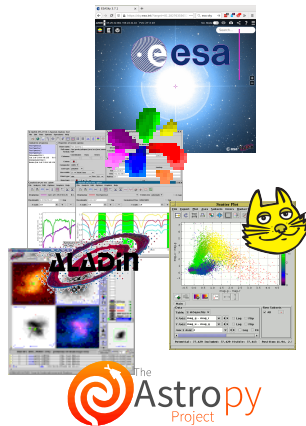
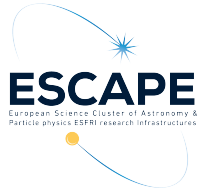


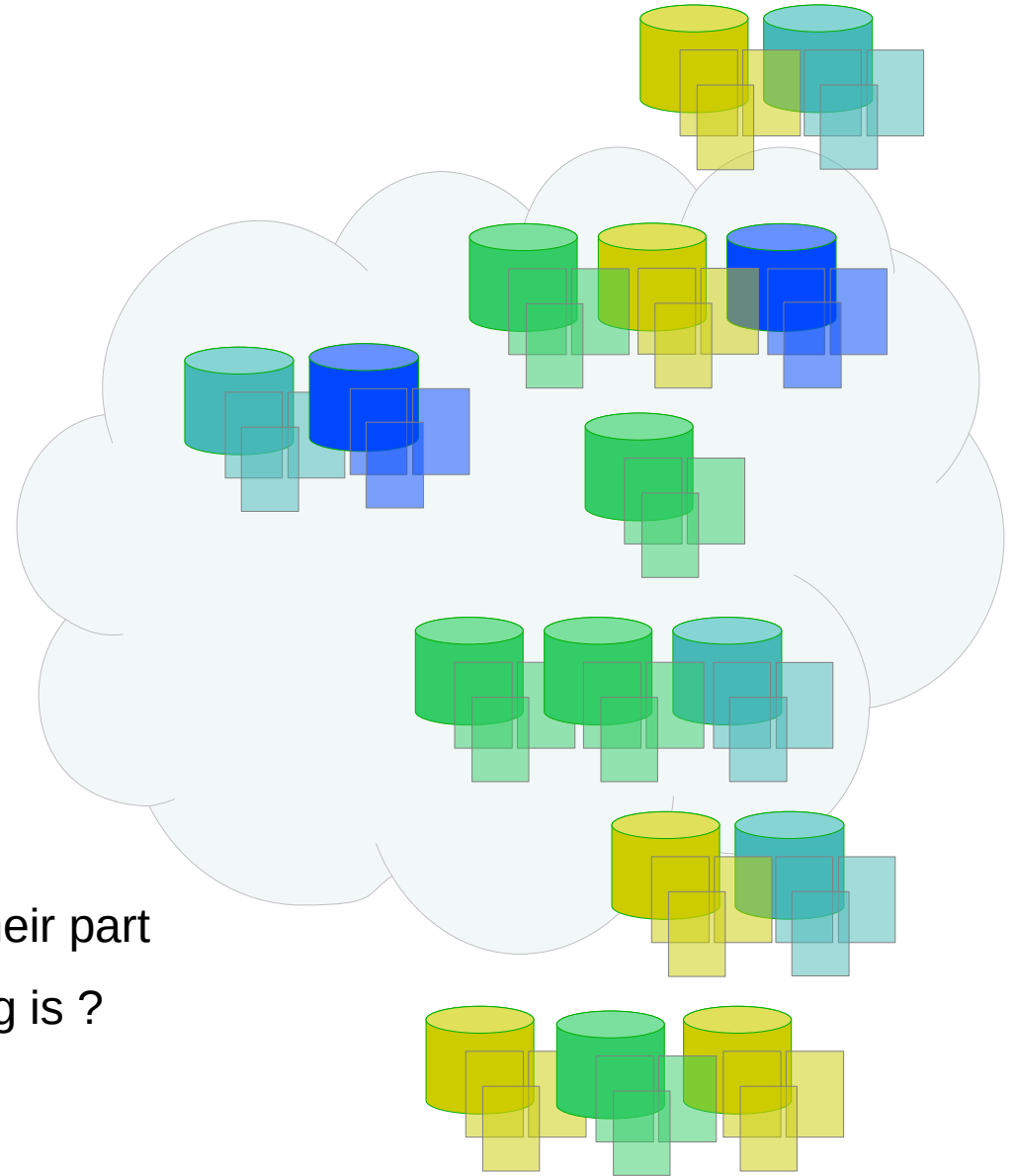
The Virtual Observatory

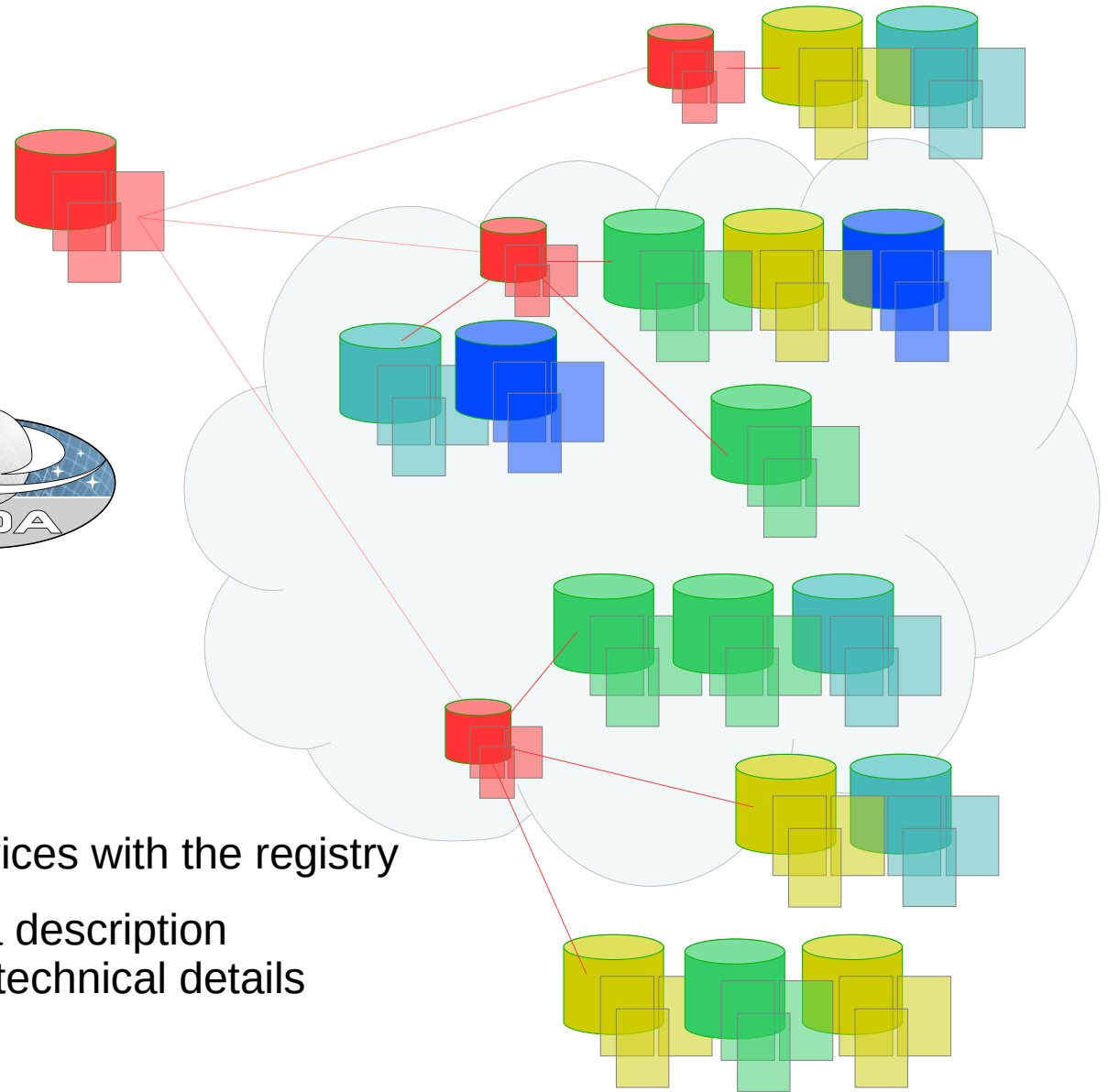
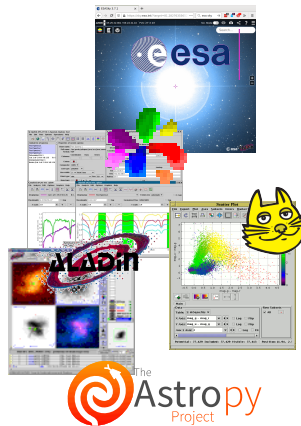
