



# ESCAPE

European Science Cluster of Astronomy &  
Particle physics ESFRI research Infrastructures

## ESCAPE OSSR: An Open-Source Software Repository

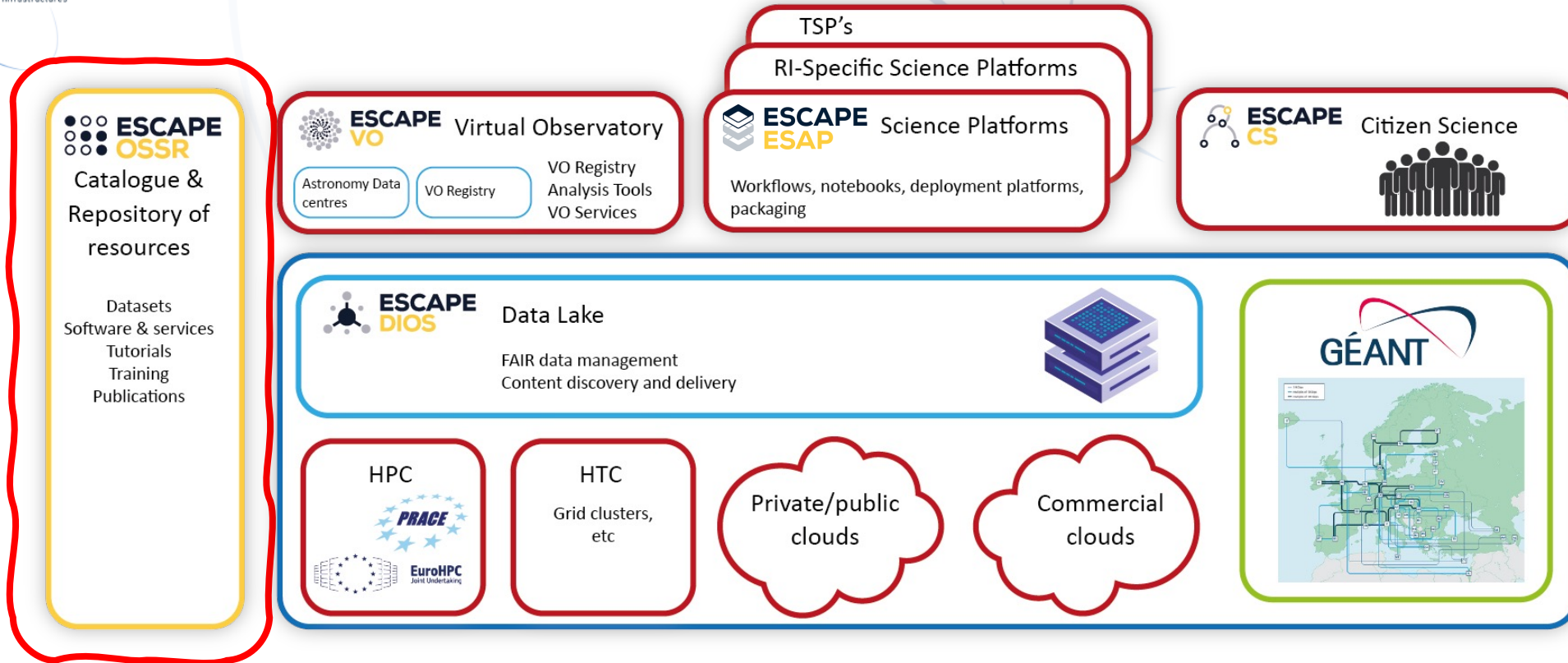
Kay GRAF

ECAP, Erlangen Centre for Astroparticle Physics, Friedrich-Alexander-Universität Erlangen-Nürnberg

on behalf of the ESCAPE OSSR Working Group

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.





OSSR was developed as part of the ESCAPE project → software community effort with repository (Astro/particle, Particle Physics and Astronomy Research Infrastructures) in the EOSC (European Open Science Cloud)

- servicing the needs of the ESF/RIS
- Since 03/2023: ESCAPE is an Open Collaboration → transition phase



**ESCAPE  
OSSR**  
Catalogue &  
Repository of  
resources

Datasets  
Software & services  
Tutorials  
Training  
Publications

The ESCAPE Open-source Scientific Software and Service Repository (OSSR) is a **sustainable open-access repository** to share scientific software, services to the **astro-particle-physics-related communities** and enable open science. It is built as a **curated [Zenodo community](#)** integrated with **dedicated tools** to enable a complete software life-cycle. The OSSR is fully onboarded into the **[EOSC explorer](#)**.

# OSSR Aims and Structure

## Development Platform

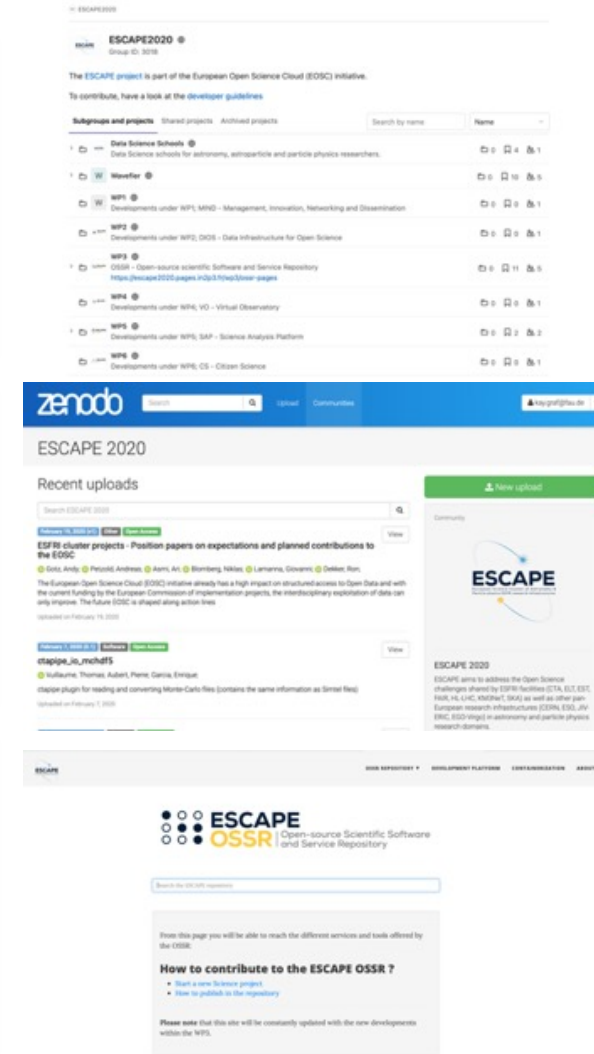
- Software Development
- Integration & Automation

