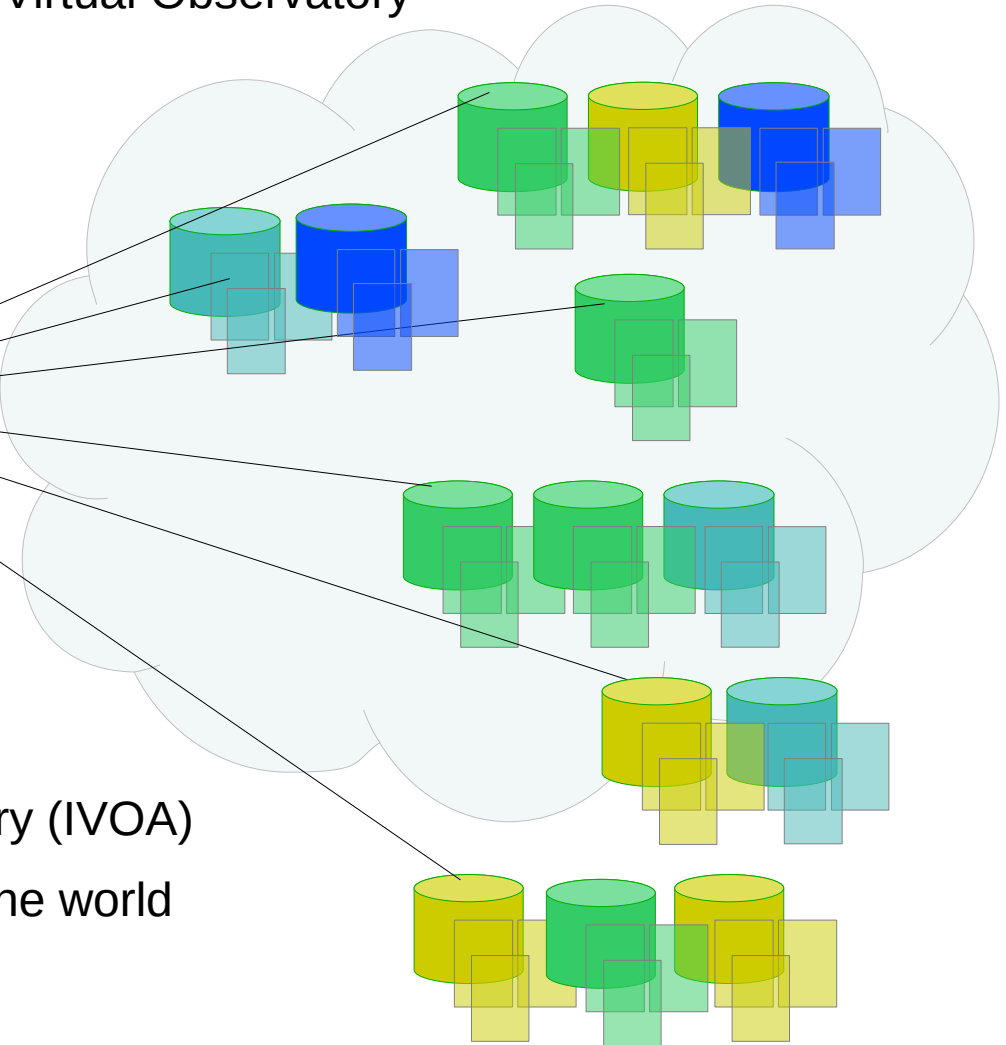Dave Morris
Research Software Engineer

International Virtual Observatory

Data from around the world
available on your desktop

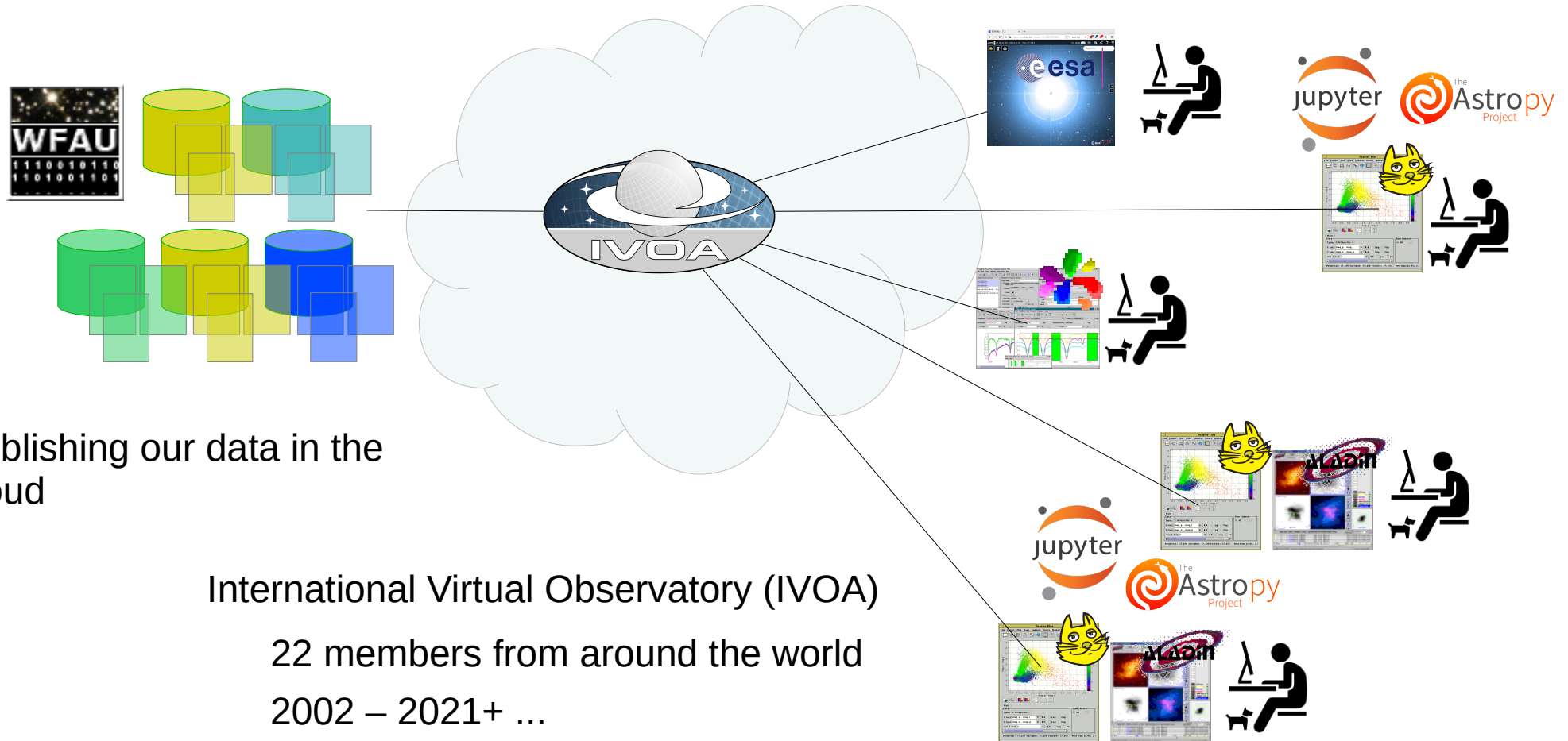International Virtual Observatory (IVOA)

22 members from around the world

2003 – 2021 ...

https://www.ivoa.net/

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Edinburgh University

Wide Field Astronomy
Unit
Show & tell
July 2021

Dave Morris
Research Software Engineer

International Virtual Observatory

Publishing our data in the cloud

International Virtual Observatory (IVOA)

22 members from around the world

