

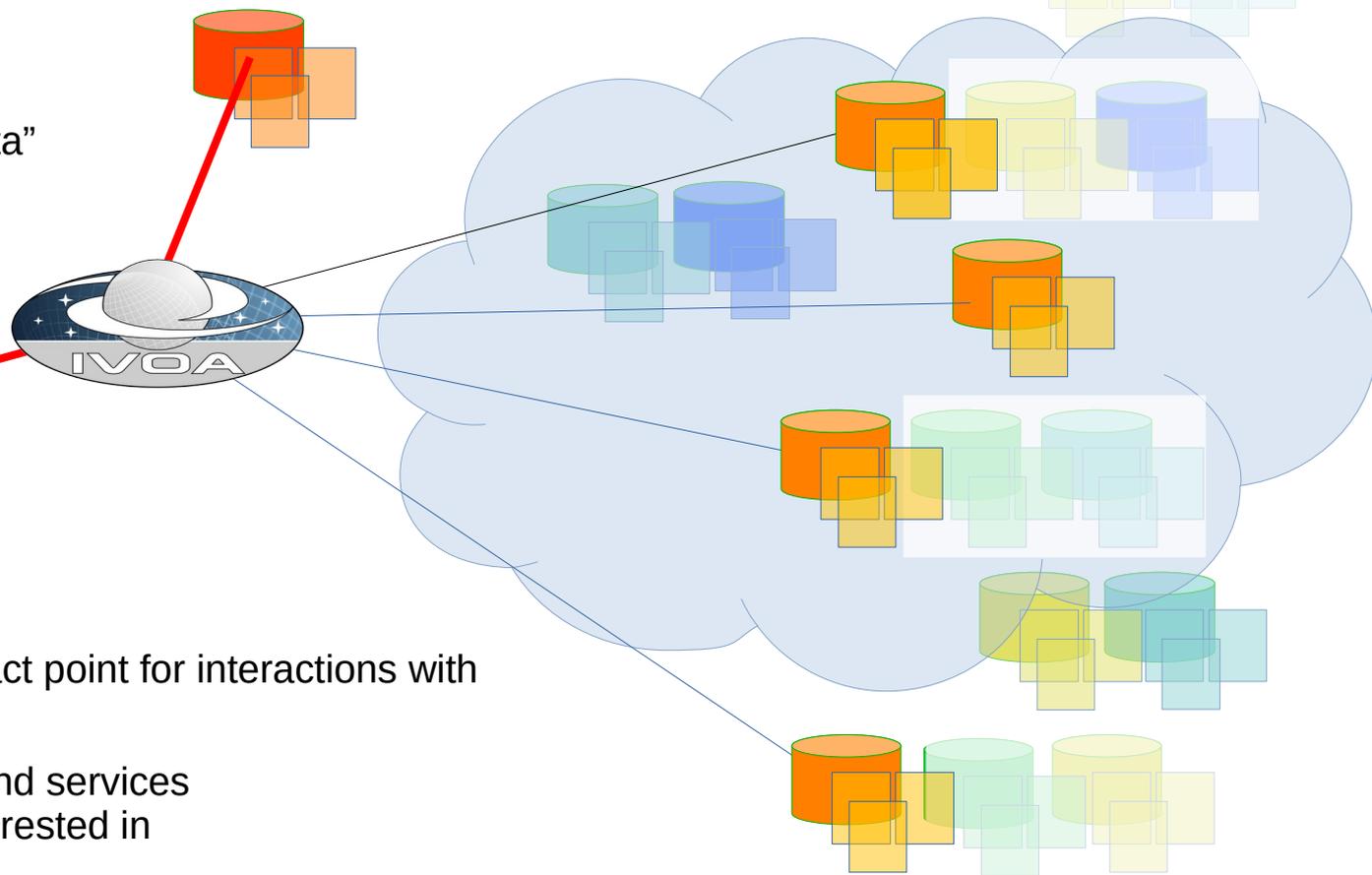


Search for:
"Services with neutrino data"



The registry is the initial contact point for interactions with IVOA services

Clients query the registry to find services that contain data they are interested in



Registry Resource Record :

Service capabilities

TAP, ObsTap, ConeSearch, SIAP, SSAP

Collection metadata

Sky coverage (MOC)