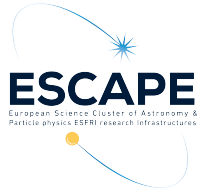
Data from all over the world in the cloud





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

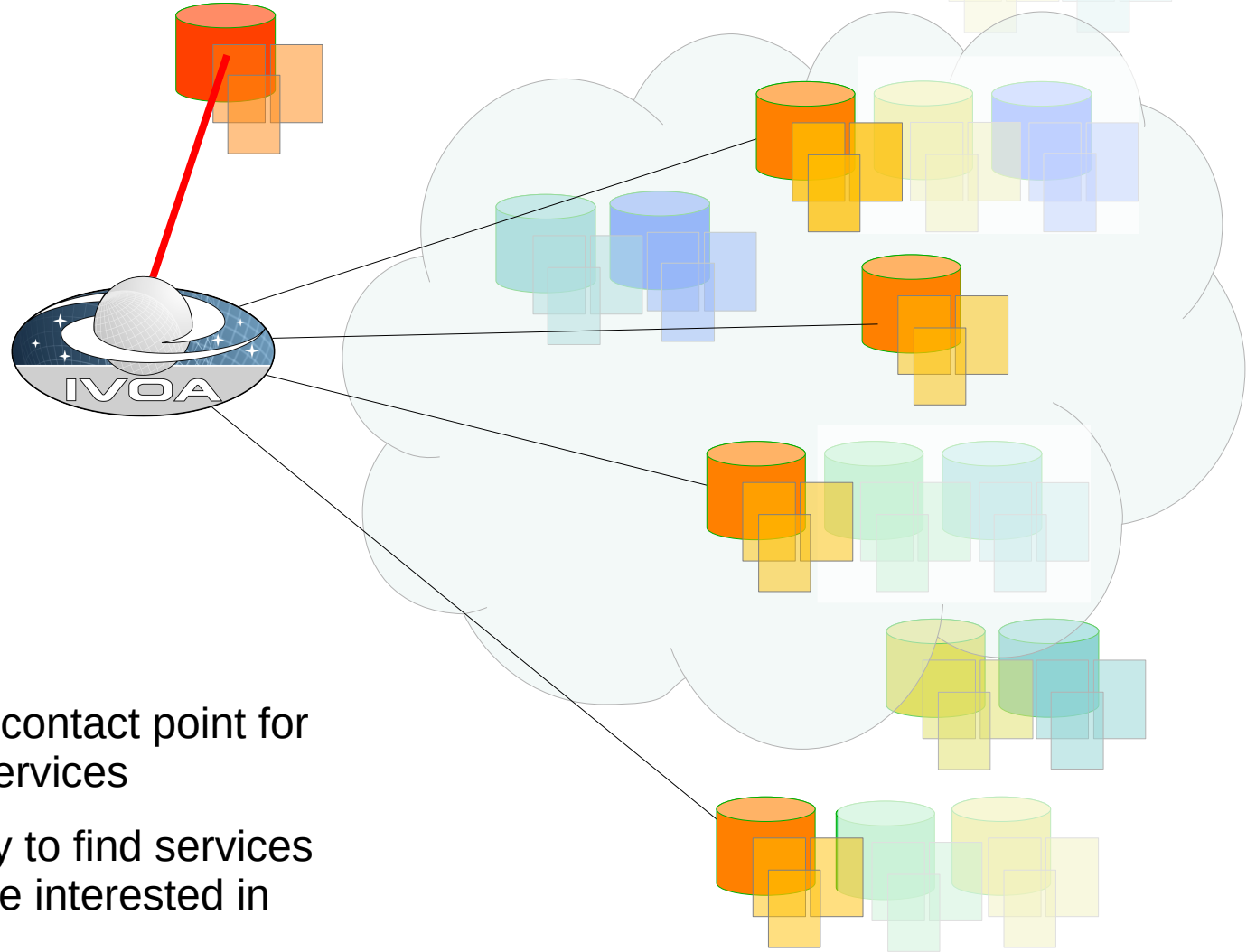
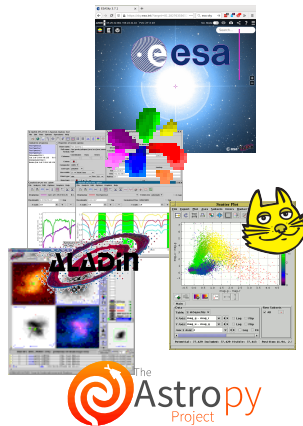
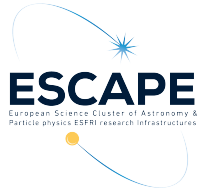