2002 – 2021+ ...

https://www.ivoa.net/

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Technology stack

Compose orchestration
Docker containers

Virtualization
platform

Virtual machines

RedHat & Debian Linux

Table Access Protocol (TAP)

https://ivoa.net/documents/TAP/

Astronomical Data
Query Language
(ADQL)

https://ivoa.net/documents/ADQL/

Jboss Hibernate ORM

Tomcat
webserver

Apache Tomcat

Java programming

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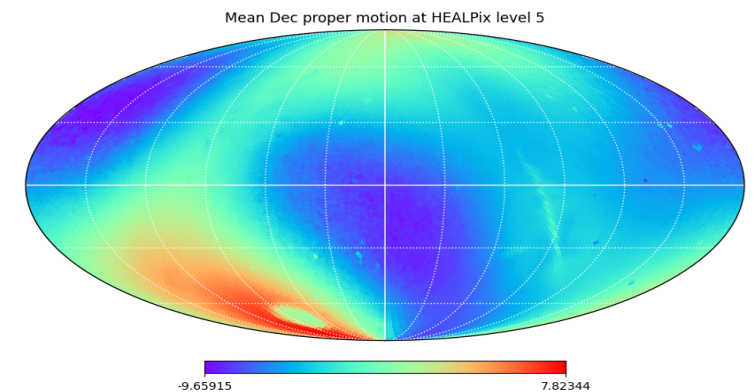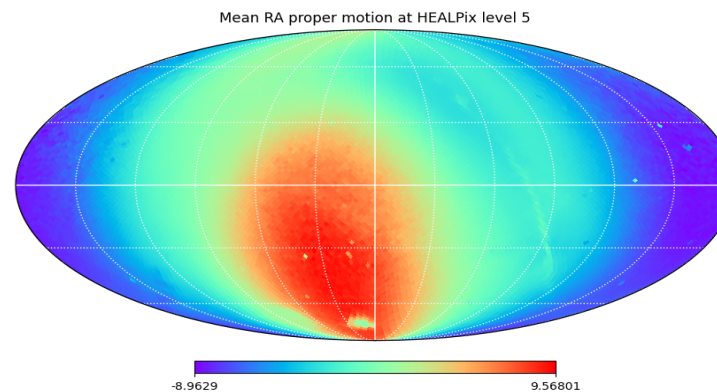Dave Morris
Research Software Engineer

