

ESCAPE

European Science Cluster of Astronomy &
Particle physics ESFRI research Infrastructures

Accessing EGI resources through ESAP

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IVOA Interoperability Meeting

18-20 October 2022



ESCAPE: European Science Cluster of Astronomy & Particle physics ESFRI research infrastructures.

The project aims to address the Open Science challenges shared by ESFRI facilities (SKA, CTA, KM3Net, EST, ELT, HL-LHC, FAIR) and pan-European research infrastructures (CERN, ESO, JIVE) in astronomy and particle physics.

Connect ESFRI projects to EOSC ensuring integration of data and tools

Establish interoperability within EOSC as an integrated multi-messenger facility for fundamental science.



ESAP: ESFRI Science Analysis Platform.

Flexible science platform for the analysis of open access data available through the EOSC environment. It allows EOSC researchers

- ▶ to identify and stage existing data collections for analysis,
- ▶ to select among software tools and packages developed by the ESFRIs or bring their own custom workflows to the platform,
- ▶ to exploit the underlying computing infrastructure to execute those workflows.



Current Status & Capabilities

Query multiple archives with an adaptable interface

Load software from the ESCAPE repository

Integration with ESCAPE Identity & Access Management

Built with Python, Django, React

Data orchestration across multiple services

Interactive Data Analysis through BinderHub services

Upload data using IVOA SA

Interactive Analysis Workflows

Workflow for plotting and visualizing data from the ESAP shopping basket (WSRT-Apertif)

ESCAPE Welcome to escape

ASTRON Data Explorer

ASTRON Virtual Observatory

Zooniverse

Virtual Observatory (VO)

RUCIO

Data Shopping Basket

Interactive Analysis Compute Facilities

MyBinder

JIVE BinderHub

SKAO BinderHub

Demo system

<https://sdc-dev.astron.nl/esap-gui>



Interactive Analysis Workflows

Search for Workflows

Advanced Search

CSIC-IAA HCG-16 workflow

Description: Analysis of Hickson Compact Group 16

Link: <https://github.com/AMIGA-IAA/hcg-16>

Author:

Runtime Platform:

Keywords: jupyter-notebook

CDS MOCpy

Description: Experiment with Multi-Order Coverage maps

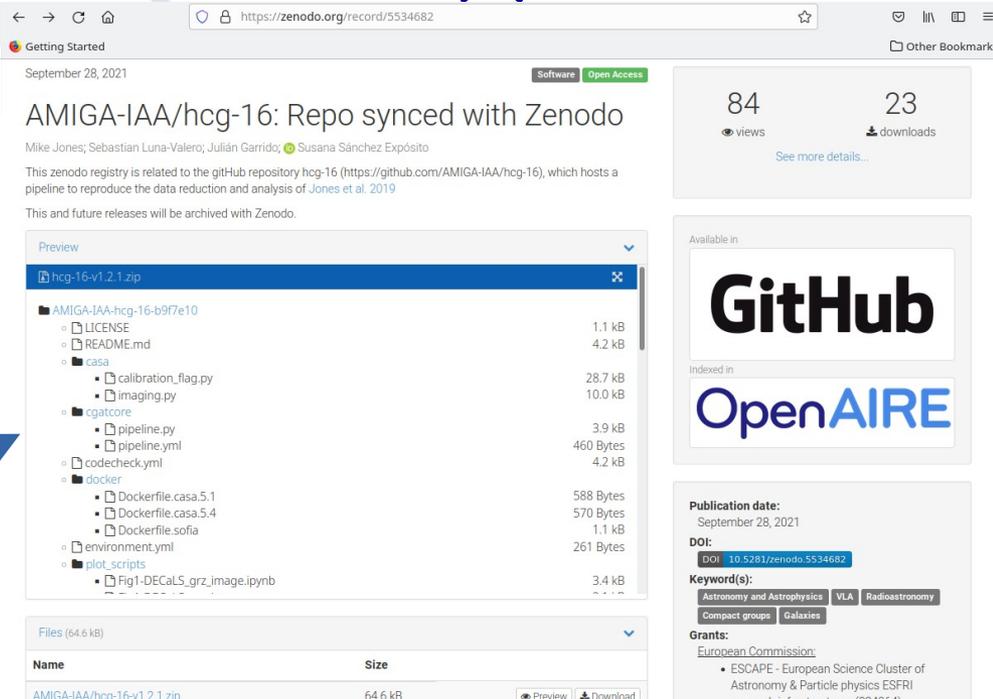
Link: <https://github.com/cds-astro/mocpy>

Author:

Runtime Platform:

Keywords: jupyter-notebook

Next



Getting Started
September 28, 2021 Software Open Access

AMIGA-IAA/hcg-16: Repo synced with Zenodo

Mike Jones; Sebastian Luna-Valero; Julián Garrido; Susana Sánchez Expósito

This zenodo registry is related to the gitHub repository hcg-16 (<https://github.com/AMIGA-IAA/hcg-16>), which hosts a pipeline to reproduce the data reduction and analysis of Jones et al. 2019

This and future releases will be archived with Zenodo.