Waveband

Infra-red, optical, ultra-violet, xray

Database catalogs

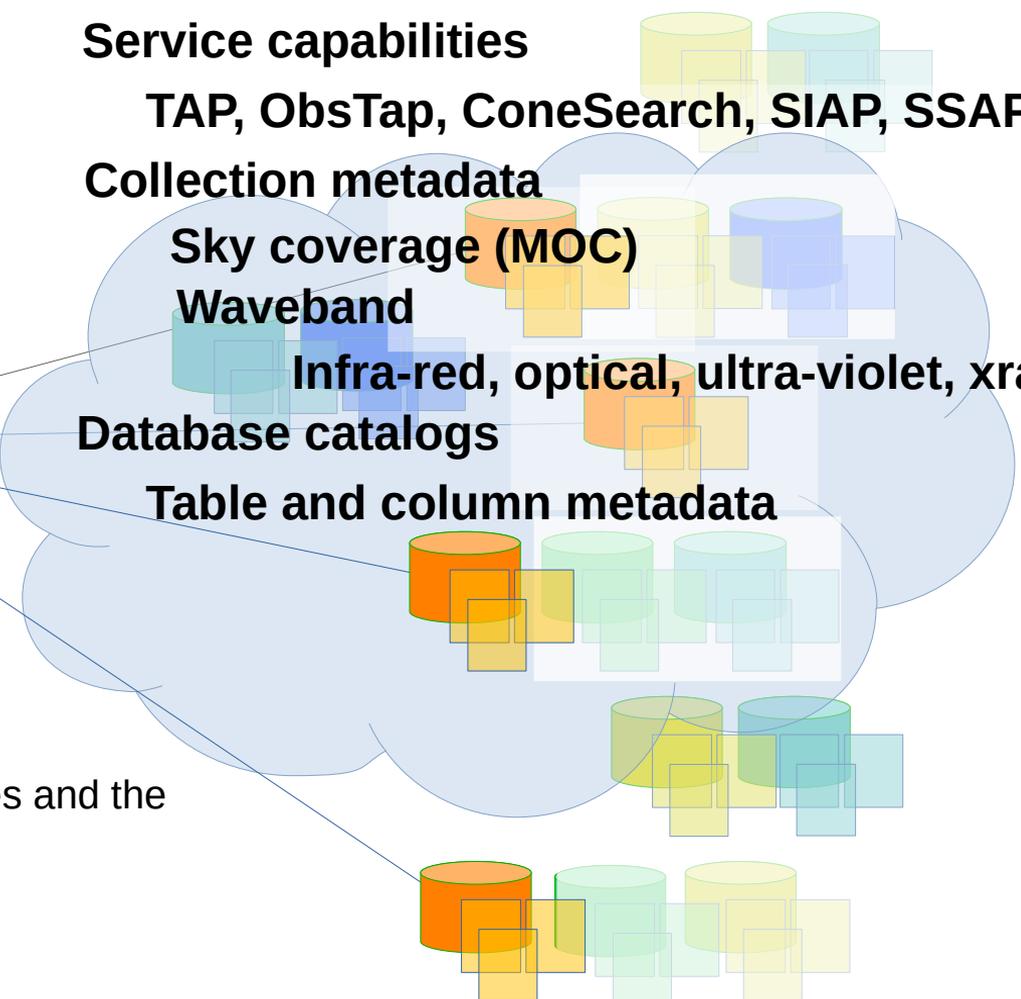
Table and column metadata

Search for:
"Services with neutrino data"



Data providers publish metadata about their services and the data they contain

Client applications can use standard terms to help the user discover the data they need



Registry Resource Record :

