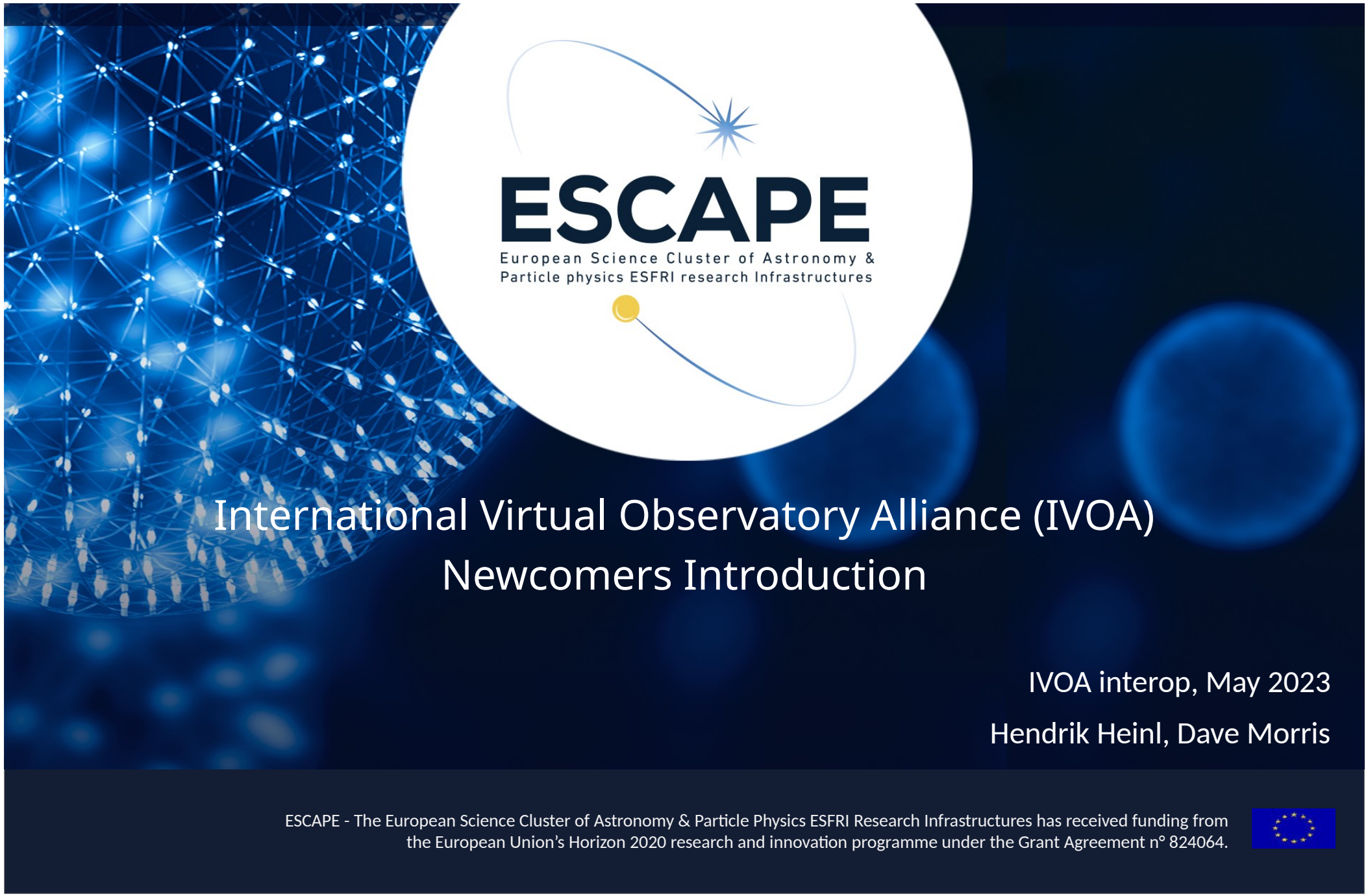


International Virtual Observatory Alliance (IVOA) Newcomers Introduction

IVOA interop, May 2023

Hendrik Heinl, Dave Morris

ESCAPE - The European Science Cluster of Astronomy & Particle Physics ESFRI Research Infrastructures has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement n° 824064.

Everyone invited to develop science use cases

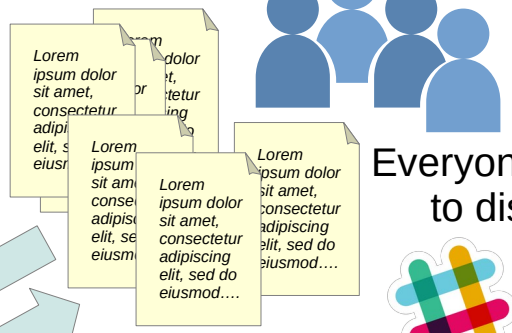
Science based interest groups

Science priorities committee

Scientists from IVOA members and major astronomy projects

IVOA working groups

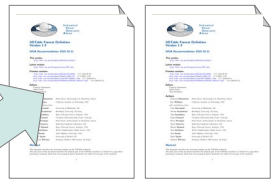
Working group discussions

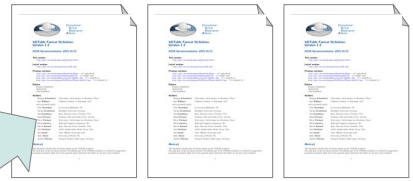


Everyone invited to discuss

Request For Comment (RFC) document

IVOA recommendation





Everyone invited to comment

Anyone can raise issues

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IVOA interop
May 2023

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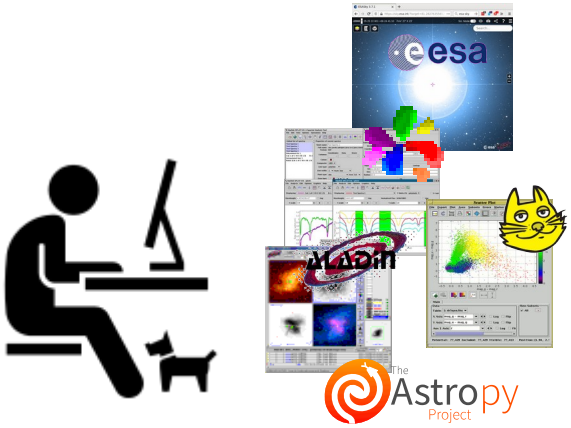