## Repository

- Service Aggregation
- Preservation / Archive
- (link to EOSC)

## Landing Page

- Entry point,  
Link Aggregation
- New: migration to RSD  
planned





The ESCAPE Open-source Scientific Software and Service Repository (OSSR) is an open-access repository of scientific software, astro-particle-physics communities and science. It is built on the curated [Zenodo community](#) and dedicated tools. The complete software OSSR is fully onboarded into the [EOSC explorer](#).

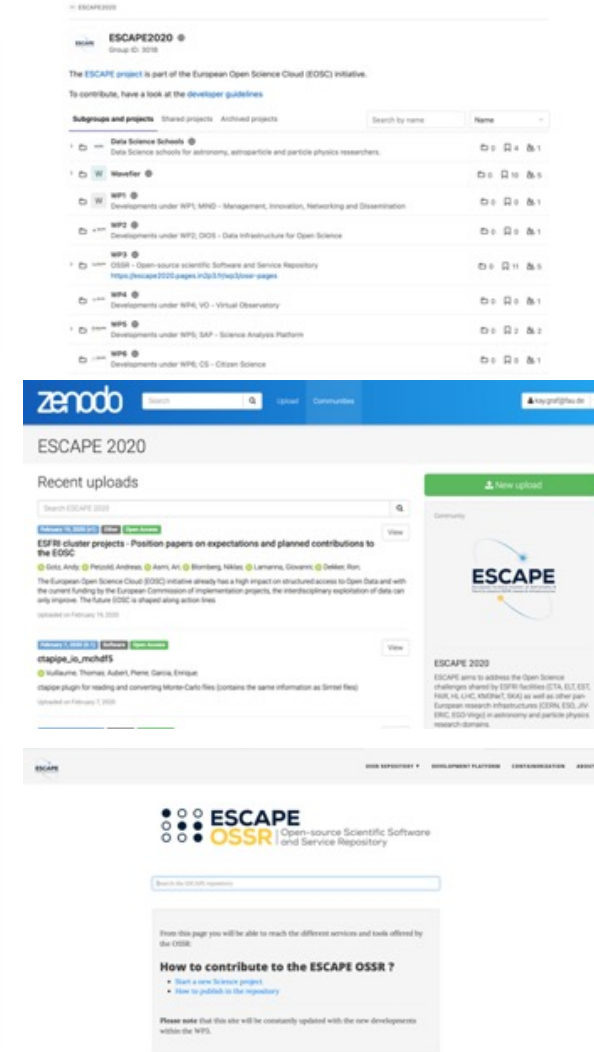
(Open) Software is  
an integral part of  
research and  
needs to be treated  
as such

# OSSR Aims and Structure

## Development Platform

- Software Development
- Integration & Maintenance

- New: migration to RSD planned



The screenshot shows the Zenodo website interface. At the top, the Zenodo logo is on the left, and a menu icon is on the right. Below the header, the 'ESCAPE OSSR' logo and name are displayed, along with the tagline 'Open-source Scientific Software and Service Repository'. A URL 'https://purl.org/escape/ossr' and a 'Project' icon are also visible. A green 'New upload' button is present. A navigation bar includes links for 'Records', 'Requests', 'Members', 'Settings', 'Curation policy', and 'About'. The main content area shows search results for '48 results found', sorted by 'Newest'. Two project entries are visible: 'MOC Lib Rust, MOCCLi, MOCWasm and MOCSet' (uploaded December 11, 2023, version 0.11.3) and 'cds-astro/mocpy: Release v0.13.1' (uploaded December 4, 2023, version v0.13.1). Each entry includes a description, upload date, version, and download statistics.

Zenodo used as backend:

- FAIR centered
- long-term archive
- software citability (DOI)
- widely accepted and used
- integrates with other services (aggregators)
- community management

⇒ [escape2020](#) community



- Software metadata are the implementation of FAIR principles
  - Findable, Interoperable
  - They should be part of the software and not defined or retained by an external service