Data providers register their services with the registry

Registration metadata includes a description of the data they provide and the technical details of how to connect

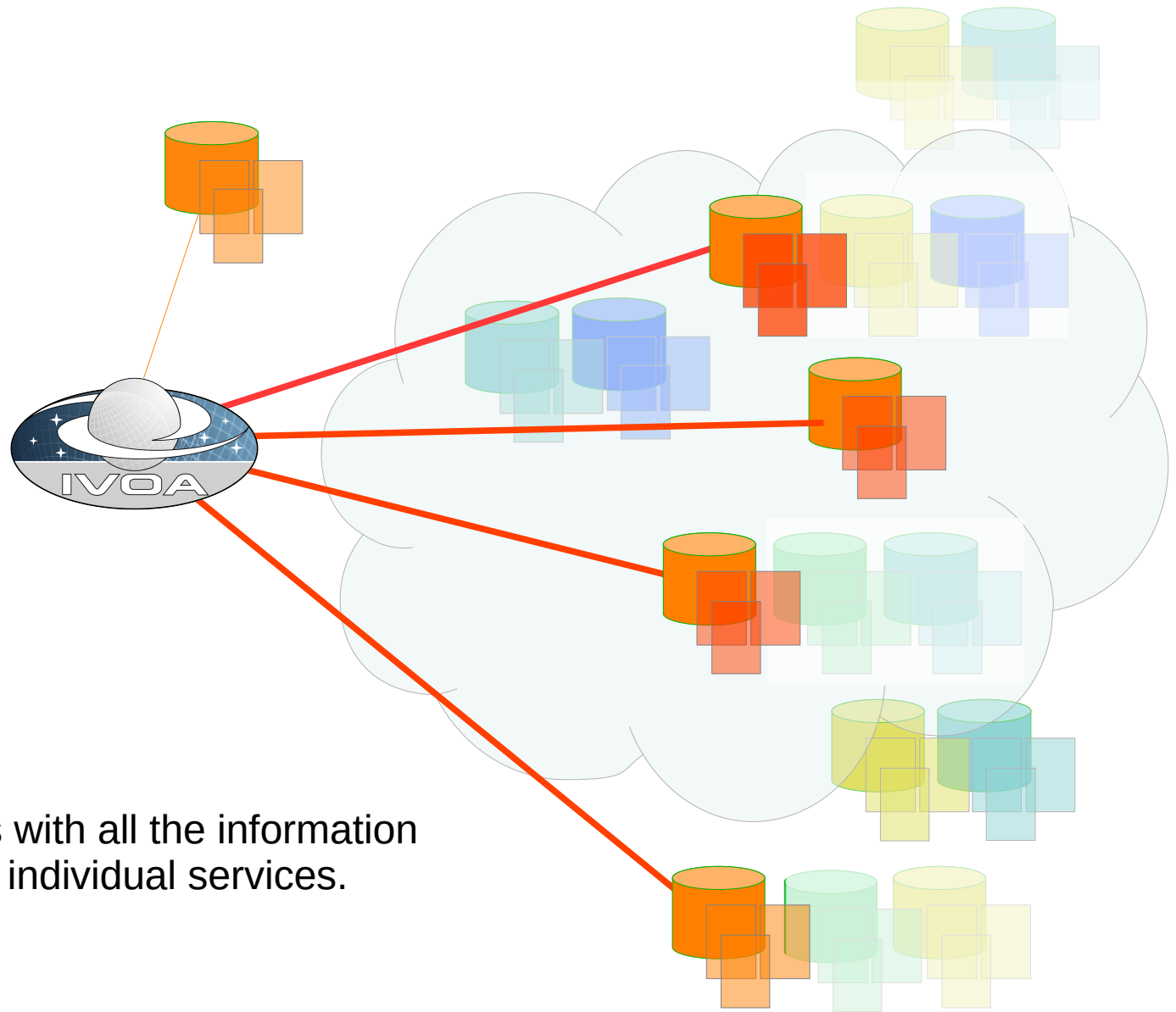
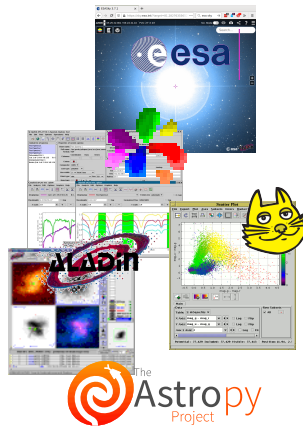
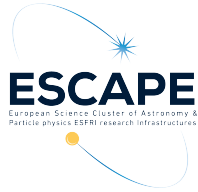