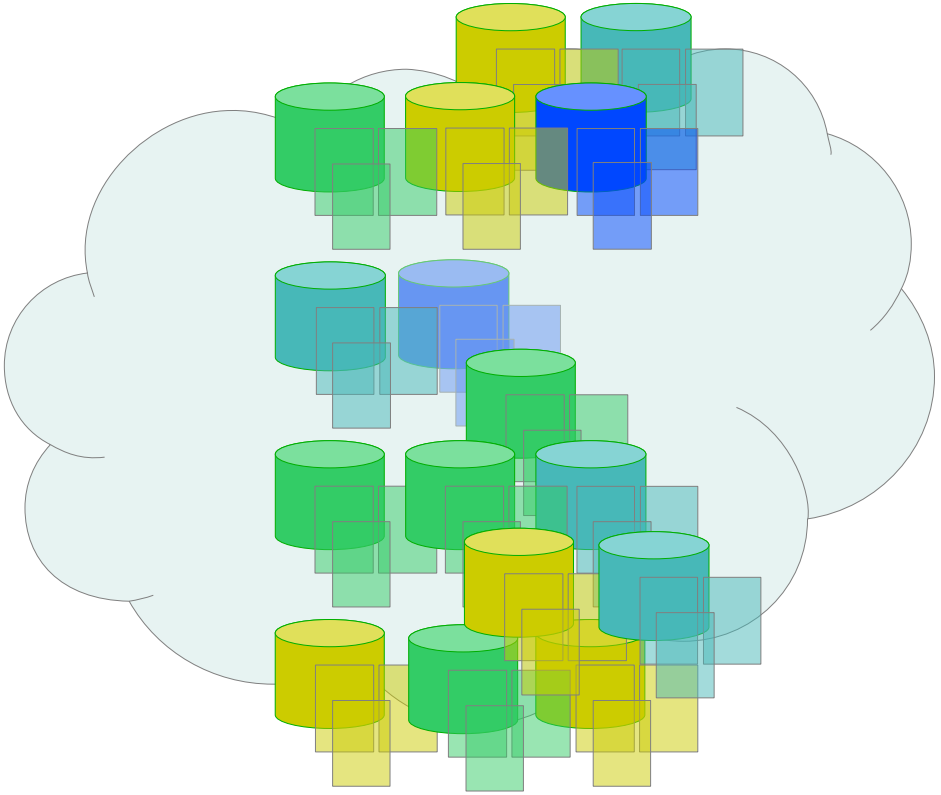

The Virtual Observatory

Data from all over the world …. in the cloud

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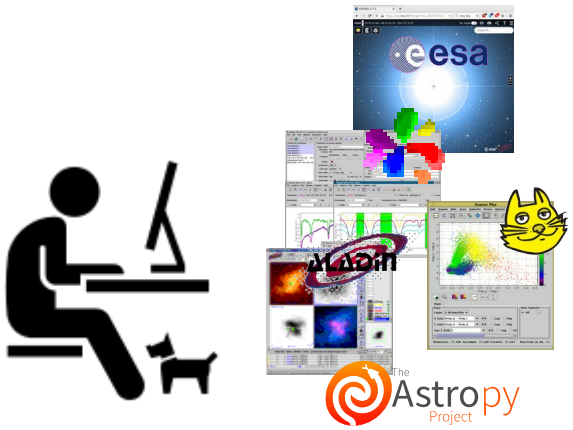

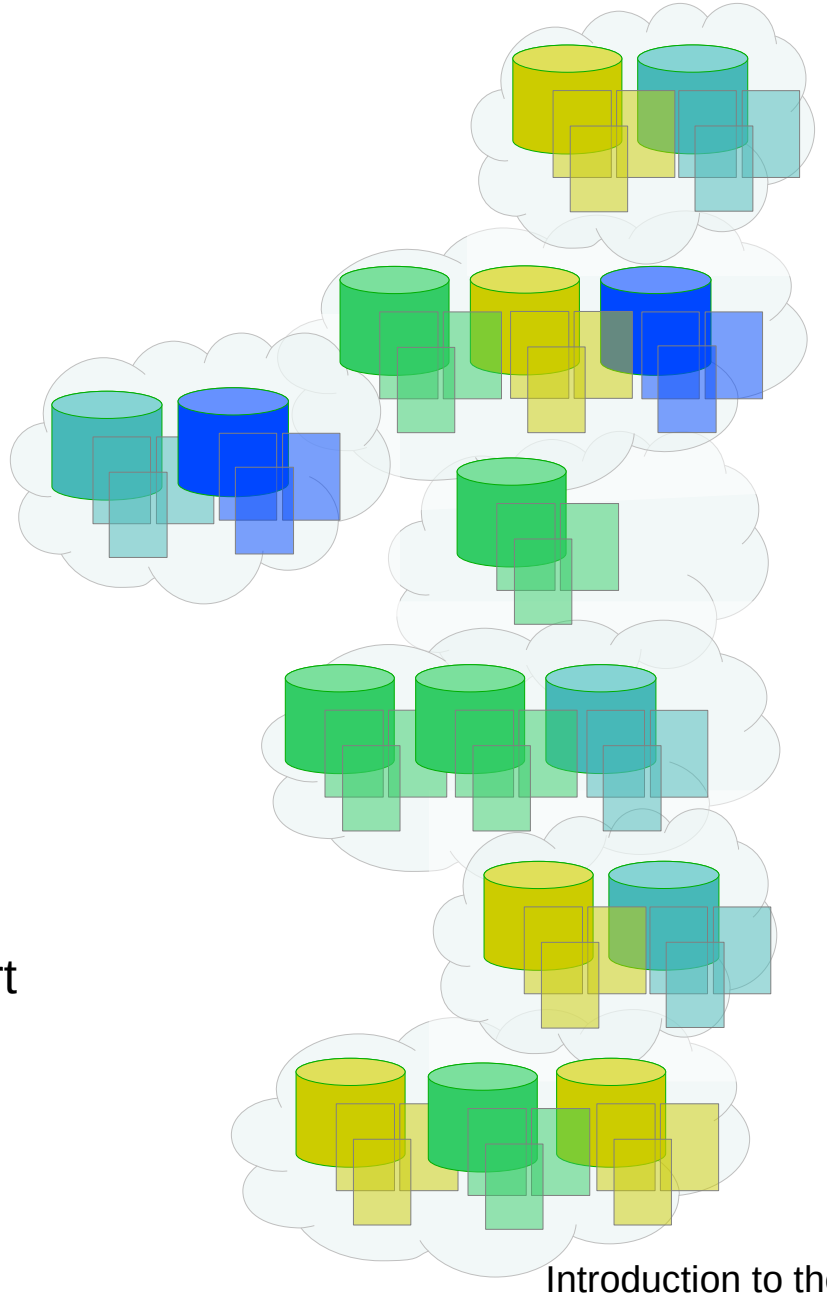

Lots of individual services each playing their part

But … how do you know where everything is ?

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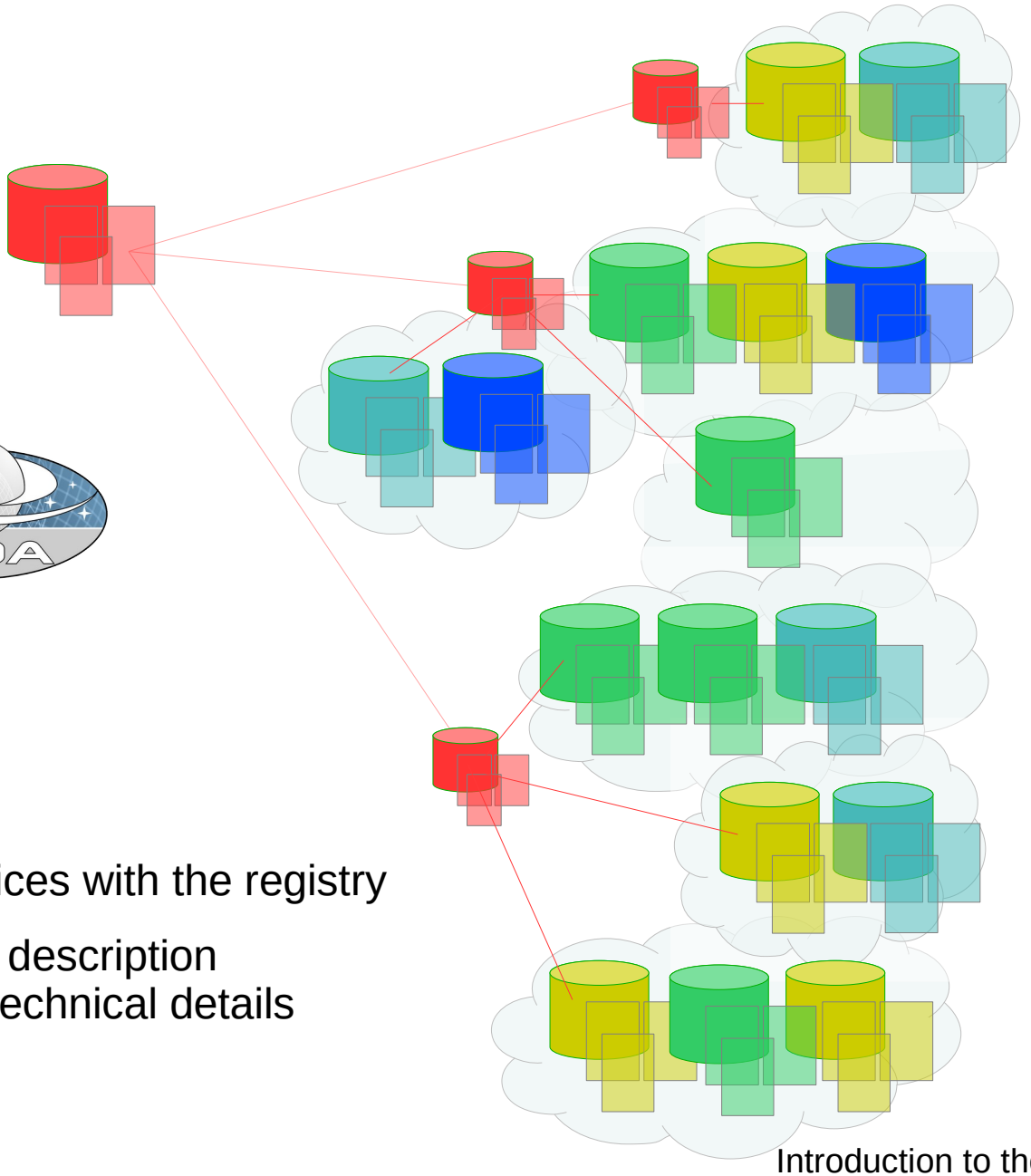

