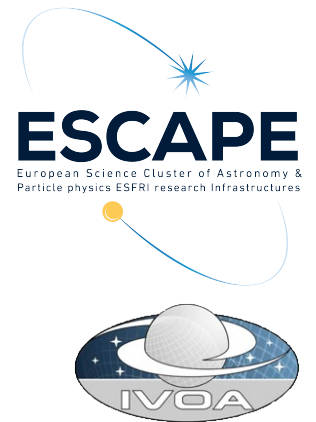




# Virtual observatory and Science platforms

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ESCAPE WP5 Requirements Workshop  
Groningen, April 2019

## The role of the IVOA

<http://www.ivoa.net/>

*“The Virtual Observatory (VO) is the vision that astronomical datasets and other resources should work as a seamless whole.”*

*“The International Virtual Observatory Alliance (IVOA) is an organisation that debates and agrees the technical standards that are needed to make the VO possible.”*

W3C defines the HTTP, HTML, XML and CSS standards



Microsoft, Apple, Google, Mozilla and Opera create web browsers.





So who does write the software ?

We do – each of us creates the tools we need  
(and hopefully share them with others)



German Astrophysical  
Virtual Observatory



Canadian Astronomy  
Data Centre



Edinburgh  
University



Astronomical Observatory  
of Trieste



Strasbourg astronomical  
data center

ESAC

Space Telescope

LSST

.. and lots more





# FAIR data

- Findable
- Accessible
- **Interoperable**
- Reuseable

*“Metadata use a formal, accessible, shared, and broadly applicable language for knowledge representation.”*

Data access protocols are well established

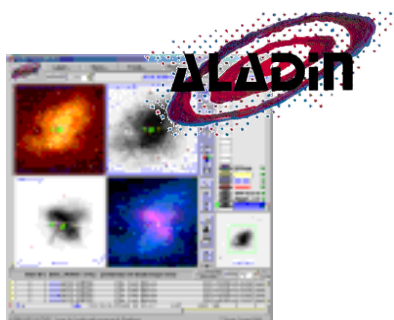
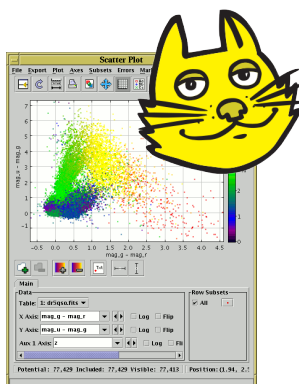
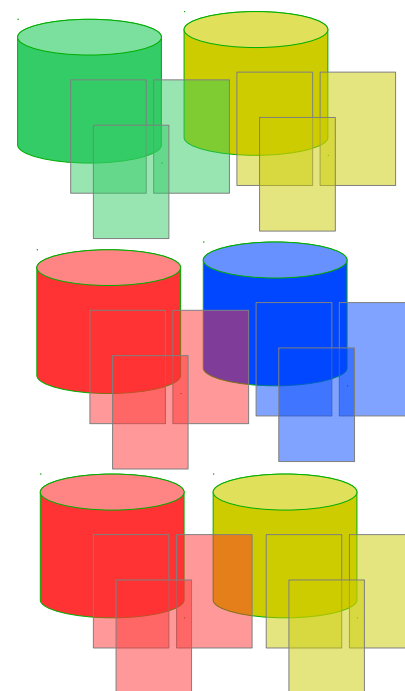


Image Access Protocol

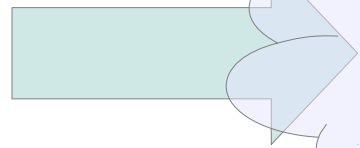
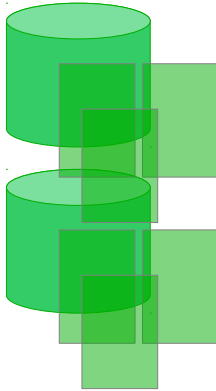
Table Access Protocol