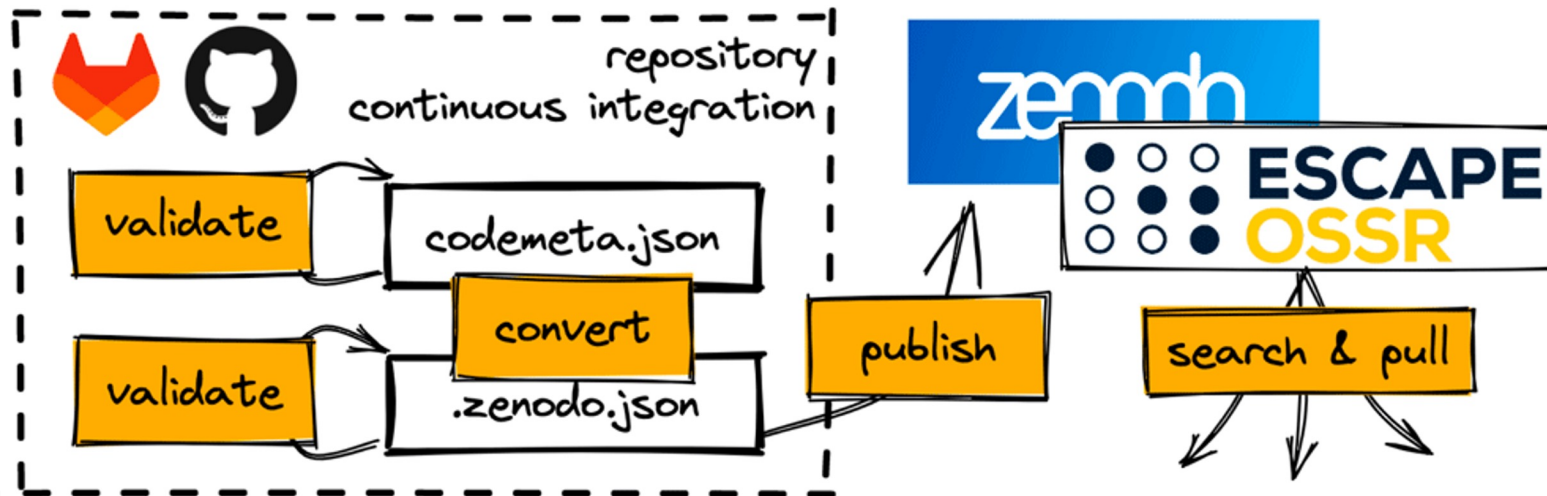
## OSSR uses CodeMeta

- Universal metadata schema to describe software
- Not limited or linked to a specific service
- Increasing adoption
- Integration with other services

⇒ A codemeta.json file with a number of required keys is mandatory to submit software to the OSSR



- The eOSSR is the OSSR Python library
- Connects to Zenodo API to handle:
  - records: search, download, upload, publish, submit...
  - communities: list records, list and handle submissions
- Handles OSSR metadata:
  - Defines required one
  - Converts from CodeMeta to Zenodo schema
  - Validates codemeta.json file



# Online tools: metadata generator, converter & validator

## Validate and convert your metadata



This notebook will help you validate your metadata for an upload to the ESCAPE OSSR.

To do so, upload your codemeta metadata, either using an URL pointing to the `codemeta.json` file, uploading a `codemeta.json` file or copying the metadata in the text box below.

Note that you can generate your ESCAPE codemeta file using the online generator: <https://escape2020.pages.in2p3.fr/wp3/codemeta-generator/>

Load codemeta from a `json` file

Upload (0)

Load codemeta from a [Zenodo record ID](#)

Record ID:

Load

Load codemeta from an [URL](#)

URL:

Load

codemeta:

### ESCAPE OSSR CodeMeta generator

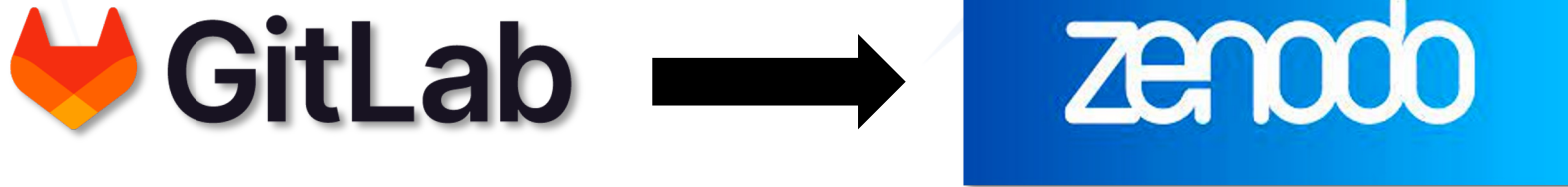
This tool helps you create a CodeMeta.json file for your software. Note however that it is not exhaustive and other fields can be manually added in your file following the [CodeMeta schema](#).  
Most fields are optional. Mandatory fields will be highlighted when generating CodeMeta.

<b>The software itself</b>	<b>Discoverability and citation</b>
<b>Name</b> <input type="text" value="My Software"/> <small>the software title</small>	<b>Unique identifier</b> <input type="text" value="10.151.xxxxx"/> <small>such as ISBNs, GTIN codes, UUIDs etc. <a href="http://schema.org/identifier">http://schema.org/identifier</a></small>
<b>Description</b> <input type="text" value="My Software computes ephemerides and orbit propagation. It has been developed from early '80s."/>	<b>Application category</b> <input type="text" value="Astronomy"/>
<b>Documentation or readme</b> <input type="text" value="https://online-documentation.org"/>	<b>Keywords</b> <input type="text" value="Projects: CTA, EGO-Virgo, ELT, EST, FAIR, HL-LHC, KM3Net, LSST, LOFAR, SKA; Content: Astronomy, Astroparticle physics, Particle physics"/>
<b>Creation date</b> <input type="text" value="YYYY-MM-DD"/>	<b>Keywords</b> <input type="text" value="Projects: CTA, EGO-Virgo, ELT, EST, FAIR, HL-LHC, KM3Net, LSST, LOFAR, SKA; Content: Astronomy, Astroparticle physics, Particle physics"/>
<b>First release date</b> <input type="text" value="YYYY-MM-DD"/>	<b>Funding</b> <input type="text" value="ESCAPE 824064"/> <small>grant funding software development</small>
<b>License</b> <input #"="" type="text" value="from &lt;a href="/> SPDX licence list"/>	<b>Funder</b> <input type="text" value="European Union's Horizon 2020 research and innovation programme organization funding software development"/>
<b>Development community / tools</b>	<b>Authors and contributors can be added below</b>
<b>Code repository</b> <input type="text" value="git+https://github.com/You/RepoName.git"/>	<b>Run-time environment</b>
<b>Continuous integration</b> <input type="text" value="https://travis-ci.org/You/RepoName"/>	<b>Programming Language</b> <input type="text" value="C#, Java, Python 3"/>
<b>Issue tracker</b> <input type="text" value="https://github.com/You/RepoName/issues"/>	<b>Runtime Platform</b> <input type="text" value=".NET, JVM"/>
<b>Related links</b> <input type="text"/>	<b>Operating System</b> <input type="text" value="Android 1.6, Linux, Windows, macOS"/>
	<b>Other software requirements</b> <input type="text" value="Python 3.4"/> <input type="text" value="https://github.com/psf/requests"/>
	<b>Current version of the software</b>
	<b>Version number</b> <input type="text" value="1.0.0"/>
	<b>Release date</b> <input type="text" value="YYYY-MM-DD"/>
	<b>Download URL</b> <input type="text" value="https://example.org/MySoftware.tar.gz"/>
	<b>Release notes</b> <input type="text" value="Change log: this and that; Bugfixes: that and this."/>