Data providers register their services with the registry

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

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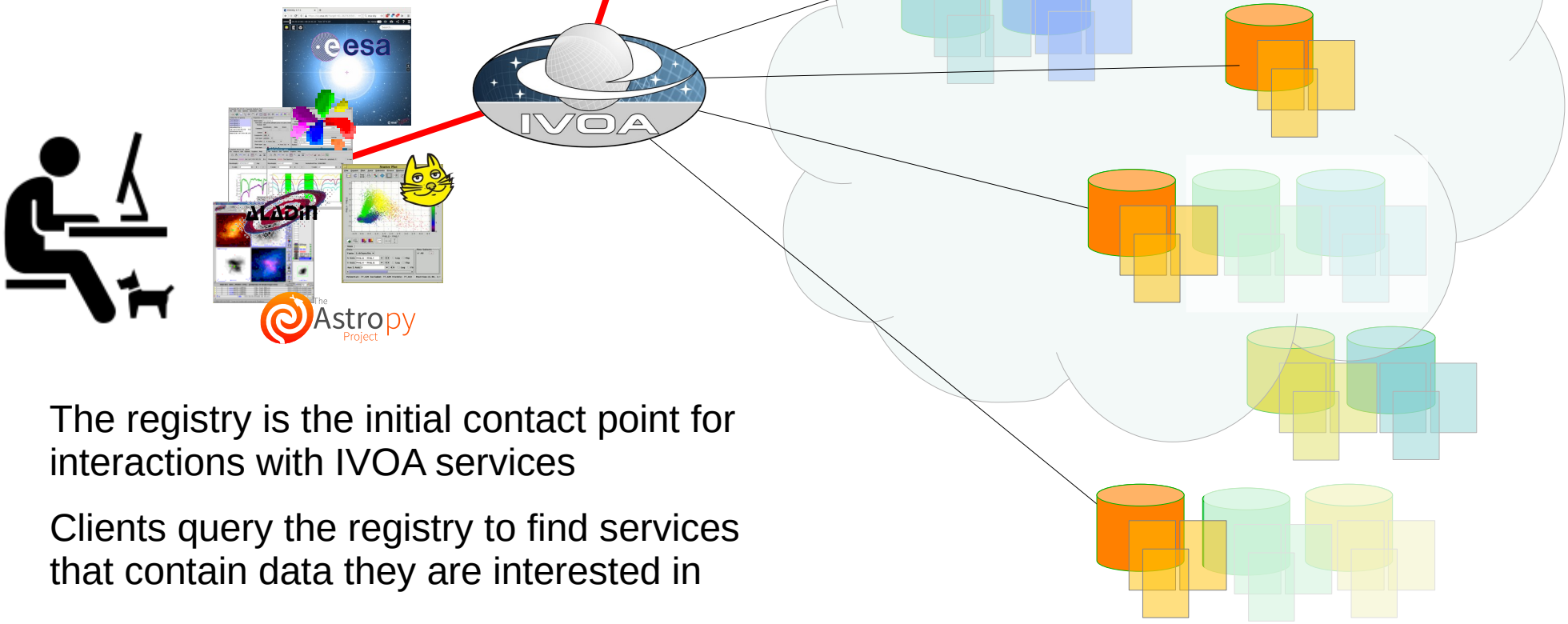

The registry is the initial contact point for interactions with IVOA services

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

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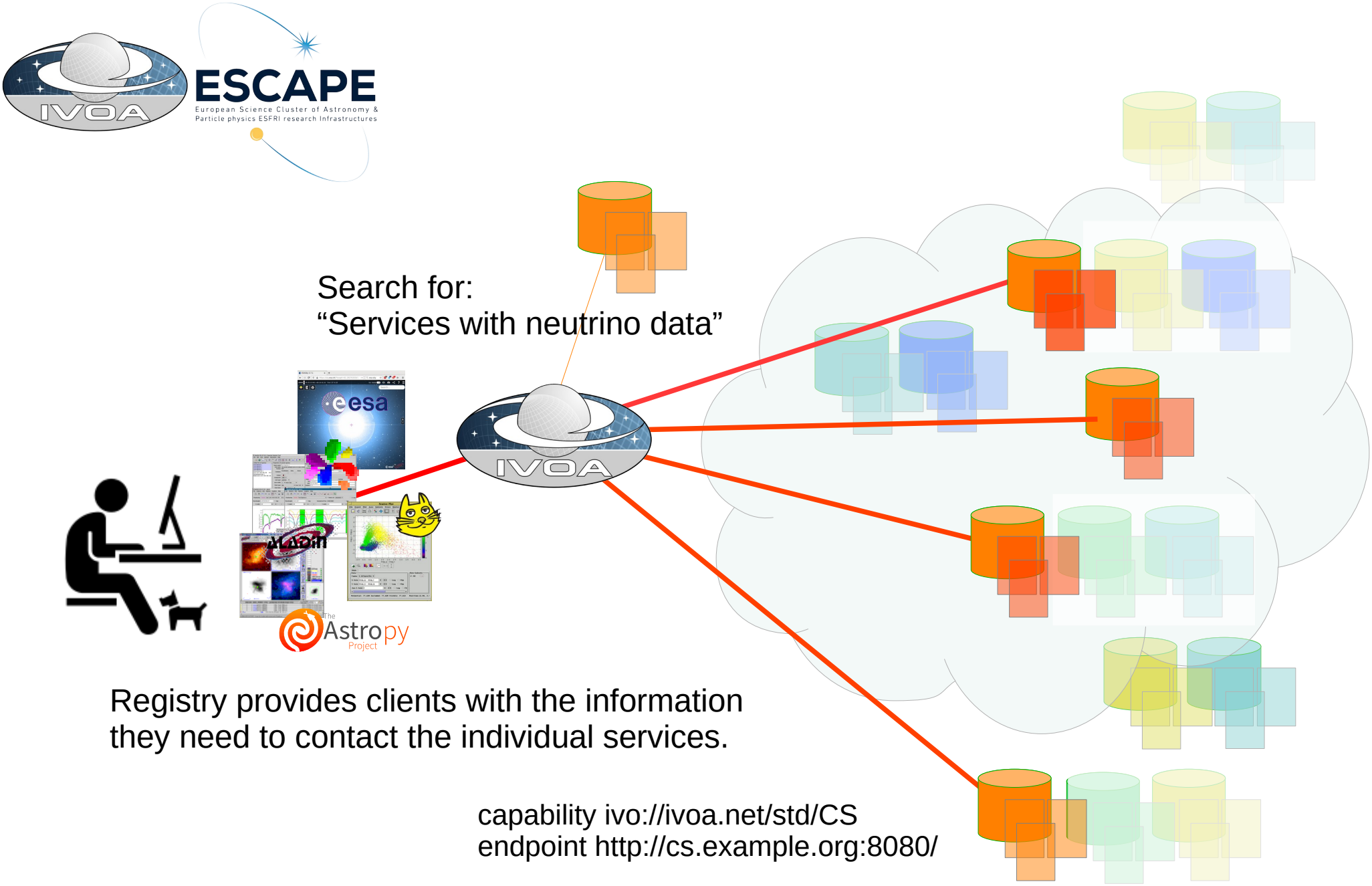

Registry provides clients with the information they need to contact the individual services.

