

The logo graphic for ESCAPE features a stylized blue starburst at the top, a thin blue orbital line curving around a small yellow circle, and another thin blue orbital line curving around a small blue circle.

# ESCAPE

European Science Cluster of Astronomy &  
Particle physics ESFRI research Infrastructures

## Rucio and the IVOA

Dave Morris

Rucio Community workshop  
Lancaster University  
November 2022  
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.





# Rucio and IVOA

D Morris November 2022





# What is the VO ?

Xxx publishers  
23,975 datasets  
44,158 services

## Global observatory for astronomy

- 348 image access
- 18737 cone search
- 162 spectra access
- 24908 table access

## FAIR access to data

Findable Accessible Interoperable Reusable


Flexible resource registry

“blind discovery”, finding data by physical constraints

sky position, waveband etc






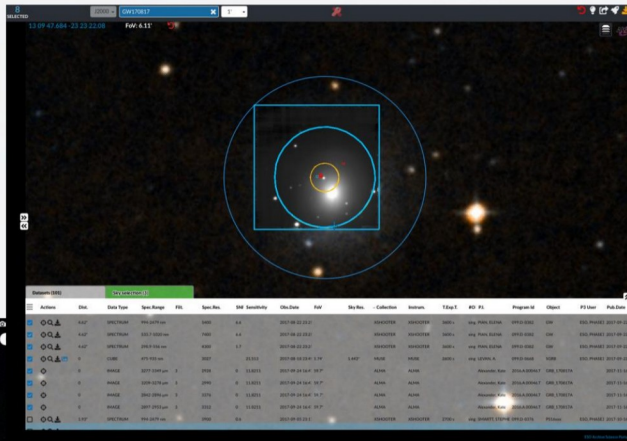


**ESCAPE**  
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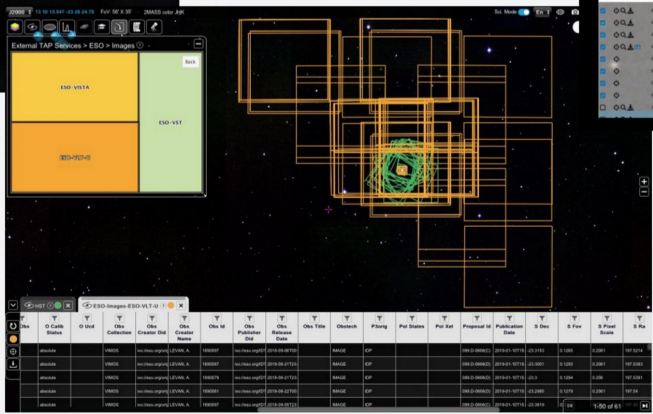
# Multi-messenger, multi-wavelength view of neutron star merger GW170817




ESO + LIGO/Virgo




ESO + HST (ESASky)



ESO La Silla Paranal + ALMA



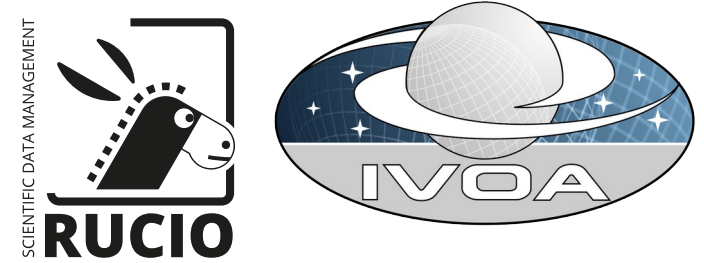
21



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25/10/2022





# What is the IVOA ?

International Virtual Observatory Alliance

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

Developing common standards

Service interfaces, metadata and vocabularies

Internet Engineering Task Force (IETF)

World Wide Web Consortium (W3C)

Developing common standards

Protocols and data formats

VOTable

VOResource

SimpleImageAccess (SIA)

Unified Content Descriptors (UCD)

HyperTextTransferProtocol (HTTP)

HyperTextMarkupLanguage (HTML)

Extensible Markup Language (XML)