- Help software developers to provide valid and complete metadata
- Get that first working version of codemeta.json (adapted from codemeta generator)
- Test things out (gitlab pages based)









- Zenodo has an efficient GitHub integration, but no gitlab integration
  - Many ESFRIs use their own Gitlab instance
- ⇒ We provide a simple gitlab-ci snippet
- to publish your software to Zenodo / OSSR, e.g. when making a release in gitlab
  - using metadata provided in codemeta.json




- The OSSR is a curated software repository
  - implementation of the FAIR principles
  - good code practices
  - software quality
  - do not review scientific results  science paper
- Curation happens in a dedicated gitlab repository
  - completely open
  - automated checks
  - discussion between reviewers and providers
- Curation provides
  - Trust in the repository and provided content
  - Recognition for software providers



cssr / OSSR Curation / Merge requests / 148

## [CURATE] HiPeRTA

 Open Thomas Vuillaume requested to merge [7378249](#) into [master](#) 1 year ago

Overview **1** Commits **2** Pipelines **2** Changes **1** Add a to do

=== Record #7378250 ===  
 Title: HiPeRTA  
 DOI: 10.5281/zenodo.7378250  
 URL: <https://zenodo.org/record/7378250>  
 HiPeRTA is a C++ library providing High Performance computing algorithms which provide full C++ programs from HiPeRTA C++ sources for the Cherenkov Telescope Array (CTA) low-level data analysis real time reconstruction. It takes advantage of the latest SIMD (Single input multiple data) operations included in modern processors, for native vectorized optimization of analytical data processing. It is developed to be updated by respect to the ctapipe framework.

**Check the software checklist for the entry**

- ☐ Contains valid codemeta.json (see validator output)
- ☒ Documentation is provided in the Zenodo entry (at least through codemeta)
- ☒ a stable versioned release of the project
- ☒ It is under an open-source license (see SPDX [<https://spdx.org/licenses/>])
- ☒ Follows a reasonable set of software development / software engineering practices (rough by-eye quality estimate)


**Complete onboarding issue**


Related onboarding issue: XXX (to be entered by onboarding manager)

- ☐ Make sure all boxes of the checklist up to "Uploaded to Zenodo" are ticked
- ☐ Tick "software checklist completed" when done with the above
- ☐ When cleared for merging, tick "Added to Zenodo community/published" and change issue status to "closed"

**There are 8 warnings:**


- `memoryRequirements` not provided in the codemeta schema but is recommended
- `processorRequirements` not provided in the codemeta schema but is recommended




**Assignee** Edit  
 Thomas Vuillaume

**Reviewer** Edit  
 Kay Graf

**Labels** Edit  
[Ready for curation](#) x

**Milestone** Edit  
 None

**Time tracking**  +  
 No estimate or time spent

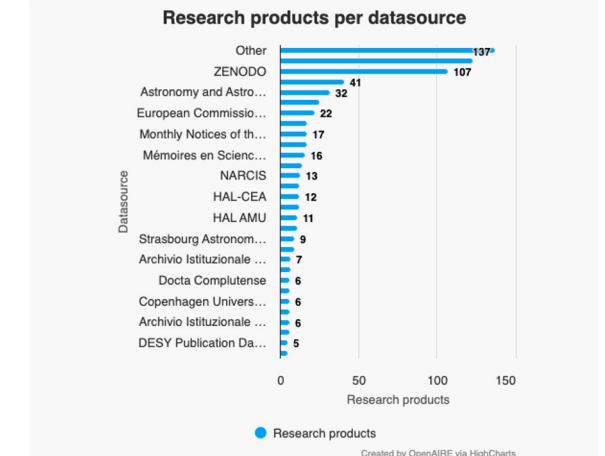
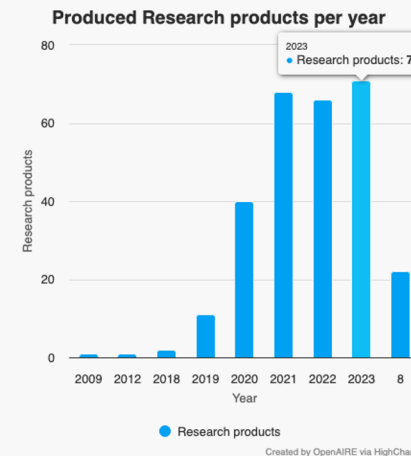
**3 Participants**  
  

- connects to other services
- analyse data
- search and pull software from the OSSR
- fully integrated with DMA ST2, as sub-community via GSI group, also including the relevant entries to <https://helmholtz.software/>

## Integration with other services



- EOSC integration
- Provides integrated statistics
- Connects with other data sources





## Welcome to the ESCAPE OSSR!

[Browse the OSSR content.](#)

### What is it?

The ESCAPE Open-source Scientific Software and Service Repository (OSSR) is a sustainable open-access repository to share scientific software, services and datasets to the astro-particle-physics-related communities and enable open science. It is built as a curated [Zenodo community](#) integrated with several tools to enable a complete software life-cycle. The ESCAPE Zenodo community welcomes entries that support the software and service projects in the OSSR such as user-support documentation, tutorials, presentations and training activities. It also encourages the archival of documents and material that disseminate and support the goals of ESCAPE.