84 views 23 downloads
[See more details...](#)

Available in
GitHub
Indexed in
OpenAIRE

Publication date: September 28, 2021
DOI: [10.5281/zenodo.5534682](https://doi.org/10.5281/zenodo.5534682)
Keyword(s): Astronomy and Astrophysics VLA Radioastronomy Compact groups Galaxies
Grants: [European Commission](#)
• ESCAPE - European Science Cluster of Astronomy & Particle physics ESFR research infrastructures (ESPAE)

Preview

- hcg-16-v1.2.1.zip
- AMIGA-IAA-hcg-16-b9f7e10
 - LICENSE 1.1 kB
 - README.md 4.2 kB
 - casa
 - calibration_flag.py 28.7 kB
 - imaging.py 10.0 kB
 - cgatcore
 - pipeline.py 3.9 kB
 - pipeline.yml 460 Bytes
 - codecheck.yml 4.2 kB
 - docker
 - Dockerfile.casa.5.1 588 Bytes
 - Dockerfile.casa.5.4 570 Bytes
 - Dockerfile.sofia 1.1 kB
 - environment.yml 261 Bytes
 - plot_scripts
 - Fig1-DECaLS_grz_image.ipynb 3.4 kB

Files (64.6 kB)

Name	Size
AMIGA-IAA/hcg-16-v1.2.1.zip	64.6 kB

Workflow metadata description needed:

- OSSR & CEVO working on it
- codemeta.json

<https://escape2020.pages.in2p3.fr/wp3/eossr/master/metadata.html>



Interactive Analysis

Compute Facilities

Search for Facilities



Deploy

JIVE BinderHub

Description:

JIVE BinderHub

Link: <http://jupyter.jive.nl/binderhub/>

MyBinder

Description:

MyBinder

Link: <https://mybinder.org/>

Rosetta @ INAF OATS



Compute facilities metadata description
needed:

- ExecutionPlanner
- <https://github.com/ivoa/ExecutionPlannerNote>



Two use cases:

- ▶ provide IVOA services in a container

<https://github.com/zarquan/Oligia>

- ▶ provide an environment to run the workflow to process HI data cubes produced by radio interferometers, in particular large data cubes produced by future instruments like the SKA.

<https://hi-friends-sdc2.readthedocs.io/en/latest/>

<https://github.com/Hi-FRIENDS-SDC2/hi-friends>

which is a suitable infrastructure to satisfy such use cases ?



EGI Fedcloud in a nutshell

EGI is a federation of computing and storage resource providers united by the mission to support research and development delivering open solutions for advanced computing and data analytics

The EGI Core is a federation and management platform that pool together various resources: the EGI Federated Cloud Platform (FedCloud)

The EGI cloud compute service gives users the ability to deploy and scale virtual machines on-demand.



Implementation steps

- ▶ register to the Virtual Organisation vo.access.egi.eu
- ▶ ask to CESGA site support to be able to allocate needed resources (particularly a public IP)
- ▶ write a simple django web application, to be integrated in ESAP, to automate the virtual machine creation process in the EGI fedcloud
 - following the EGI provided guide
<https://docs.egi.eu/users/getting-started>
 - using the EGI federated cloud python client
<https://github.com/tdviet/fedcloudclient>



EGI Federated Cloud Resources Access API

Home

- Create Server
- Delete Server
- Show Server
- Create Access Key

Here are available the EGI Federated Cloud Resources Access utilities. Before to create a server you must do three things:

- Create your ssh key-pair following the instructions [here](#)
- Load your public key using the "Create Access Key" in the menu on the left
- Create you own EGI fedcloud access token following the instructions [here](#)

If needed, instructions to ask resources are [here](#)

Create Server

Home

- Create Server
- Delete Server
- Show Server
- Create Access Key

Access Token*:

Provide a server name*:

Pre-loaded ssh key name*:

Server creation result

Home

- Create Server
- Delete Server
- Show Server
- Create Access Key

Server successfully created:

Server name: ESCAPE TEST
 Server IP: XXX.XXX.XX.XXX
 Access user: ubuntu
 Connect using: ssh ubuntu@ XXX.XXX.XX.XXX

<https://github.com/bertocco/ESCAPE-VM-worker>
<https://github.com/bertocco/ESCAPE-VM-worker-gui>



Lessons learned

Show stopper in the virtual machine automation process:

- 1) Public network. Each site has a slightly different network configuration, and there is no standard way to tell which one to use and how to setup the router for it. There is not a convention for the Networks naming → need some guess (human intervention) to understand which is a public network.
- 2) Supported Virtual Organizations. There is not a command in openstack or in the Fedcloud tool that lists the sites that support a certain virtual organisation.
- 3) Flavours and images: it is needed to guess (human intervention) the resources associated to the flavors or the Operative System in an image. A naming convention could be useful. Possible solution forflavours: to use 'list' and 'show' commands in association to create a configuration information file.