The registry is the initial contact point for interactions with IVOA services

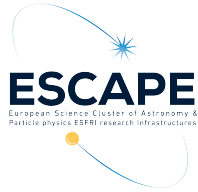
Clients query the registry to find services that contain data they are interested in





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





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Simple Cone Search

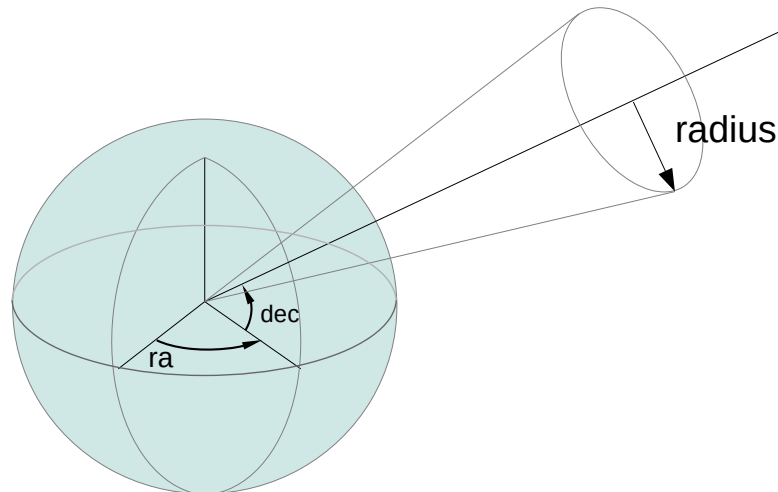
One of the earliest services
defined by the IVOA

Version 1.0 adopted as an
IVOA recommendation in 2006

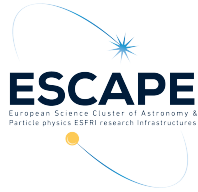
RA = 170° (deg)

DEC = 25° (deg)

SR = 30° (deg)

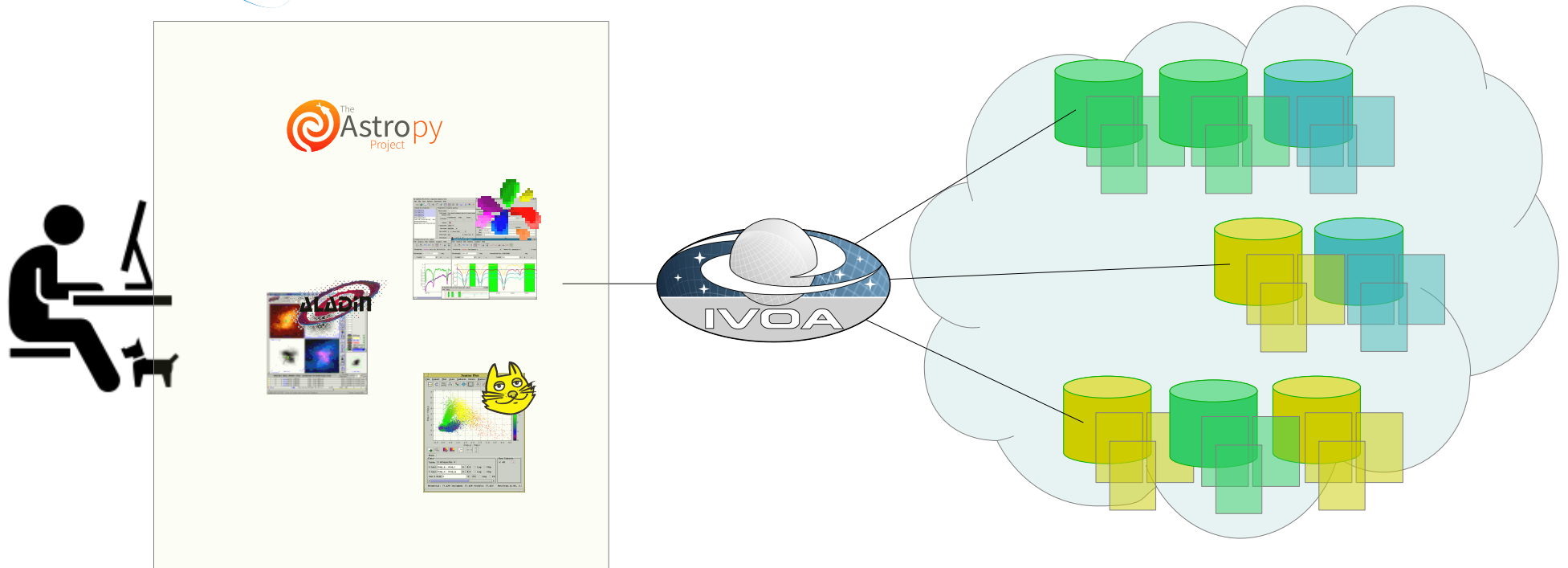
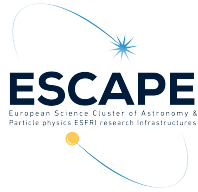