Spectral Access Protocol





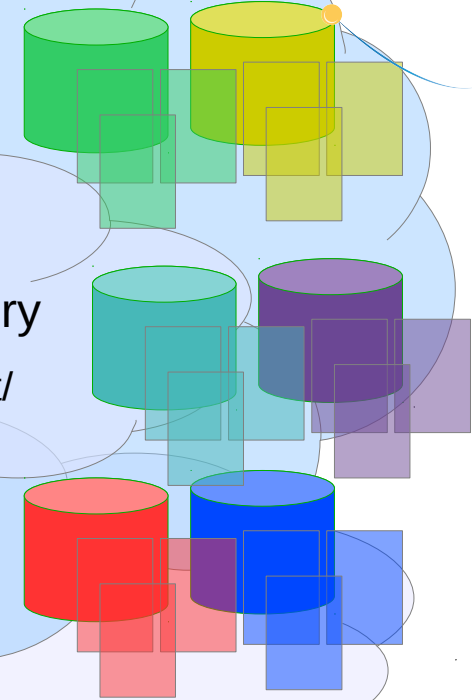
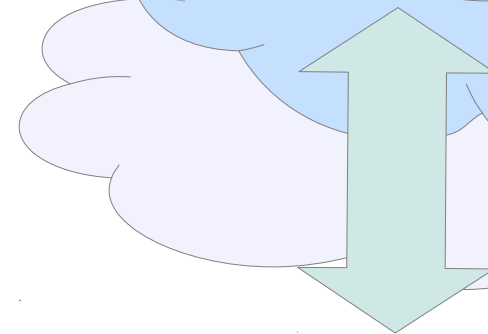
Publishing our data into the VO



International Virtual Observatory

<http://www.ivoa.net/>

*"the cloud"*



Slides from a department  
meeting in Edinburgh 2014

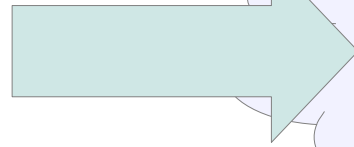
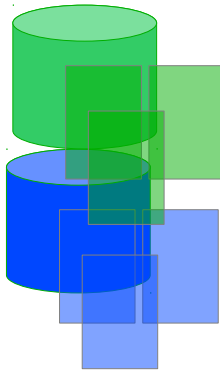
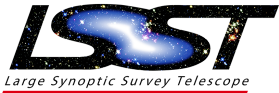
Access to other people's data from the VO

[our data] + [their data] => [interesting stuff]





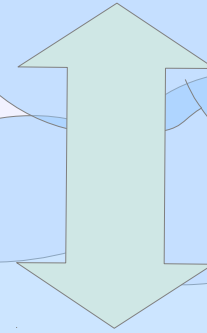
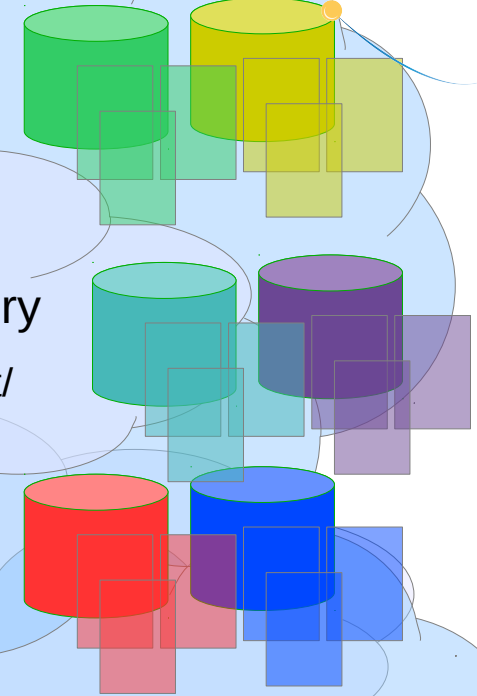
Publishing all our data into the VO



International Virtual Observatory

<http://www.ivoa.net/>

*"the cloud"*



IVOA science platform  
goals in 2019

Access to everyone's data **in** the VO

[our data] + [their data] => [interesting stuff]