Authentication and Authorization thoughts

- ▶ ESCAPE-ESAP **A&A** managed with **INDIGO-IAM**

<https://indigo-iam.github.io/v/current/docs/>

Project deployment:

<https://iam-escape.cloud.cnaf.infn.it/login>

- ▶ EGI FedCloud **A&A** managed with **EGI Check-in**

<https://docs.egi.eu/users/aai/check-in/>

EGI Check-in as a service:

<https://aai.egi.eu/registry/>

Both: OpenID Connect, JWT token, group membership

Could them interoperate? and with IVOA compliant A&A?



Interoperability with IVOA compliant A&A?

Authentication: mapping between tokens?

Authorization: GMS defines a REST API that answers the question: Is this user a member of this group?

The GMS service having the group information is identified and queried through the group name. Group URI example: ivo://oats.inaf.it/gms?MyGroup.

The IAM token contains the ISS (issuer field):

“iss”: “<https://iam-dem.cnaf.infn.it/>”

and an introspection endpoint containing (also) groups informations

<https://iam-dem.cnaf.infn.it/introspect>

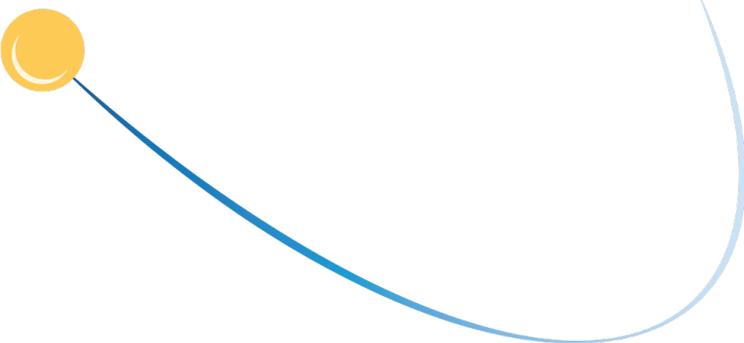
<https://agenda.infn.it/event/20847/contributions/108730/attachments/69792/86836/IAM-corso-big-data.pdf>





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Thank you !



Backup Slides



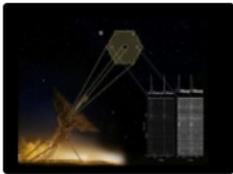
Browser address bar: <https://sdc-dev.astron.nl/esap-gui/>

Navigation icons: Back, Forward, Refresh, Home, Search, Star, Settings, Print, Full Screen, Update

Bookmarks: LRZ: How to set u..., Previsioni meteo..., PostaCertificata, concorsi attivi, Cloud - Introduzi..., Standard Deviati..., Federated AAI Co..., Astrochannel 2.0, La Vida Es Un Car..., Other bookmarks

ESCAPE ESAP Archives Multi Query Interactive Analysis Batch Analysis Asynchronous Jobs IVOA-SAMP Login

WSRT-Apertif



Apertif Surveys

Data from the Apertif surveys include imaging and time-domain data. The time-domain products consist of high-time resolution filterbank data in the PSRFITS standard. The imaging data products include the raw observations in the measurement set (MS) standard format. In addition, processed data products are available, including calibration tables, calibrated visibilities, multi-frequency synthesis continuum images, polarization images and cubes, and uncleaned neutral hydrogen (HI) line and beam cubes. Full details of these data will be provided in upcoming papers (van Leeuwen et al.

ASTRON VO



ASTRON Virtual Observatory

The Virtual Observatory defines a set of standards that can be used to download astronomical data. The ASTRON VO contains several image surveys, which are images in the FITS format. Since the VO is currently under development, more data types will be available in the future.

[Visit ASTRON VO Archives](#)

Zooniverse



Zooniverse Classification Database

The Zooniverse is the world's largest and most popular platform for people-powered research. This research is made possible by volunteers – more than a million people around the world who come together to assist professional researchers. Our goal is to enable research that would not be possible, or practical, otherwise. Zooniverse research results in new discoveries, datasets useful to the wider research community, and many publications.

[Visit Zooniverse Archives](#)

Virtual Observatory (VO)



Virtual Observatory (VO)

The Virtual Observatory defines a set of standards that can be used to download astronomical data.

[Visit Virtual Observatory \(VO\) Archives](#)

RUCIO



Rucio

Built on more than a decade of experience, Rucio serves the data needs of modern scientific experiments. Large amounts of data, countless numbers of files, heterogeneous storage systems, globally distributed data centres, monitoring and analytics. All coming together in modular solution to fit your needs.

[Visit RUCIO Archives](#)



Interoperability with IVOA compliant A&A?

The IAM token contains the ISS (issuer field):

“iss”: “<https://iam-dem.cnaf.infn.it/>”

and an introspection endpoint containing (also) groups information

<https://iam-dem.cnaf.infn.it/introspect>

```
curl -H "Content-Type: application/x-www-form-urlencoded" -u  
${CLIENT_ID}:${CLIENT_SECRET} -d "token=${ACCESS_TOKEN}"  
$ISS/introspect | jq .'
```

ISS=https://iam-escape.cloud.cnaf.infn.it

token=my access token obtained login-in

CLIENT_ID and _SECRET are ESAP configuration parameters