### How to contribute to the ESCAPE OSSR?

You can onboard your project right now - [see here](#) how.

# One single entry point

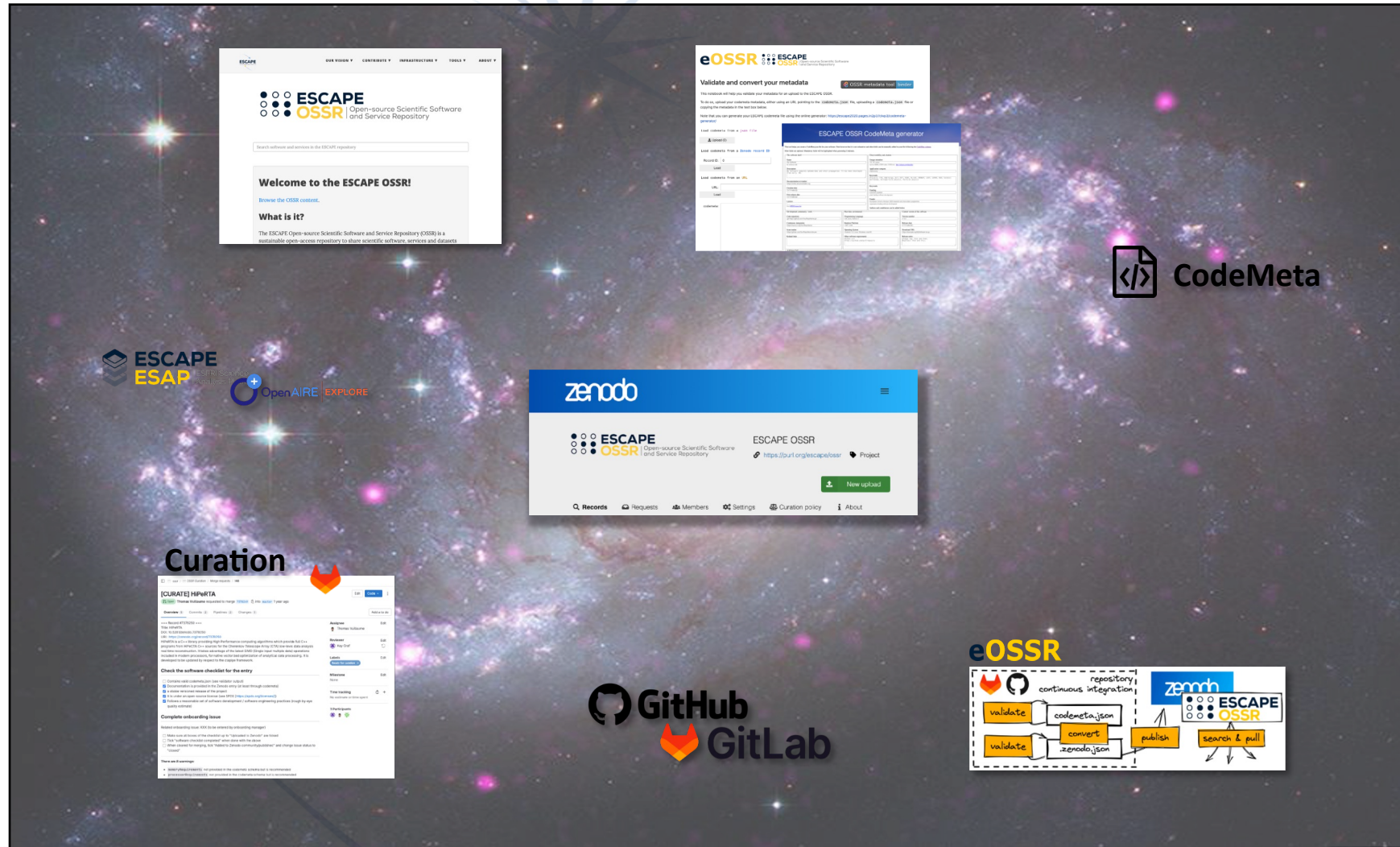
<http://purl.org/escape/ossr>

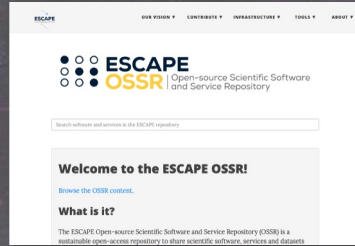
- Find all the information
- Search the OSSR
- As frontpage:  
move to [RSD](#) under discussion
- Onboarding instructions





# The OSSR galaxy



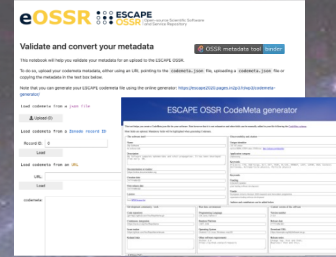


ESCAPE OSSR Open-source Scientific Software and Service Repository

Welcome to the ESCAPE OSSR!

What is it?

The ESCAPE Open-source Scientific Software and Service Repository (OSSR) is a sustainable open-source repository to share scientific software, services and datasets



eOSSR ESCAPE OSSR

Validate and convert your metadata

This validator will help you validate your metadata for an upload to the ESCAPE OSSR.