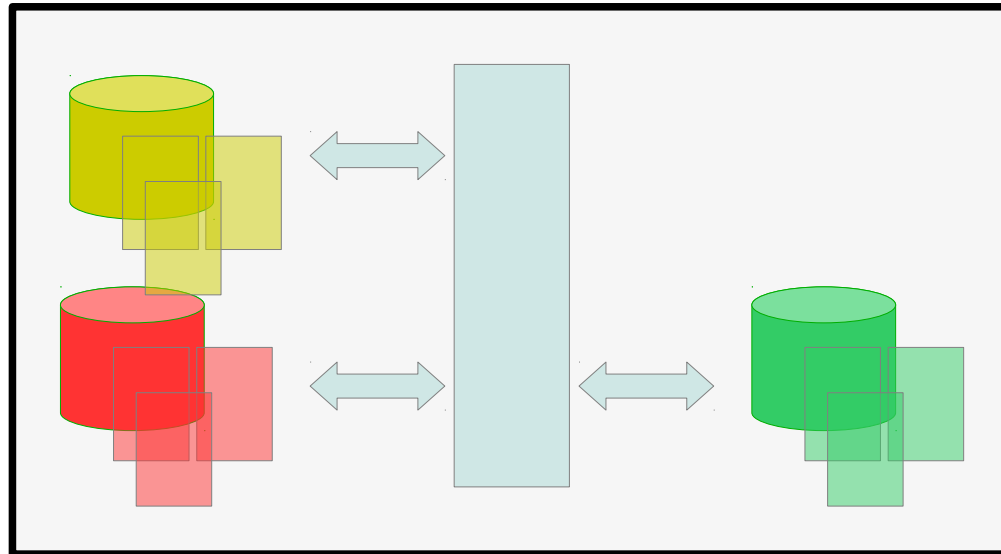




This is where we all start from

### Single monolithic platform

- Easy to get started
- Easy to control access at the border



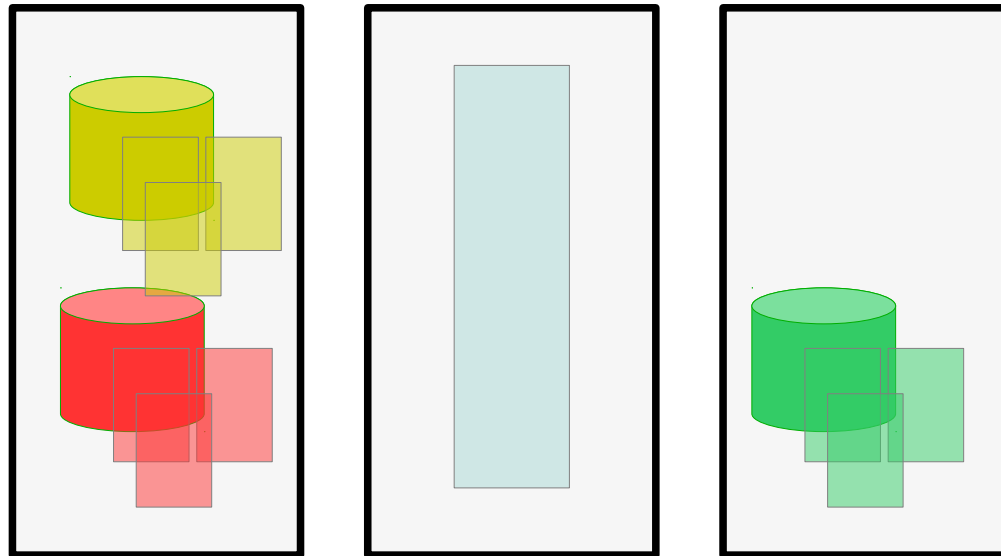




This is the problem we all find in the end

Multiple monolithic platforms

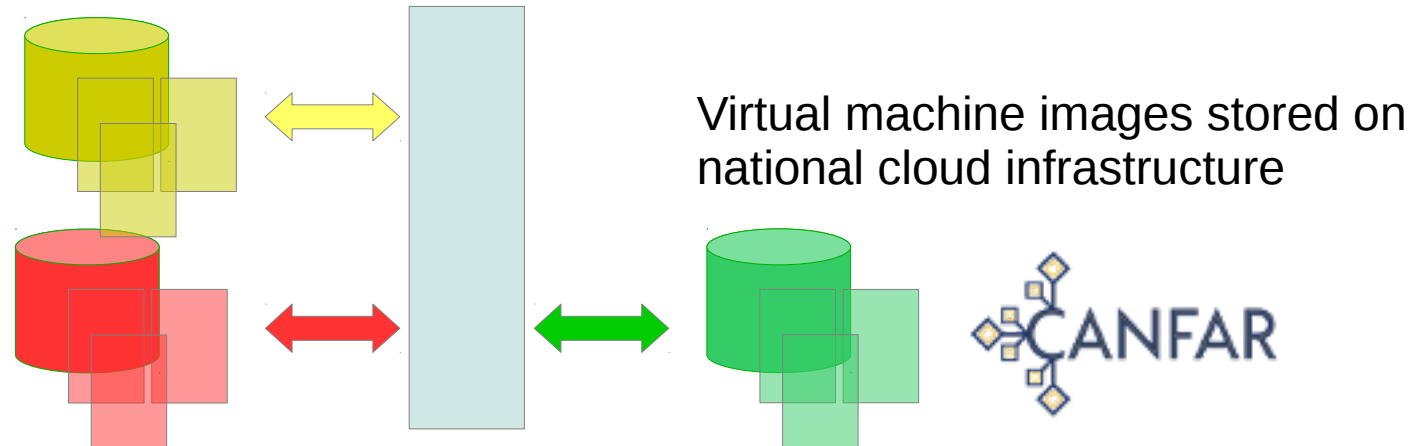
- Multiple different protocols
- Hard to federate the access control