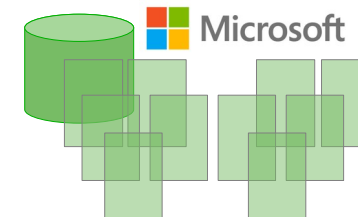
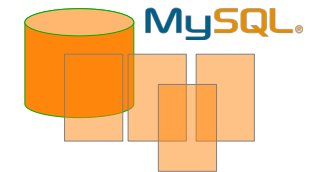
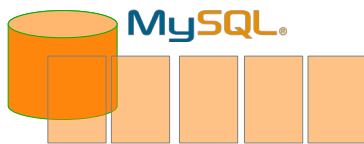
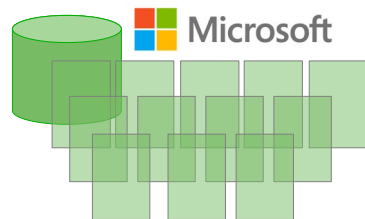


# IVOA makes the VO work

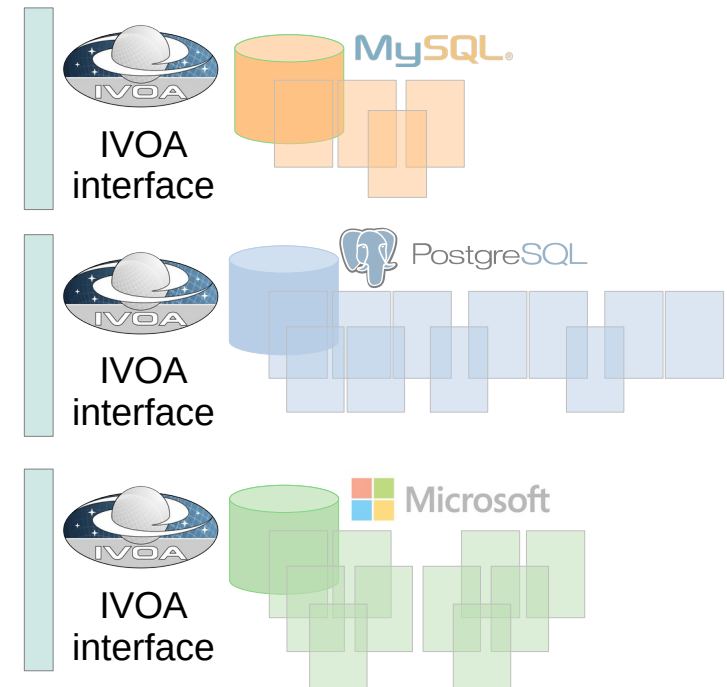
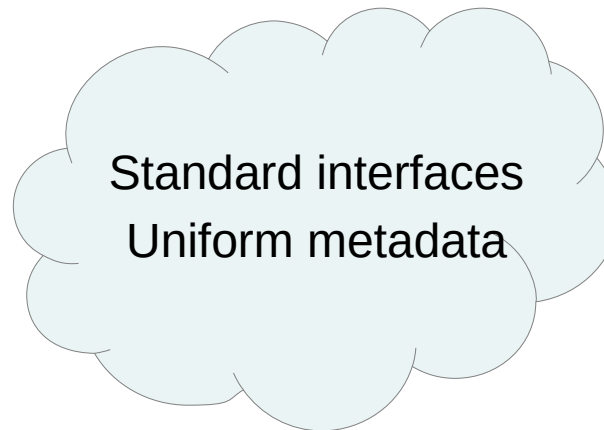
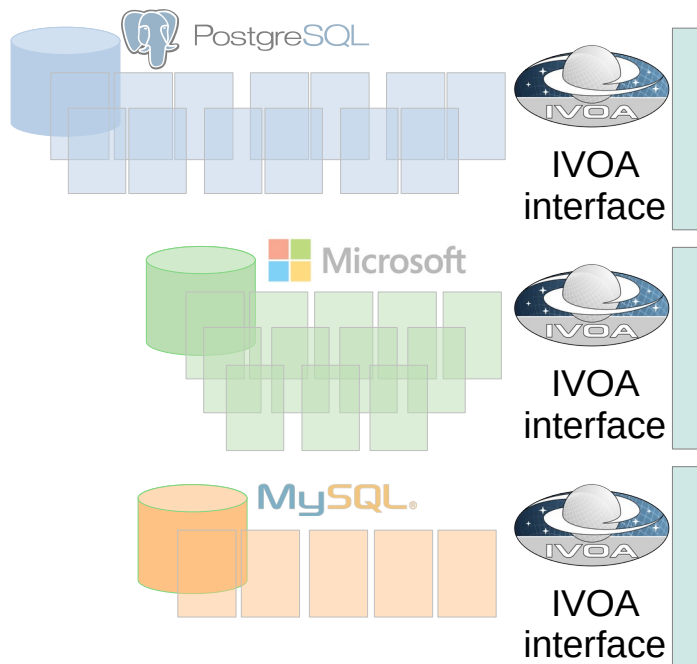