By clicking, upload your metadata file, either using an URL, pointing to the ESCAPE OSSR, the repository, or the metadata file itself.


Note that you can generate your ESCAPE OSSR metadata for using the online generator: <https://github.com/escape-oedr/escape-oedr-generator>


Load metadata from a file

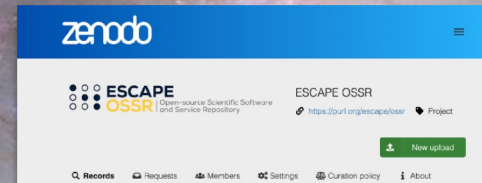
Load metadata from a URL

Load metadata from an API

ESCAPE OSSR CodeMeta generator

 CodeMeta





zenodo

ESCAPE OSSR Open-source Scientific Software and Service Repository

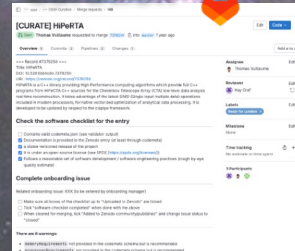
ESCAPE OSSR

<https://doi.org/10.5281/zenodo.1000000>

New upload

Records Requests Members Settings Curation policy About

## Curation




[CURATE] HIPPARA

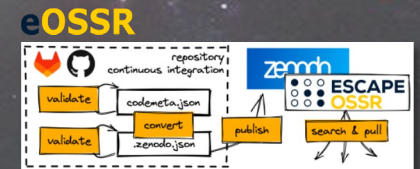
ESCAPE OSSR Open-source Scientific Software and Service Repository

Check the software checklist for the entry

Complete software checklist

There are no warnings





eOSSR repository

```

graph LR
    validate[validate] --> codemeta[codemeta.json]
    validate --> zenodo[zenodo.json]
    codemeta --> publish[publish]
    zenodo --> publish
    publish --> search[search & pull]
  
```

continuous integration


publish


search & pull

ESCAPE OSSR

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Funded by the European Union's  
Horizon 2020 - Grant N° 824064