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

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Simple Cone Search

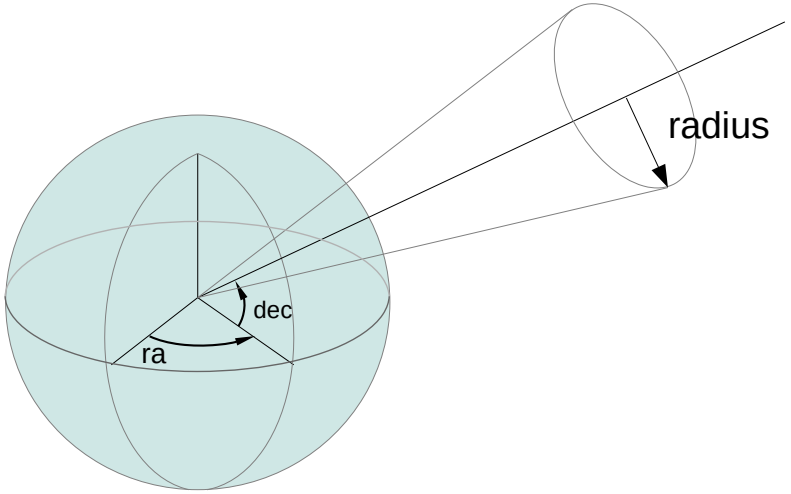
One of the earliest services defined by the IVOA

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

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Simple Cone Search

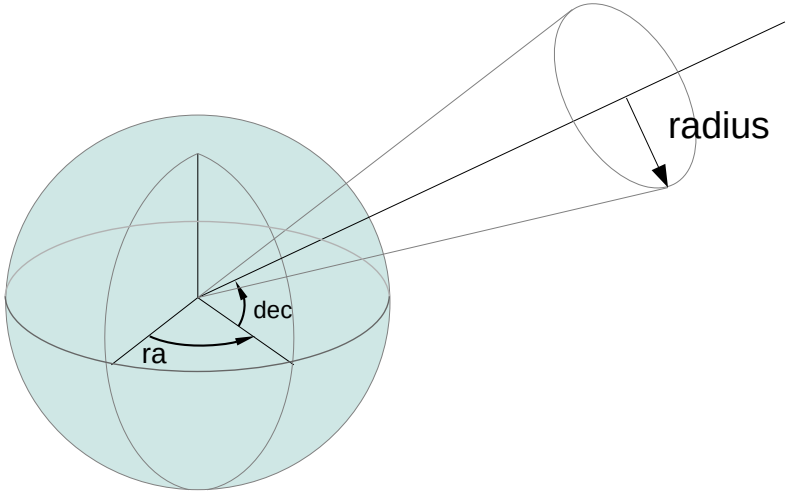
Simple HTTP GET request

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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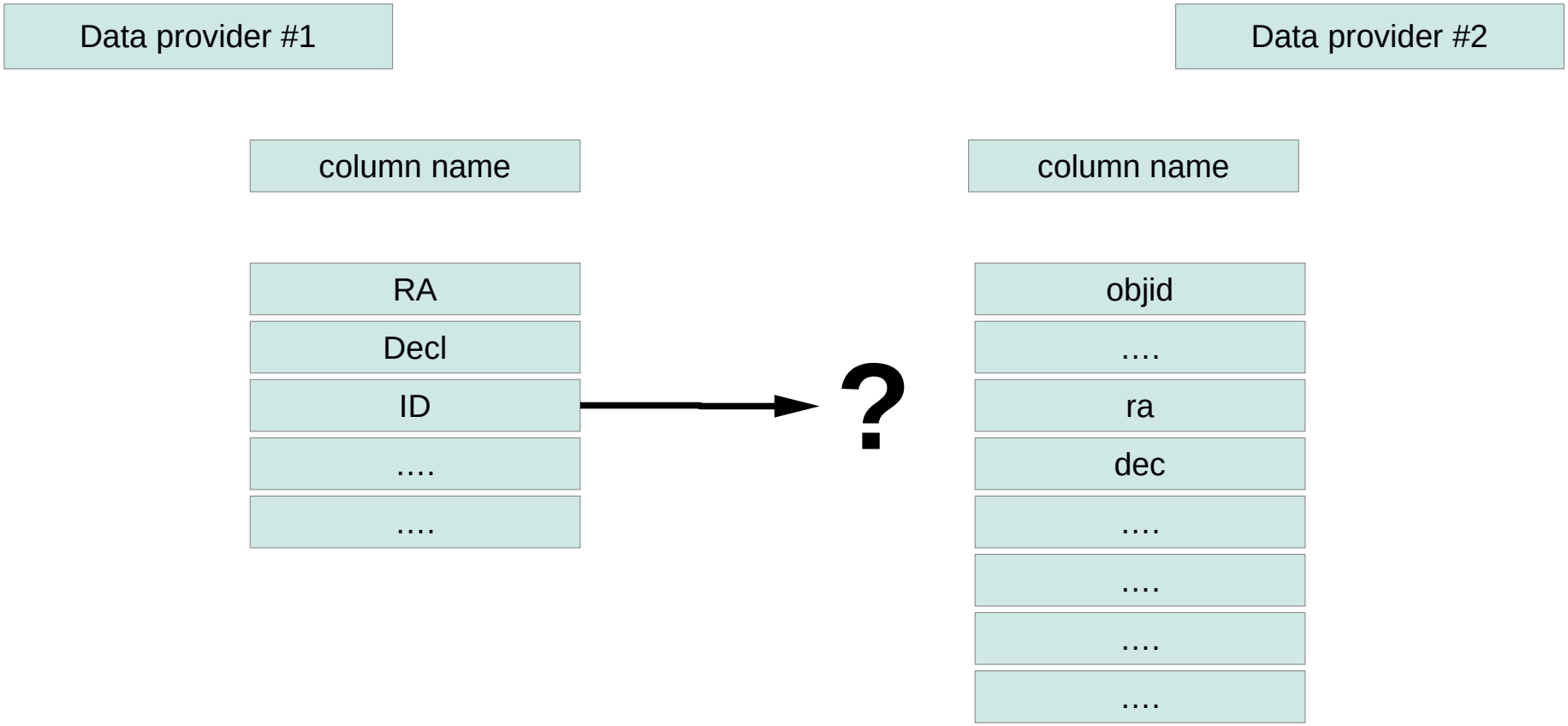
Unified Content Descriptors (UCD)

Different data providers have a different table structures



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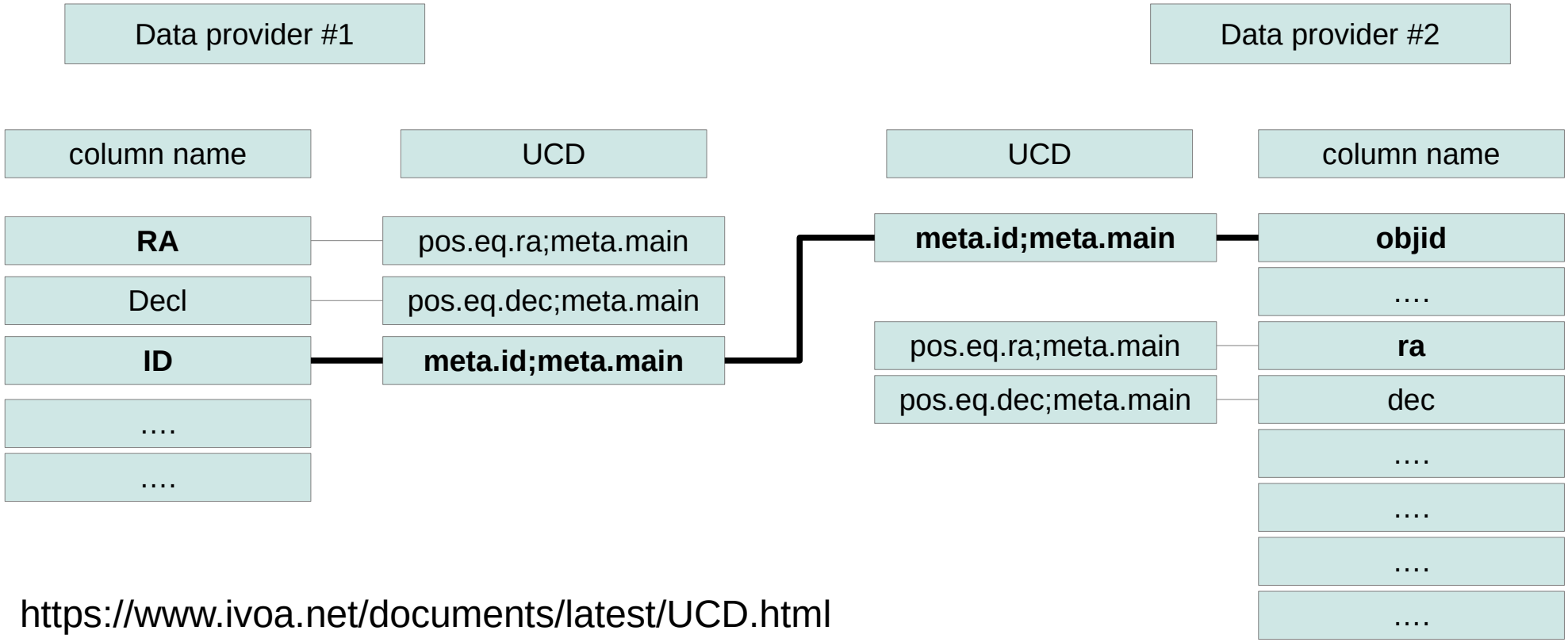
Unified Content Descriptors (UCD)