Different database platforms

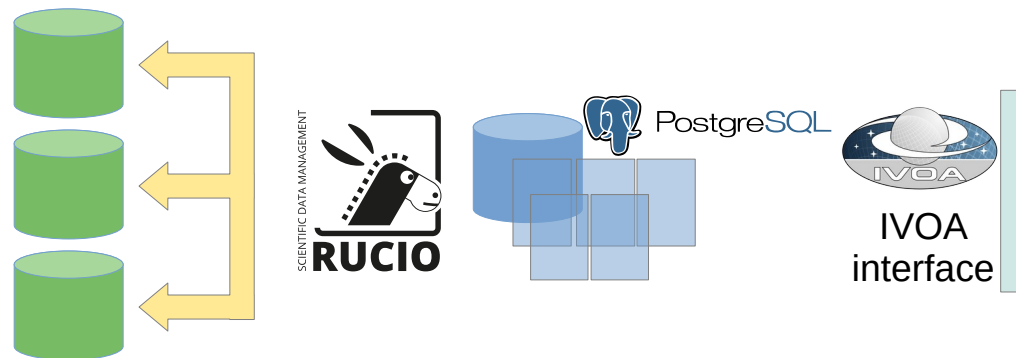
Different database structures



# IVOA makes the VO work



# Publishing Rucio metadata in the VO



Publishing Rucio metadata as an IVOA service

Prototypes explored by Astron and SKA



# Publishing Rucio metadata in the VO



Publishing Rucio metadata as an IVOA service

Prototypes explored by SKA and Astron



# Could we do this for other domains ?

Extending the IVOA to include adjacent domains



astronomy

space  
weather

Build on the common  
factors to develop a  
combined data model

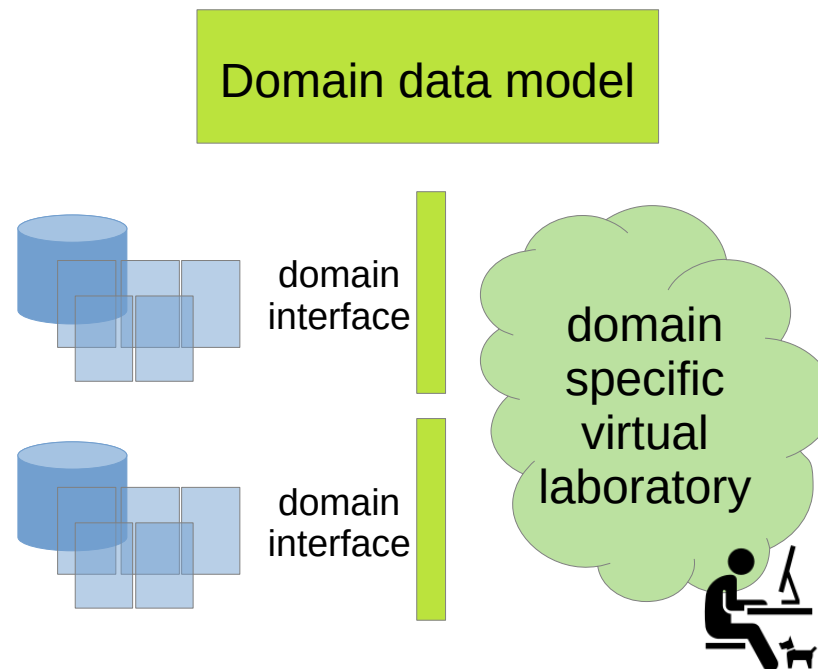
Gradual process of  
evolving data model