DMA ST2



# The OSSR galaxy

**ESCAPE OSSR** Open-source Scientific Software and Service Repository

**Validate and convert your metadata**

**ESCAPE OSSR CodeMeta generator**

**zenodo**

**GitHub** **GitLab**

**eOSSR** continuous integration repository

**CodeMeta**

**Curation**

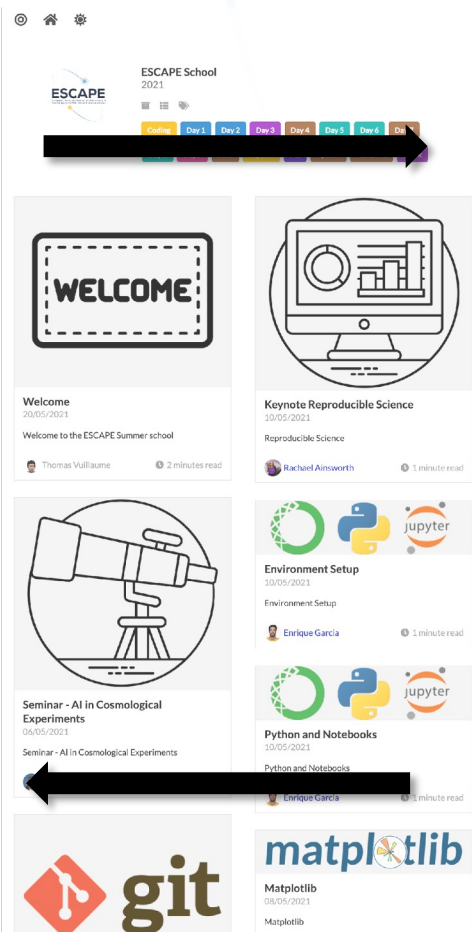
**[CURATE] HIPPARTA**

**validate** **convert** **publish** **search & pull**

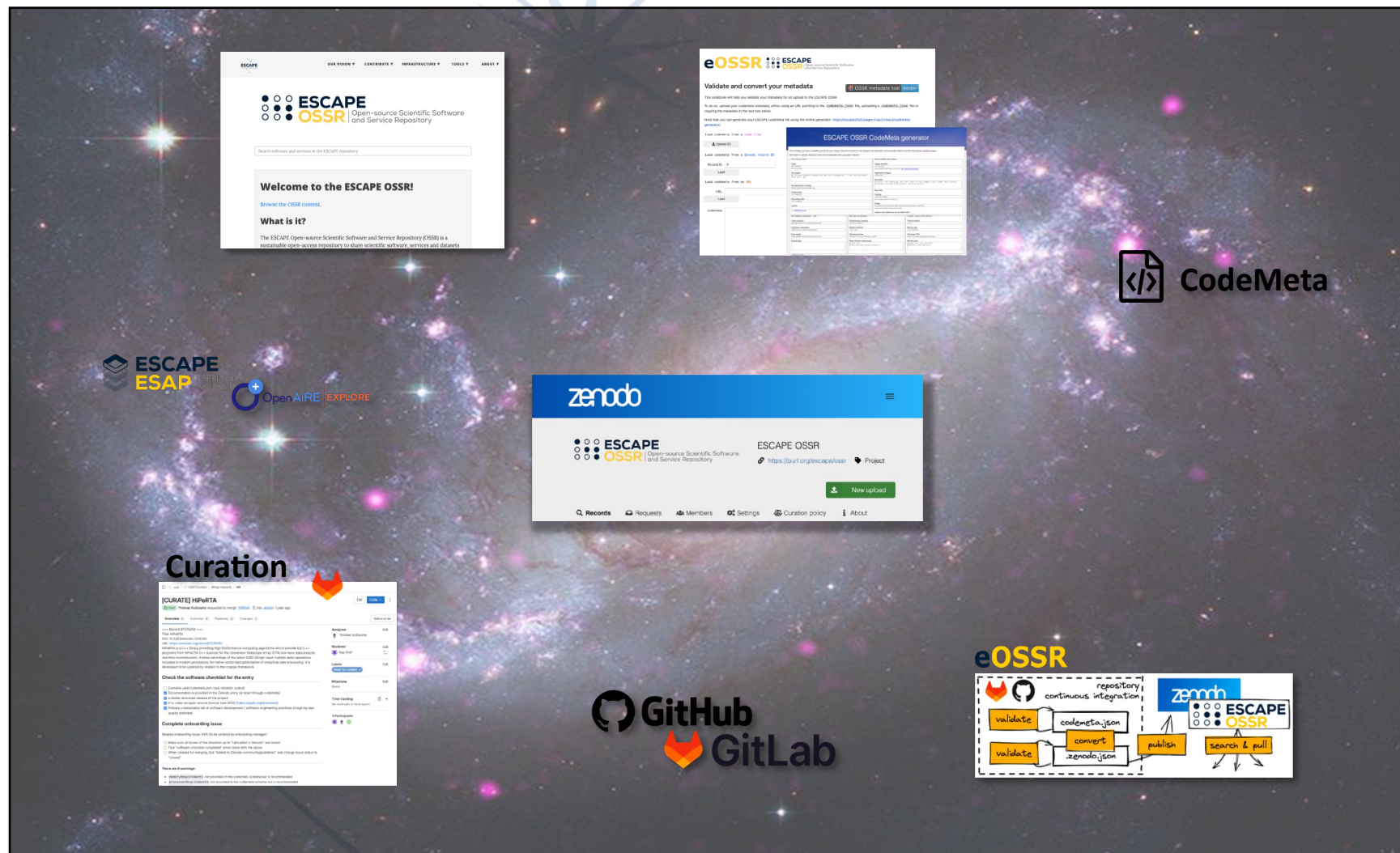




# The OSSR galaxy



OSSR workshops,  
collaboration meetings  
and Software Schools



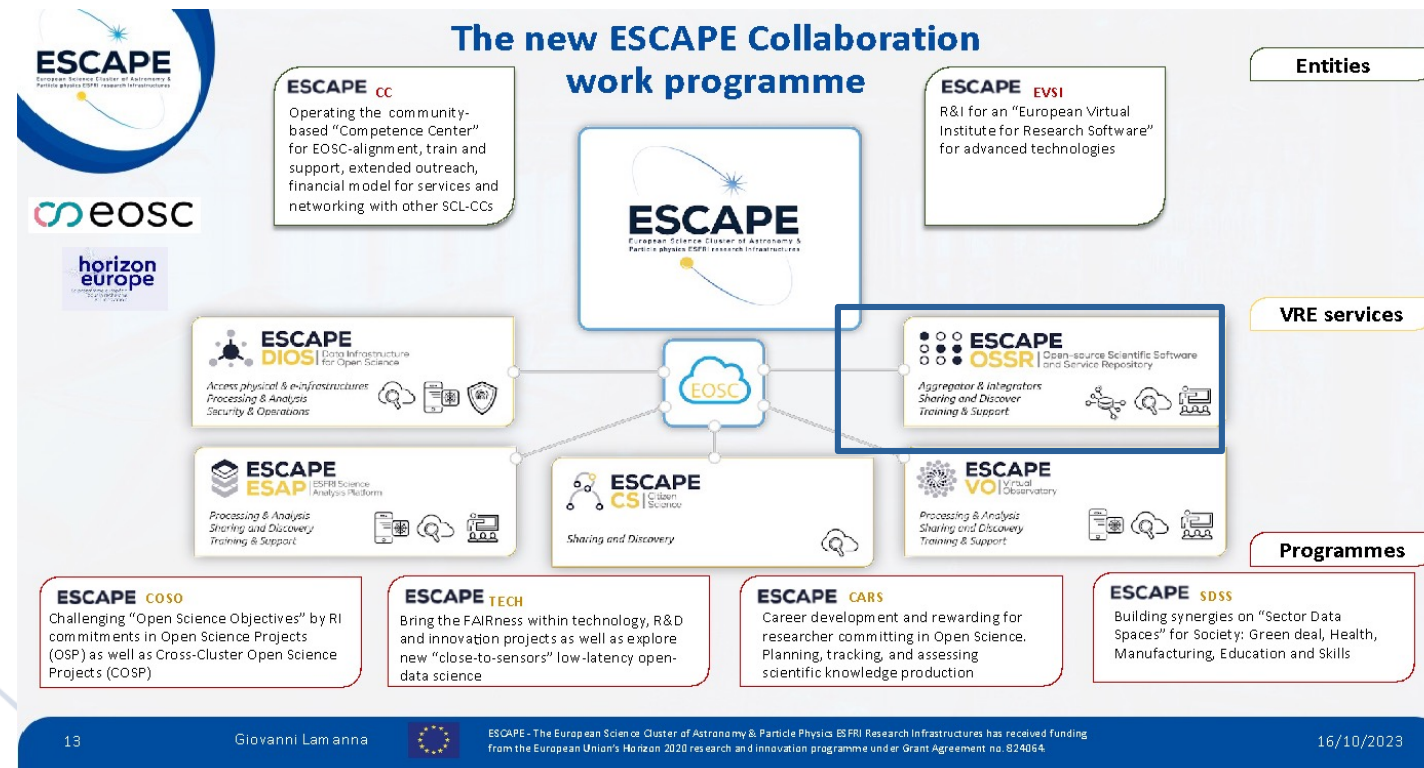
# Outreach to Users





# What is the OSSR?

- The Open Software and Service Repository is one building stone emerging from the ESCAPE project in EOSC (European Open Science Cloud)
- Supported through the ESCAPE collaboration
- Catalogue of software repositories or collections based on entries in a Zenodo community
- OSSR group to curate and develop repository & foster community
- Review performed on all entries