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



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

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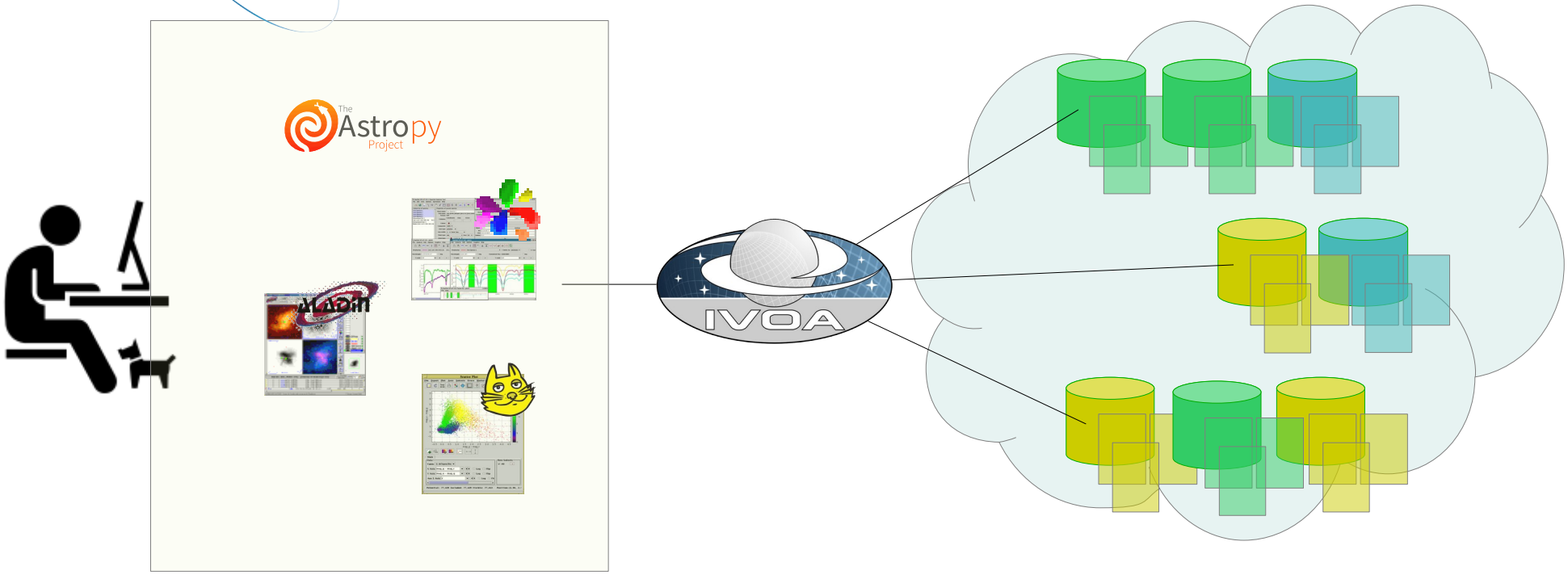

The Virtual Observatory

All the data from the cloud …. available on your desktop

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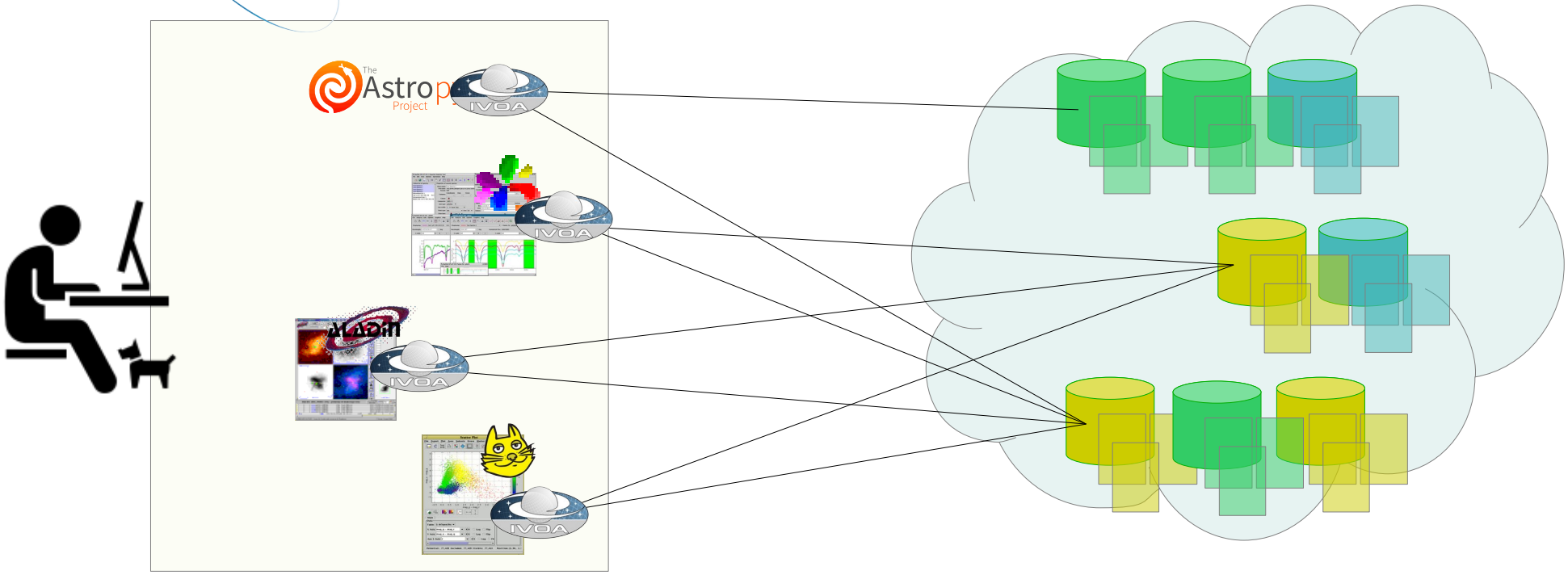