<https://ivoa.net/documents/latest/ConeSearch.html>



Back to the main session

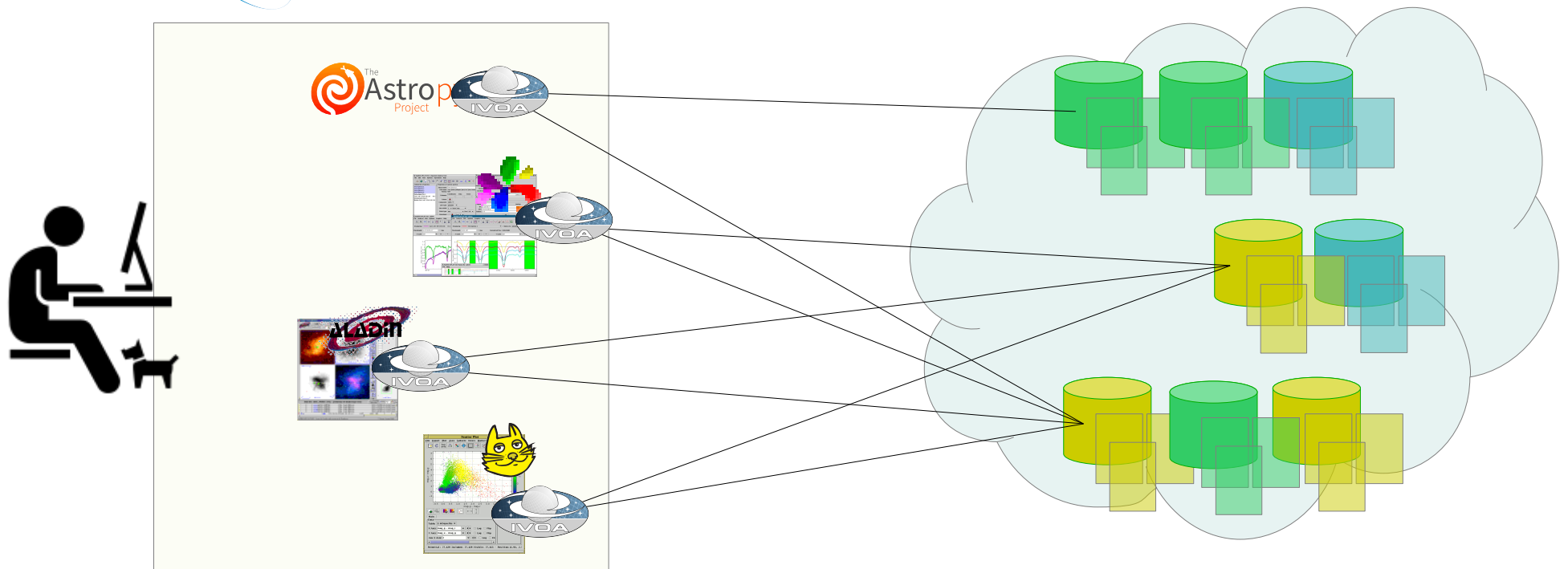
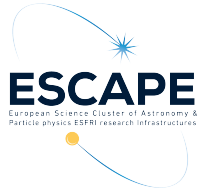




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All the data from the cloud available on your desktop

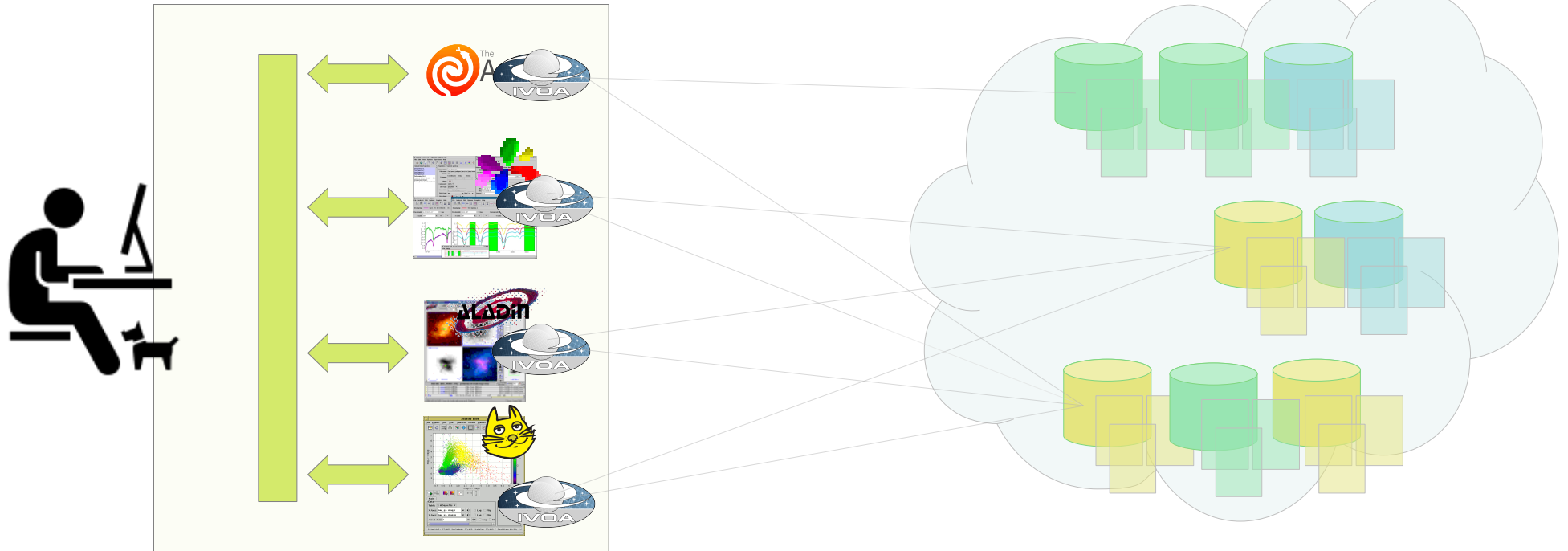
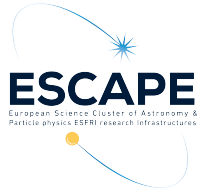