# Why should you share your software?

## Visibility

- See your work alongside other projects from the same community
- Be citeable through Zenodo and findable through multiple integrated software platforms

## Recognition

- Go through our quality review and receive the OSSR badge
- Increase citations through better findability
- Long-term archival of your software

## Community

- Be invited to the community exchange during the OSSR collaboration meetings
- Present your project and benefit from the experience of colleagues from the field

## Future integration

- Benefit from future developments to enable science platform integration
- Keep in touch with the latest developments in ESCAPE



# What to share - examples

Community relevant software



[DOI: 10.5281/zenodo.8033275](https://doi.org/10.5281/zenodo.8033275)

Analysis repositories  
SKA Science Data Challenge



[DOI: 10.5281/zenodo.5526844](https://doi.org/10.5281/zenodo.5526844)

Service and software collections  
An astronomical HiPS visualizer in the browser



[DOI: 10.5281/zenodo.8243056](https://doi.org/10.5281/zenodo.8243056)



new types

*If it makes  
sense – add it!*



## Add metadata

- Create a codemeta.json with required info
- Make sure to add good documentation

## Publish on Zenodo

- Push your work to Zenodo and request access to the ESCAPE community

## Get your review done

- Get all the quality checkmarks and get added
- Add your OSSR badge to your project

## Get involved

- Join the OSSR community meetings
- Share your software, create new opportunities!

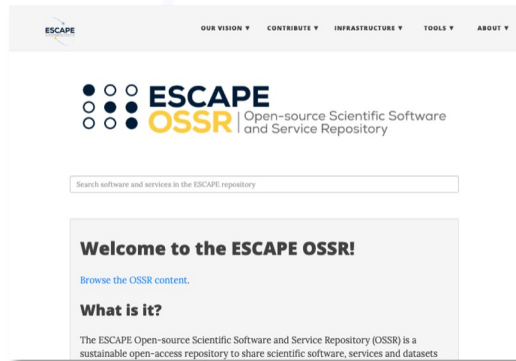
## Relevant Links

Onboarding instructions: <https://escape-ossr.gitlab.io/ossr-pages/page/contribute/onboarding/>

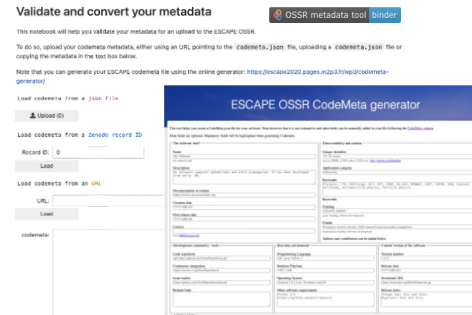
Zenodo Community:  
<https://zenodo.org/communities/escape2020>







OSSR entry point  
See our requirements  
Contact us if needed



Produce codemeta.json.  
Check its validity.

# How to onboard

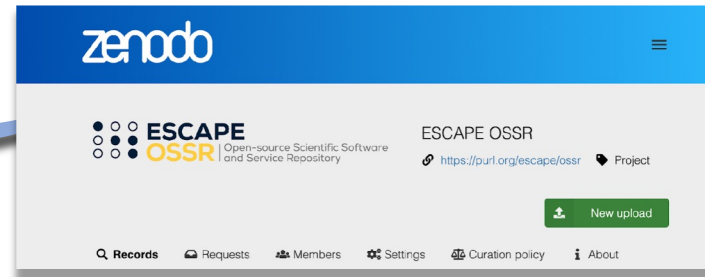


**CodeMeta**

Add codemeta.json to your repo.

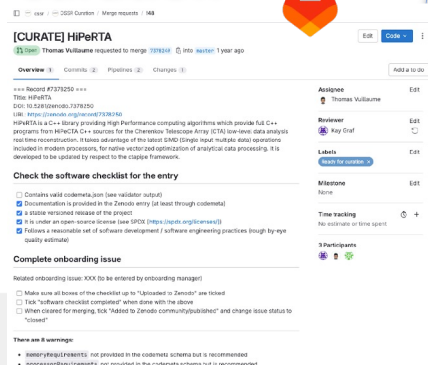


Acceptation in OSSR  
Findable and Accessible  
by other services



## Curation

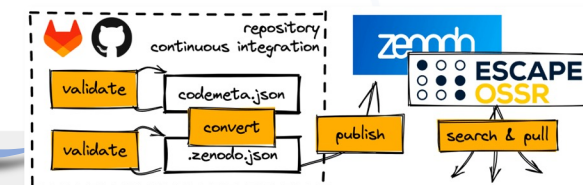
Record gets curated



GitHub/Gitlab to Zenodo  
Request to integrate  
*escape2020* community



Keep codemeta.json updated  
CI/CD validates codemeta.json in time  
**eOSSR**



⇒ process is automatic for all following revisions / releases

Funded by the European Union's  
Horizon 2020 - Grant N° 824064



# Conclusion and future

- OSSR as community software effort
- The [OSSR](#) is accepting quality software and analysis code from astro & particle physics communities

- Set of tools to help you in the software lifecycle
- Integration with services
- Curation to build trust and recognition

<https://purl.org/escape/ossr>

- Find our open letter at <https://open-research-europe.ec.europa.eu/articles/3-46>

- Strong interaction with DMA ST2 (adopted catalogue solution)

- technology decisions: thin layer over existing services

- EVERSE EU project starting in March 2024

- Establish an European Virtual Institute for Research Software
- Keep improving software quality in research
- Exchanges with other science clusters





OSSR started as EOSC Project and became an  
Open Collaboration lately  
Many overlapping topics with national projects/RIs  
Thank you for your attention!