Service capabilities

TAP, ObsTap, ConeSearch, SIAP, SSAP

Collection metadata

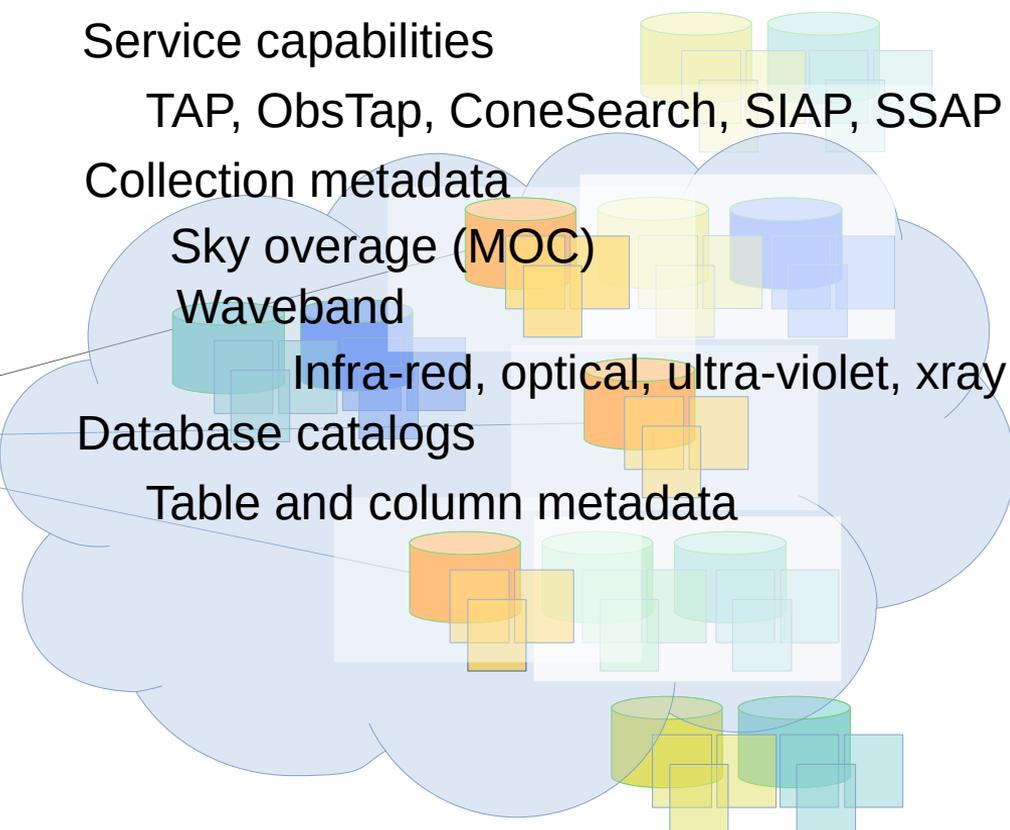
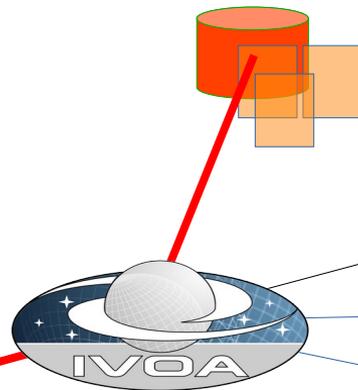
Sky overage (MOC)

Waveband

Infra-red, optical, ultra-violet, xray

Database catalogs

Table and column metadata



For more details on how to publish data:

<https://wiki.ivoa.net/twiki/bin/view/IVOA/PublishingInTheVO>

The service standards define what metadata is required for each type of service



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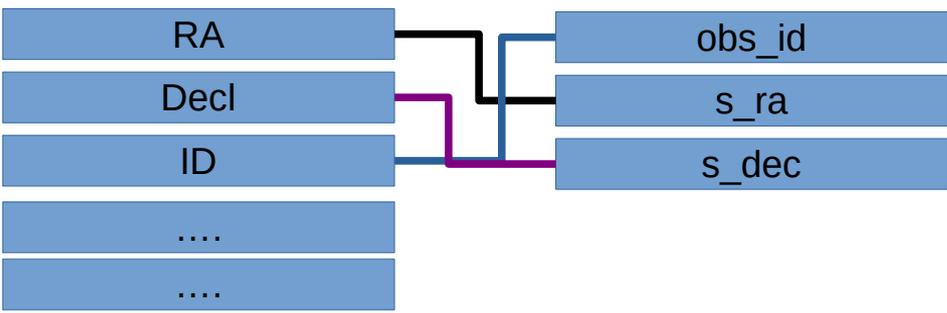


Observation Data Model Core Components

ObsCore adds a standard view to the data in each data provider

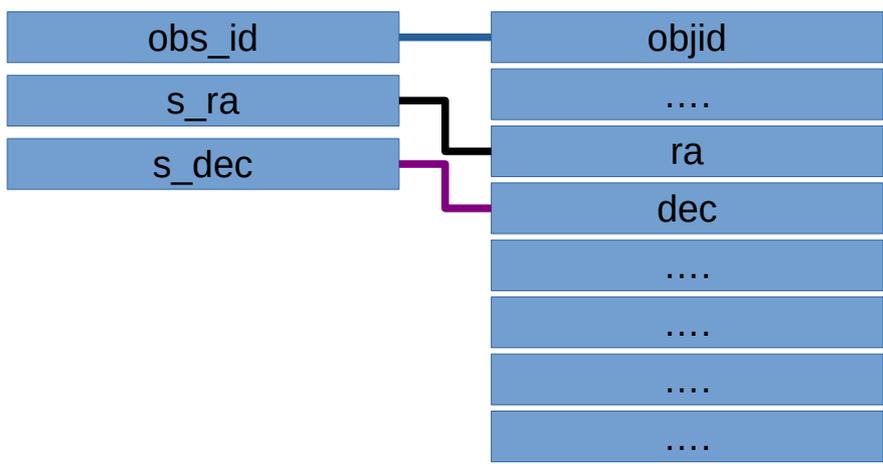
Data provider #1

```
CREATE VIEW ivoa.ObsCore ( ... )
```