All the data from the cloud …. to each desktop app

Each application maintains its own connection to the VO

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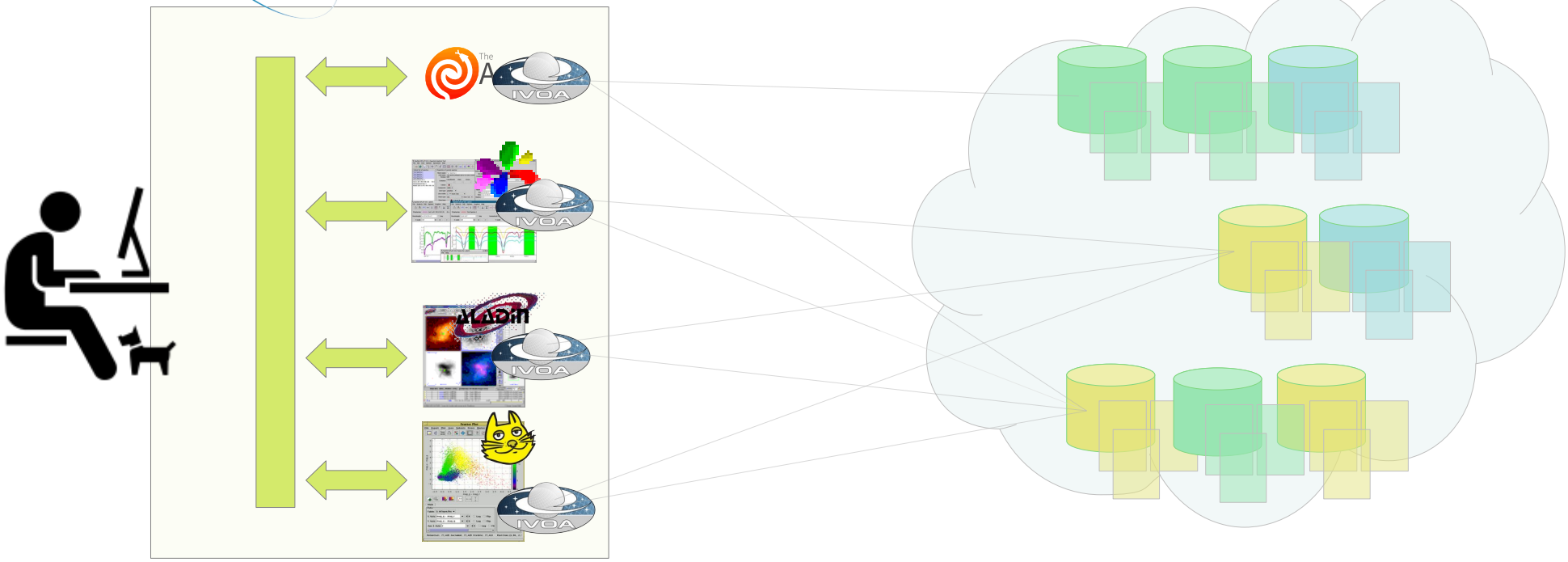

SAMP is a message bus within your local computer

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>

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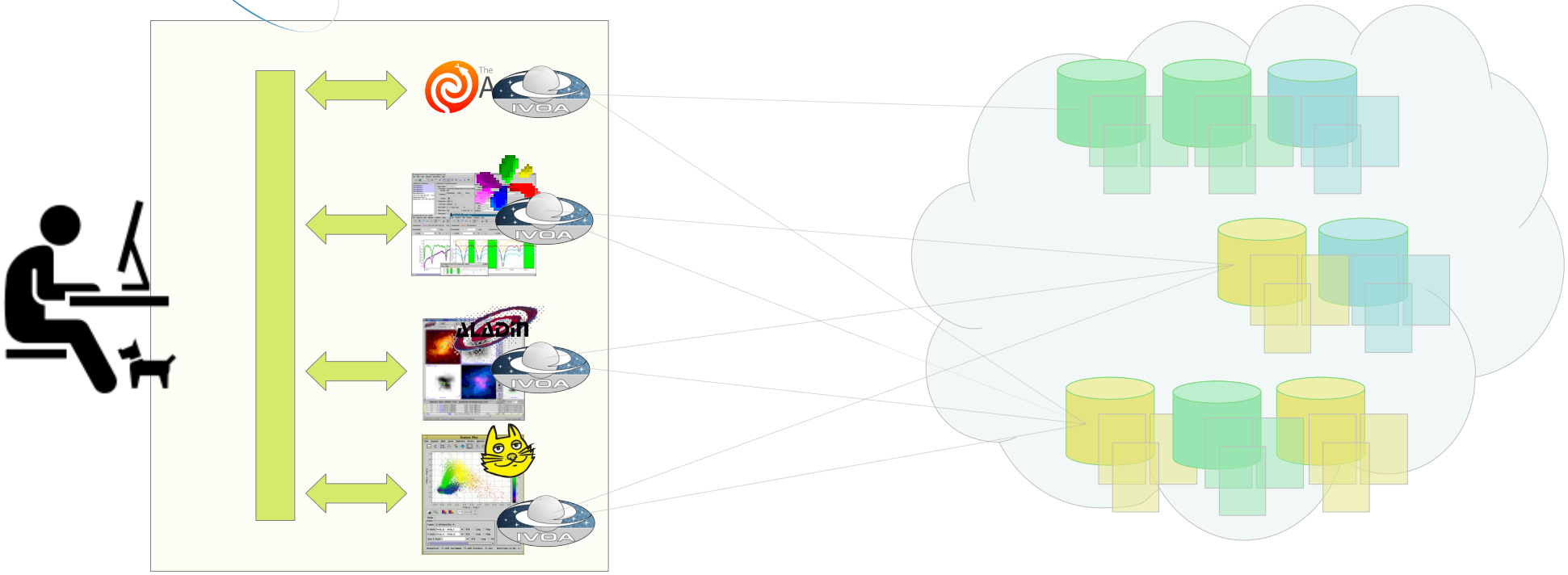

Messages can be sent to specific applications

Send to Aladin:

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

Or broadcast to all listeners

Send to all:

coord.pointAt.sky <ra,dec>

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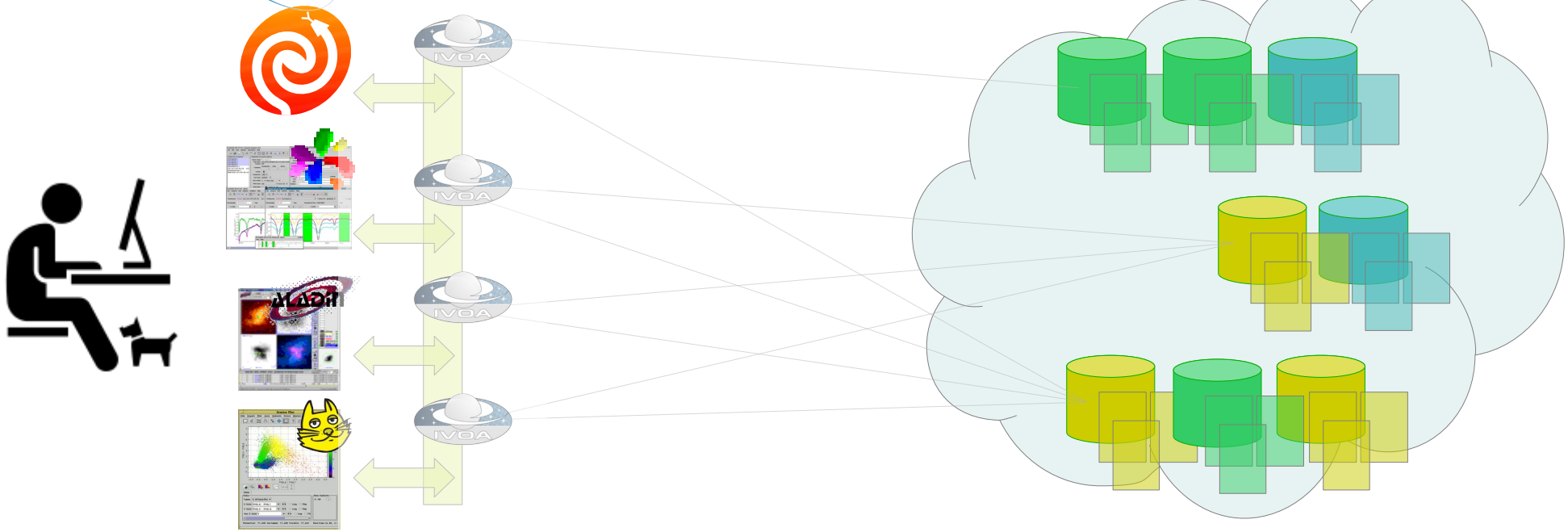