# Could we do this for other domains ?

Decouple the services from the domain model

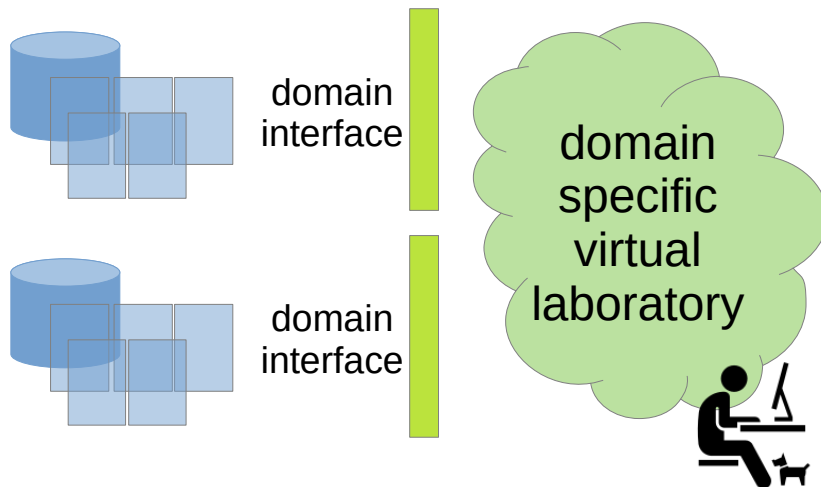
Could we create a generic toolkit for building '*virtual laboratories*' ?



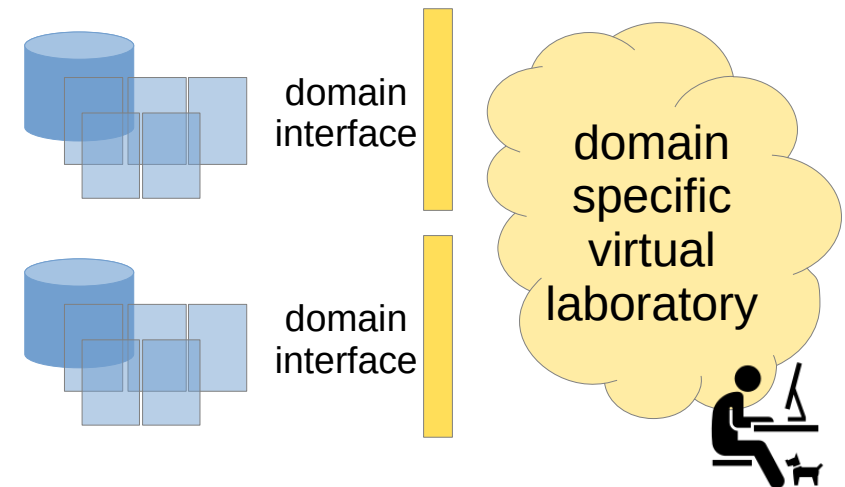
# Could we do this for other domains ?

Could we create a generic toolkit for building '*virtual laboratories*' ?