Gaia science platform

Spark '*BigData*' analysis platform

```
SELECT
    floor(source_id / 562949953421312) AS hpx5,
    COUNT(*) AS n, AVG(pmra), AVG(pmdec)
FROM
    gaia_source
GROUP BY
    hpx5
```

Mean RA proper motion at HEALPix level 5

Mean Dec proper motion at HEALPix level 5

-8.9629   9.56801

-9.65915   7.82344

Mean proper motions over the sky – 1min 28sec to calculate and plot

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Dave Morris
Research Software Engineer

Gaia science platform

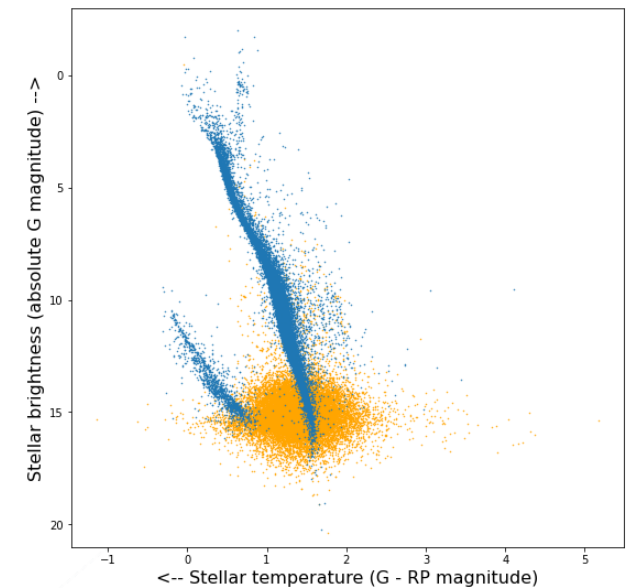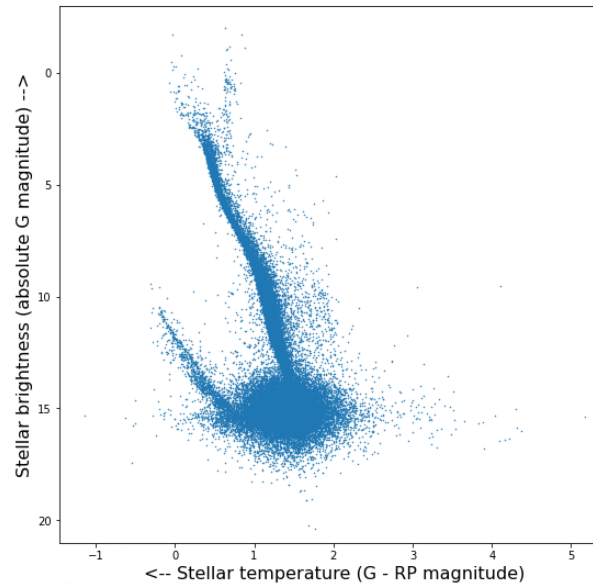Spark '*BigData'* analysis platform

Machine learning application

Random Forrest classifier to filter astrometric solutions.

4 min to train the classifier

25 sec to classify 1,724,028 sources

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Edinburgh University

Dave Morris
Research Software Engineer

Gaia science platform

Technology stack

Ansible deployment

ANSIBLE

Openstack cloud platform

openstack

RedHat & Debian Linux

redhat   debian

Helm deployment

HELM

Kubernetes orchestration

kubernetes

Docker containers

docker

Podman engine

podman

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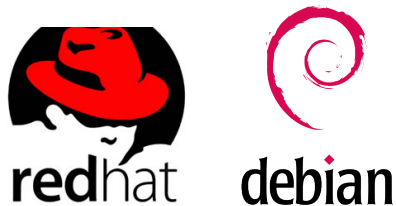Research Software Engineer

Gaia science platform

Technology stack

Analysis platform

Ansible deployment

Helm deployment

Kubernetes orchestration

Podman container engine

Openstack cloud platform

Docker containers

RedHat & Debian Linux

Zeppelin notebooks

Spark distributed analysis

Hadoop distributed execution

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