VO protocols for data access – TAP/ADQL

VO protocols for data transfer – VOSpace



VO protocols for authentication – SSO/GMS

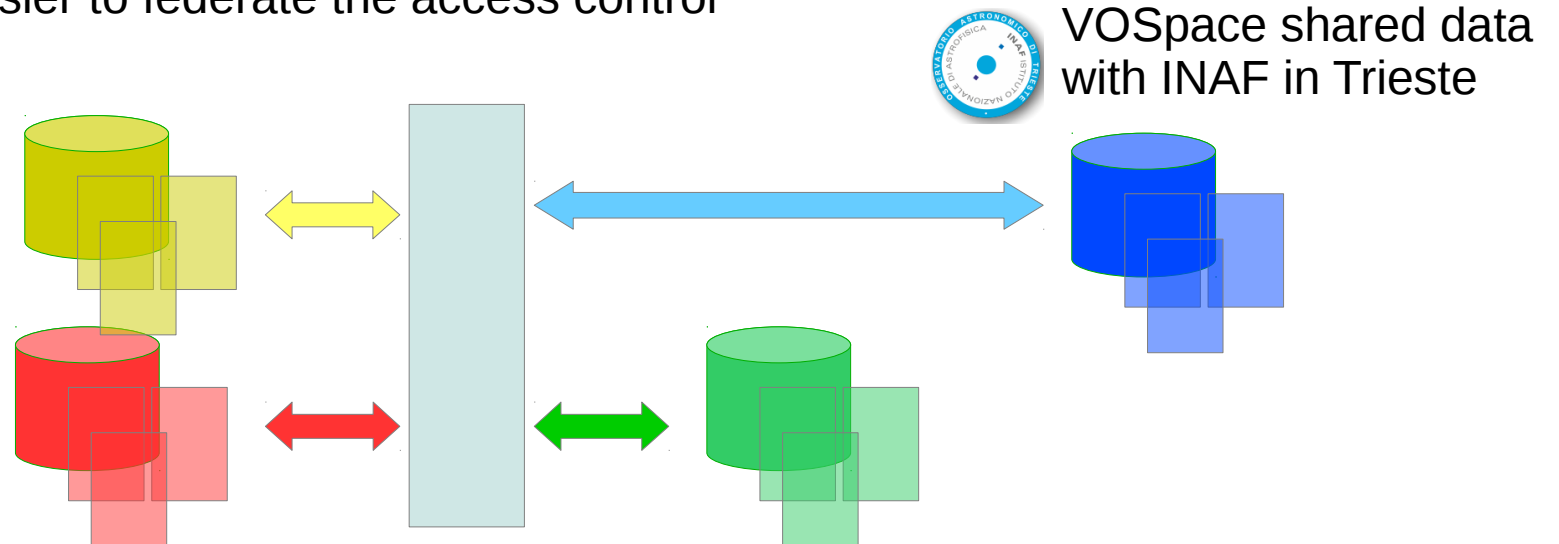
VO protocols for access control – tbd





## Multiple micro-service components

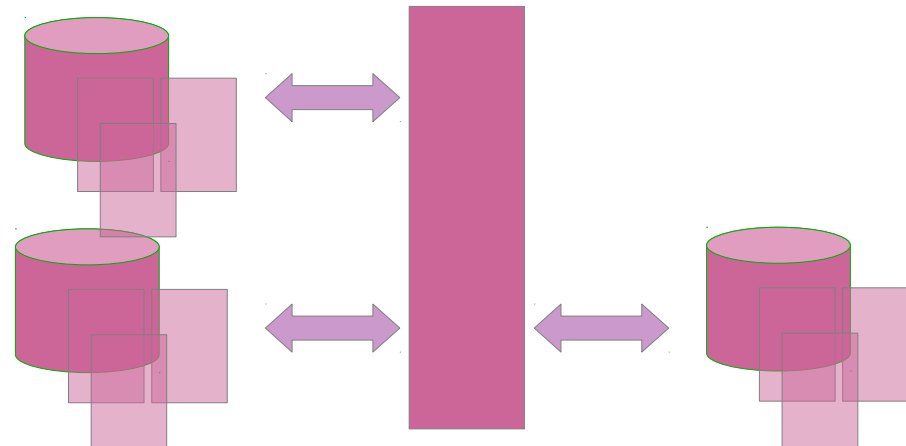
- Access control at the services
- Easier to federate the access control





Everyone uses the same software

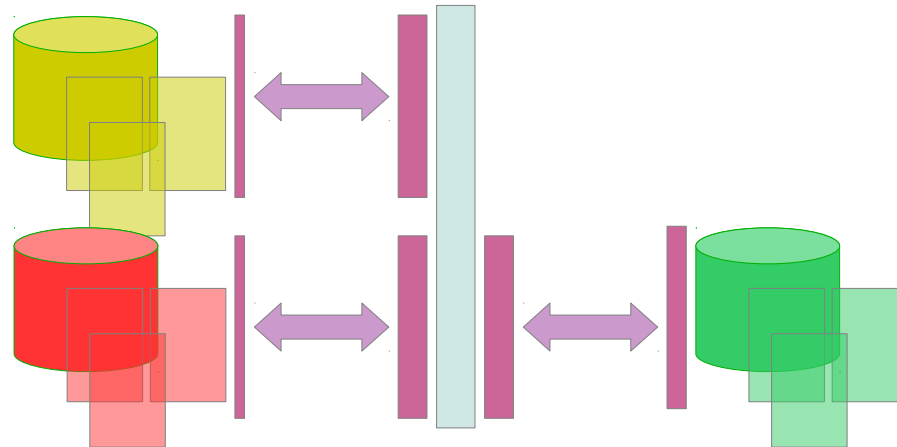
- Hard to get agreement
- Hard to migrate to new technologies





## Different software, common interfaces

- Easier to get agreement
- Easier to integrate new components





IVOA has some solutions, but  
we don't have all the solutions

We need your solutions as well

Propose your solutions as IVOA standards  
and others will help to develop them

*If you want to go fast, go alone.  
If you want to go far, go together.*

*- Wikiquote Quote of the day 2007/10/14*