Data provider #2

```
CREATE VIEW ivoa.ObsCore ( ... )
```



<https://www.ivoa.net/documents/ObsCore/>



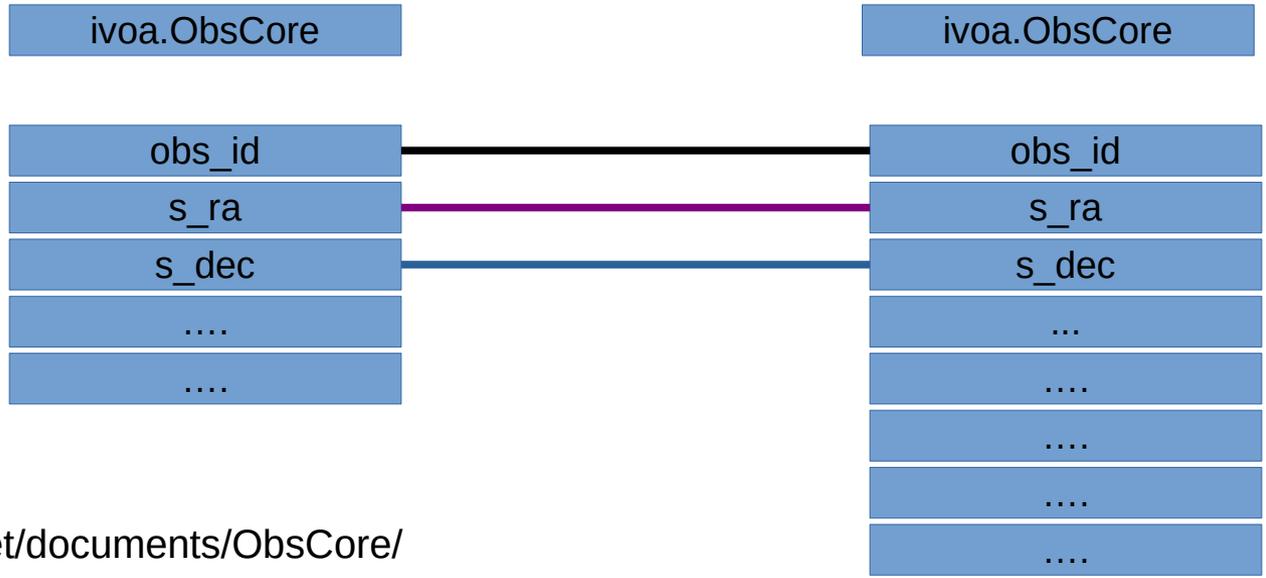


Observation Data Model Core Components

Now the public tables in **both** providers are the same

Data provider #1

Data provider #2



<https://www.ivoa.net/documents/ObsCore/>



Observation Data Model Core Components

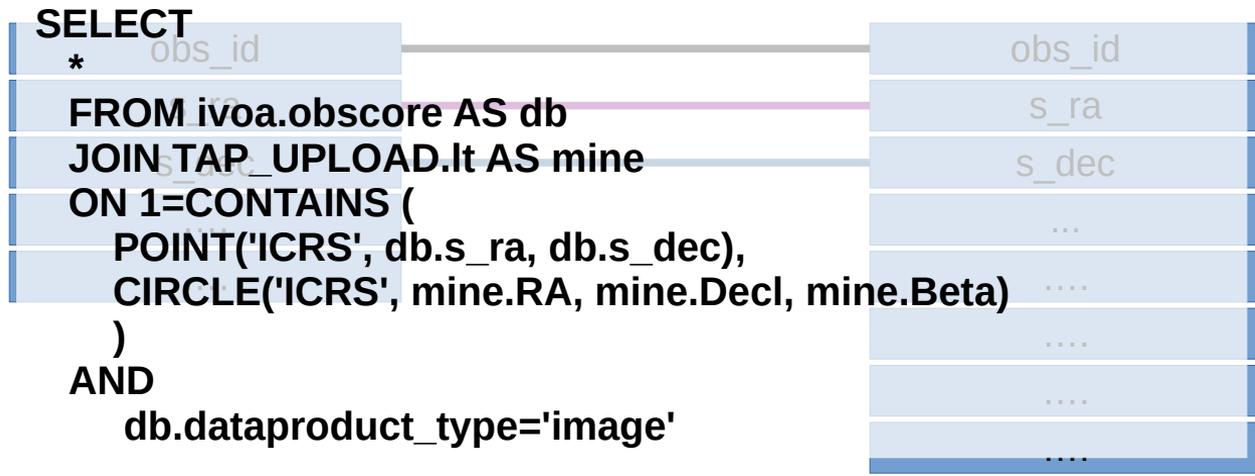
Now, the same query can be applied to **both** services

Data provider #1

Data provider #2

ivoa.ObsCore

ivoa.ObsCore



<https://www.ivoa.net/documents/ObsCore/>



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