The Virtual Observatory

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

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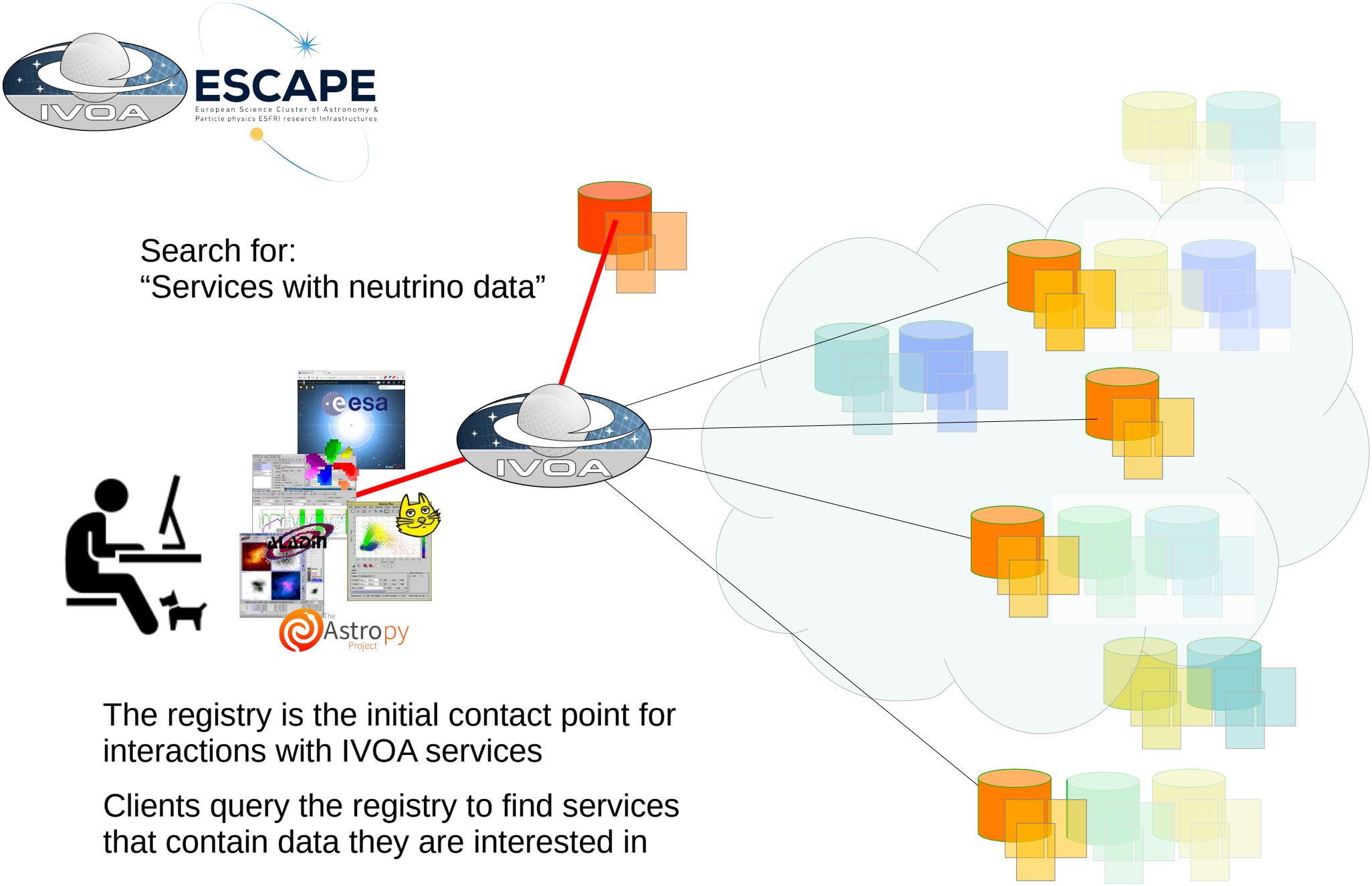

The registry is the initial contact point for interactions with IVOA services

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

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Registry Resource Record :

Service capabilities

TAP, ObsTap, ConeSearch, SIAP, SSAP

Collection metadata

Sky coverage (MOC)

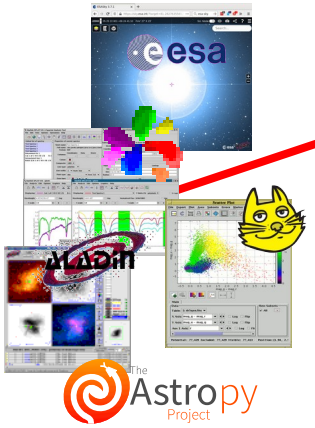
Waveband

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

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Registry Resource Record :

Service capabilities

TAP, ObsTap, ConeSearch, SIAP, SSAP

Collection metadata

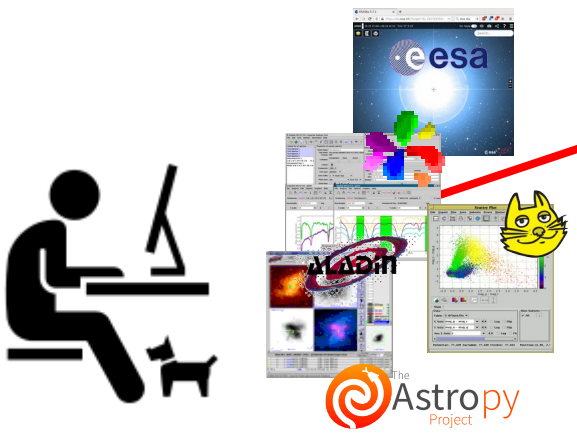
Sky overage (MOC)

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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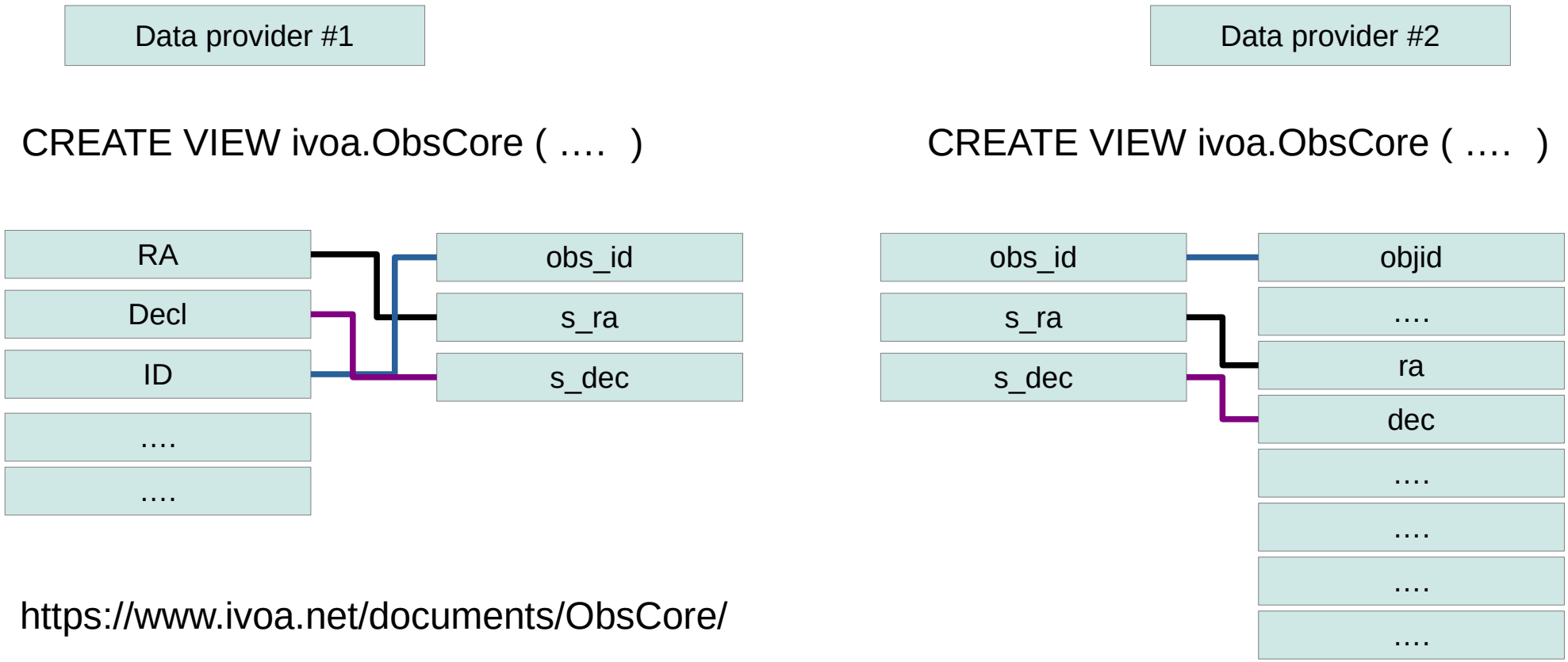
Observation Data Model Core Components