All the data from the cloud to each desktop app

Each application maintains its own connection to the VO





SAMP is a message bus within your local computer

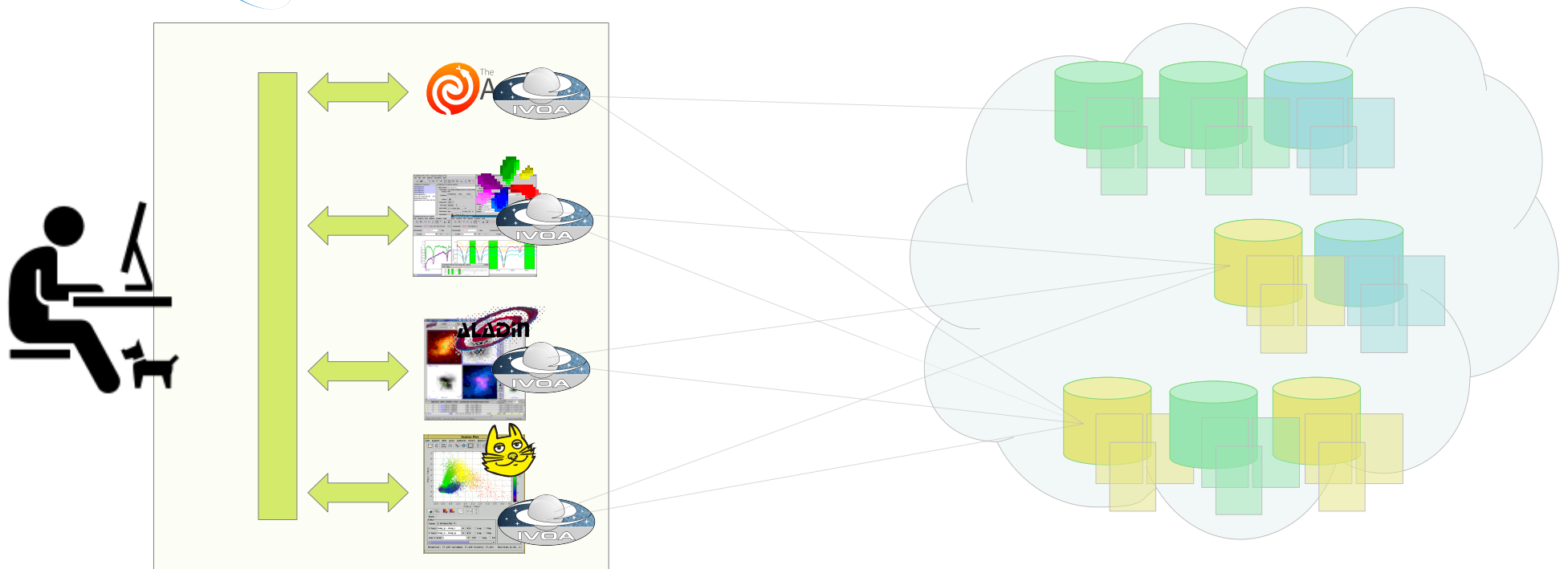
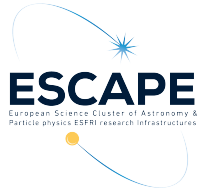
Applications can use SAMP to send messages to each other

```
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:

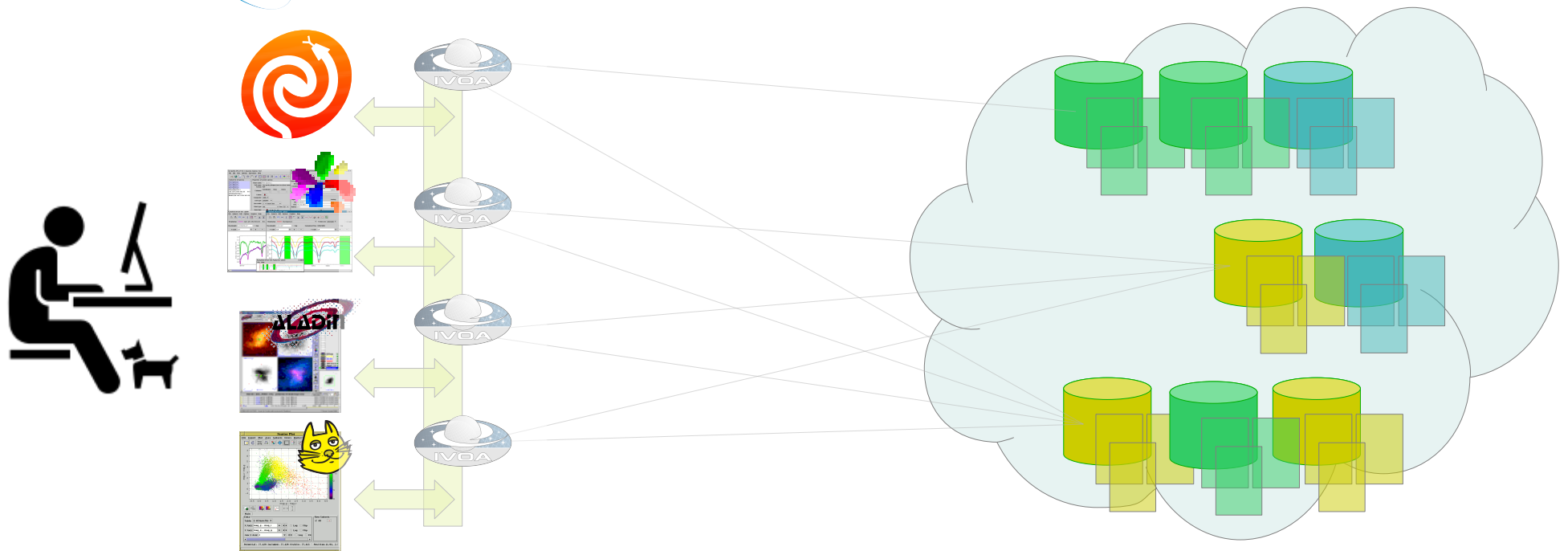
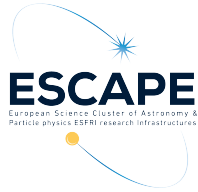
`image.load.fits <http://example.org/.../image.fits>`

Or broadcast to all listeners

Send to all:

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



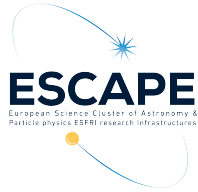


The Virtual Observatory

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 the main session



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

....

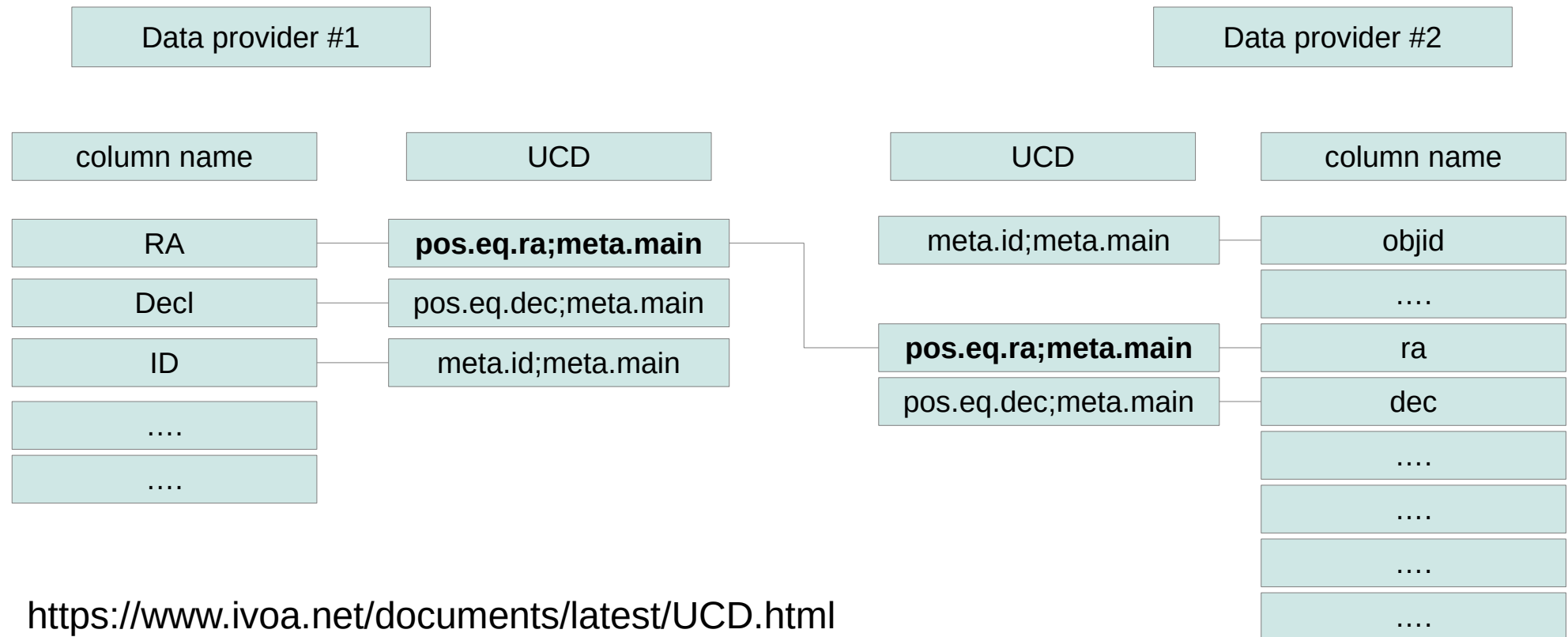
....

....

....

Unified Content Descriptors (UCD)