Domain data model



Domain data model

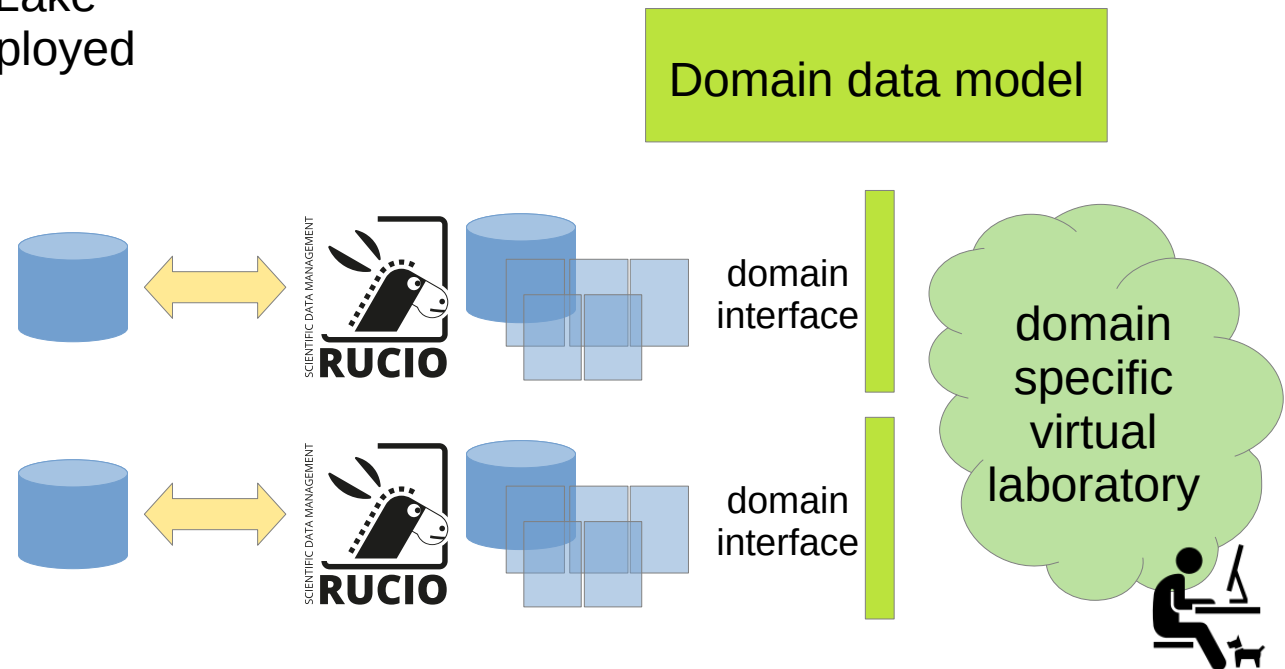


# Why base it on Rucio ?

Success of the ESCAPE DataLake means Rucio will be widely deployed

Implemented as an interface to Rucio metadata lowers barrier to entry

Provides a common platform to build on







Why now ?

ESCAPE futures meeting in Brussels

**ESCAPE**

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Panel discussion with representatives  
from European Commission and EOSC



Why now ?

ESCAPE futures meeting in Brussels

# ESCAPE

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Panel discussion with representatives  
from European Commission and EOSC

Word cloud of what they said

Word cloud containing the following words:

- Cross-domain
- Multi-discipline
- Interoperability
- Other words
- Words
- Stuff
- More stuff

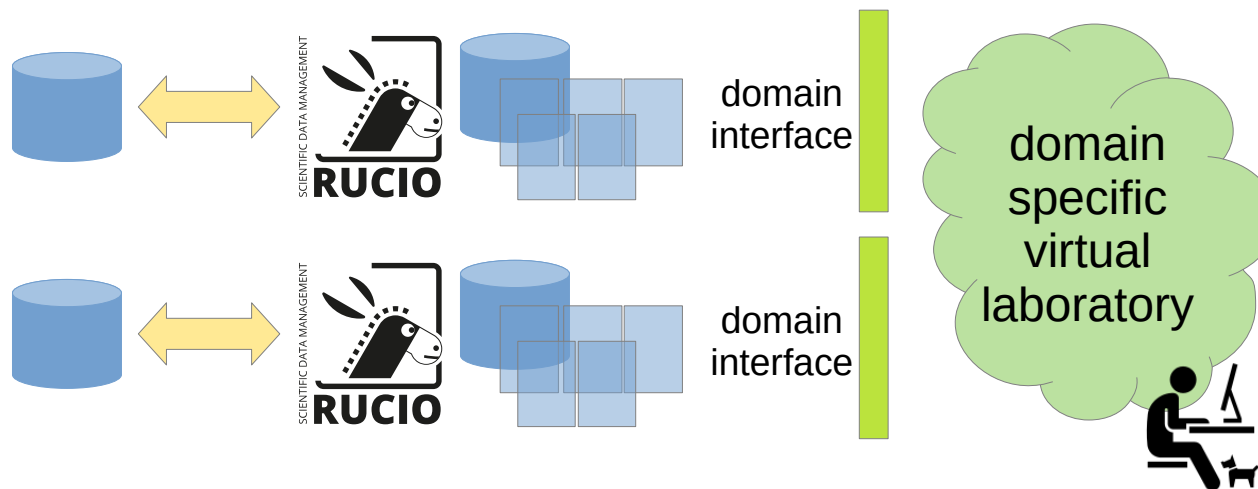




# Toolkit for creating virtual laboratories

Based on Rucio metadata

Domain data model



**Cross-domain**  
**Multi-discipline**  
**Interoperability**

Interfaces based on IVOA services