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



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

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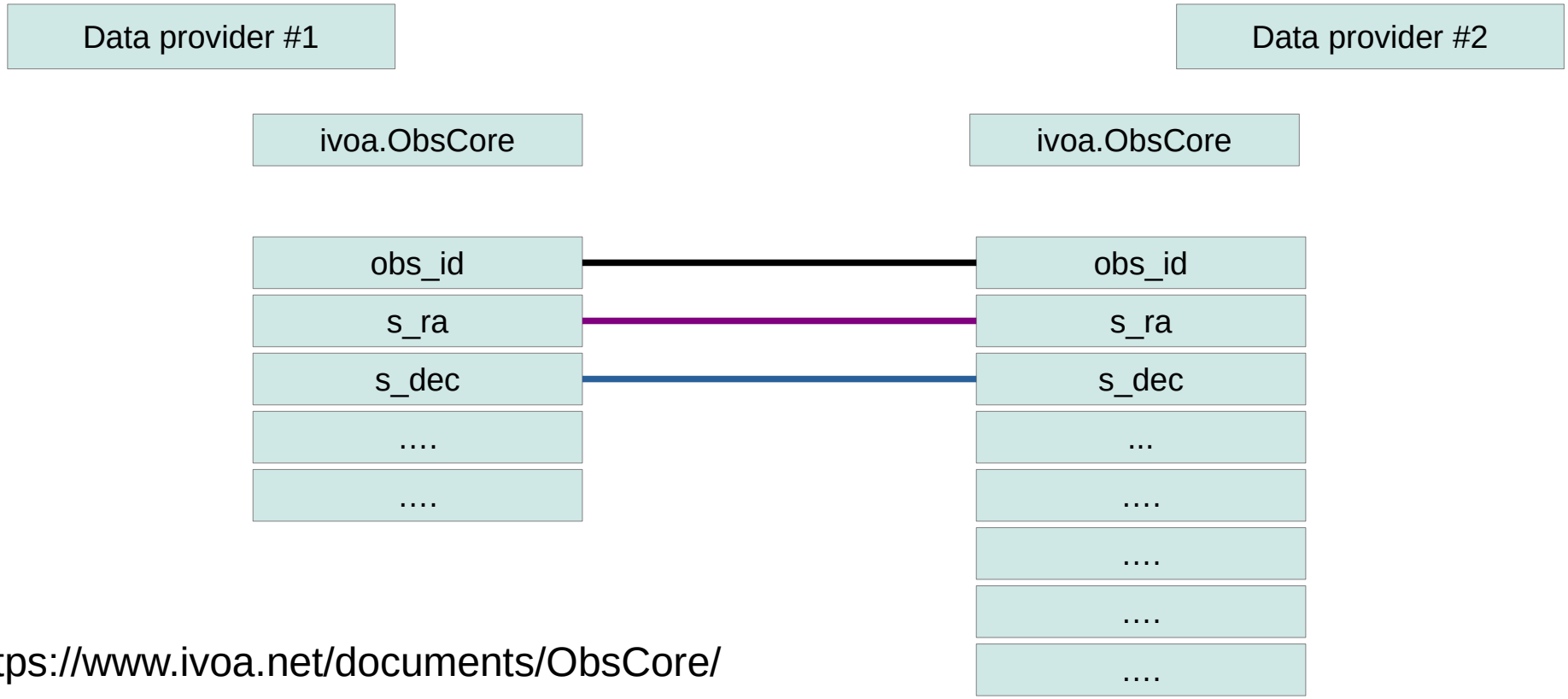
Observation Data Model Core Components

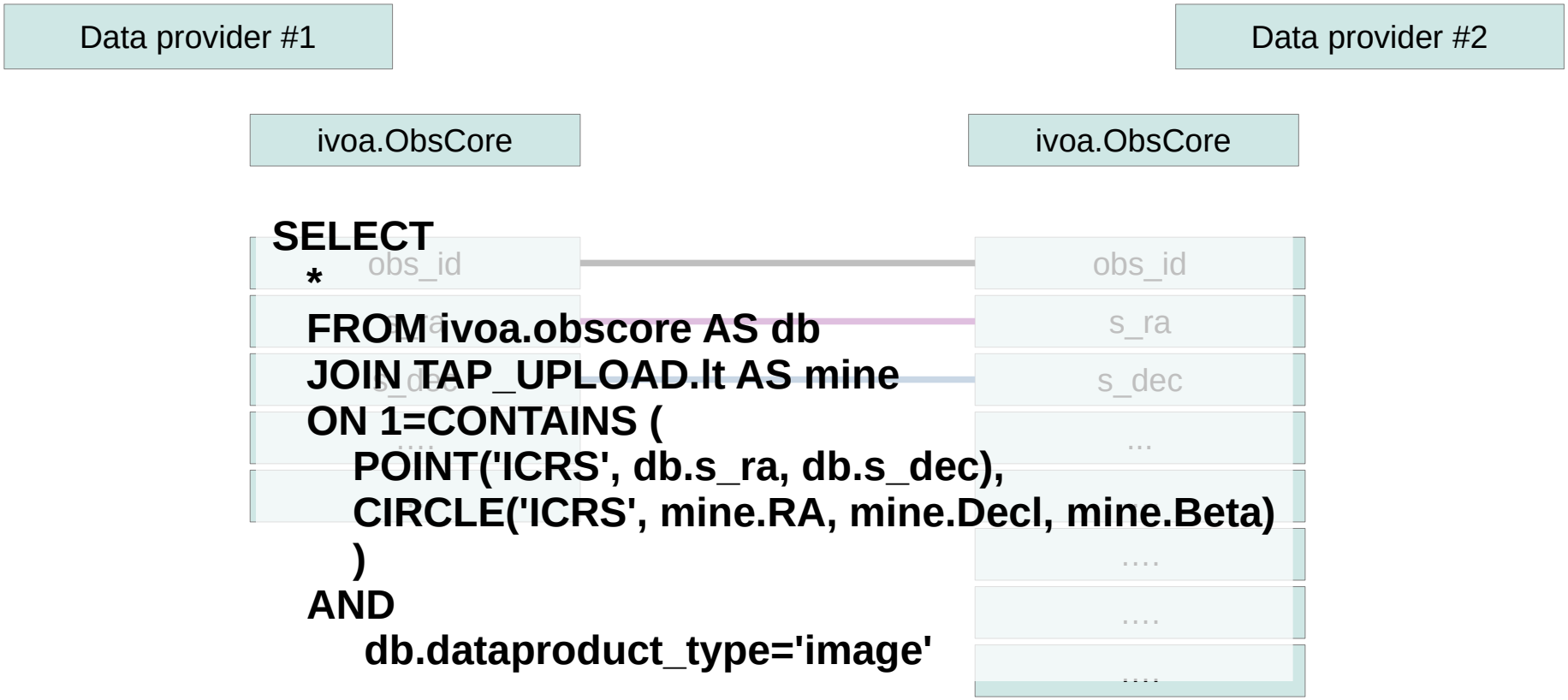
Now the public tables in **both** providers are the same



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

Observation Data Model Core Components

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



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ESCAPE
European Science Cluster of Astronomy & Particle physics ESFRI research Infrastructures

IVOA

Everyone invited to develop science use cases

Science based interest groups

Scientific use cases

theory

time-series

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

Working group email list

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod….

Everyone invited to discuss

New standards being developed

ObjVisSAP ObsLocTAP

TIMESYS Multi-order Coverage (MOC)

Hierarchical Progressive Surveys (HiPS)

Science priorities for the IVOA

Science platforms

Machine learning

Multi-messenger astronomy

Science priorities committee

Scientists from IVOA members and major astronomy projects

Request For Comment (RFC) document

IVOA recommendation

Everyone invited to comment

Anyone can raise issues

GitHub

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