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

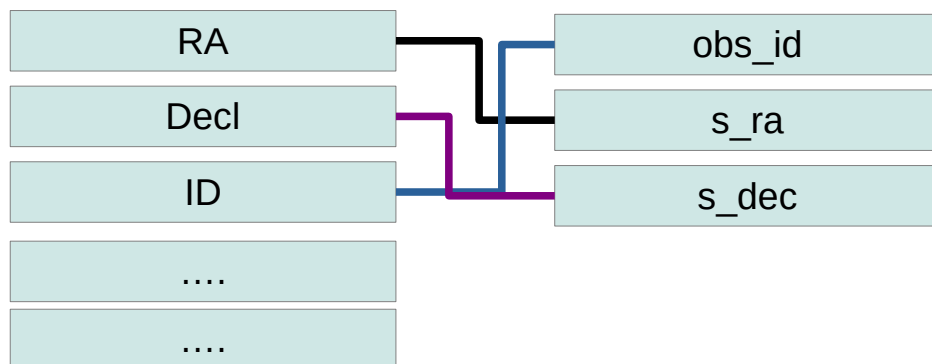


Observation Data Model Core Components

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

Data provider #1

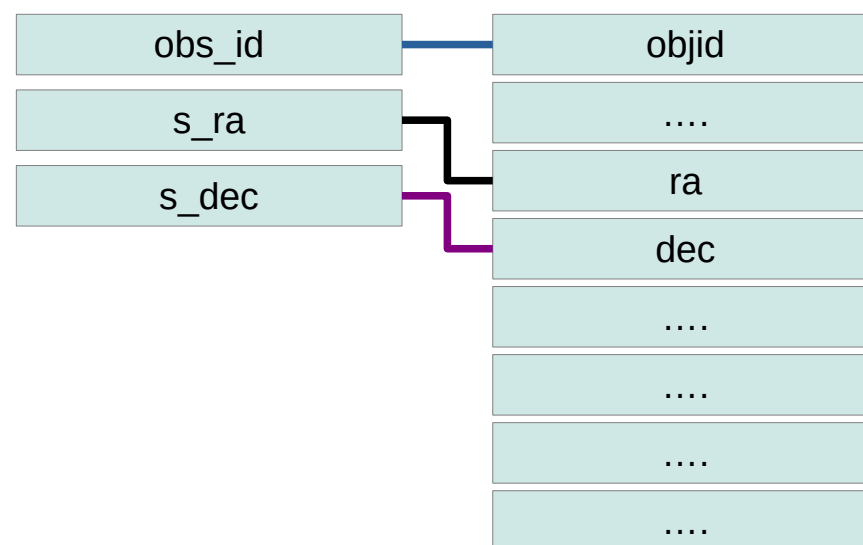
```
CREATE VIEW ivoa.ObsCore ( .... )
```



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

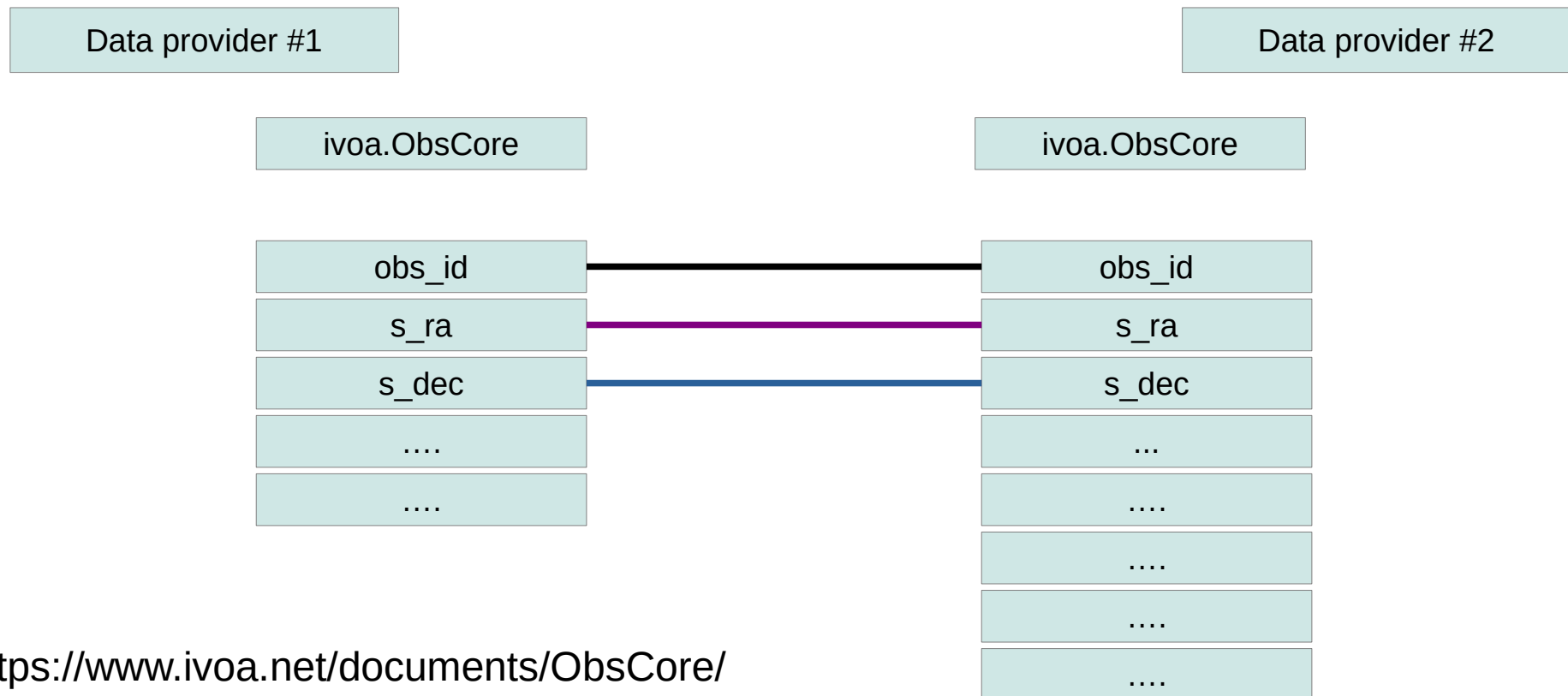
Data provider #2

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

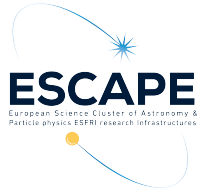


Observation Data Model Core Components

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



<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

SELECT

***** obs_id

FROM ivoa.observatory AS db

JOIN TAP_UPLOAD.It AS mine

ON 1=CONTAINS (

POINT('ICRS', db.s_ra, db.s_dec),

CIRCLE('ICRS', mine.RA, mine.Decl, mine.Beta)

)

AND

db.dataproduct_type='image'

obs_id

s_ra

s_dec

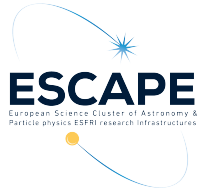
...

....

....

....





Back to the main session





Everyone invited to develop science use cases

Science based interest groups

Scientific use cases

theory
time-series

Science priorities for the IVOA

Science platforms

Machine learning

Multi-messenger astronomy

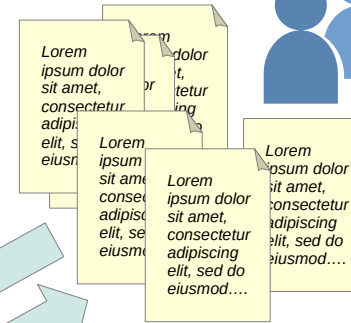
Science priorities committee



Scientists from IVOA members and major astronomy projects

IVOA working groups
e.g. DataAccessLayer,
Applications,
Semantics

Working group email list



Everyone invited to discuss

New standards being developed

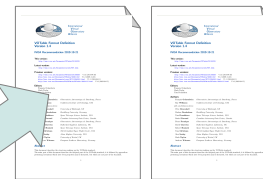
ObjVisSAP ObsLocTAP

TIMESYS Multi-order Coverage (MOC)

Hierarchical Progressive Surveys (HiPS)

Request For Comment (RFC) document

IVOA recommendation



Everyone invited to comment



Anyone can raise issues



Introduction to the VO
IVOA interoperability
Nov 2021

