



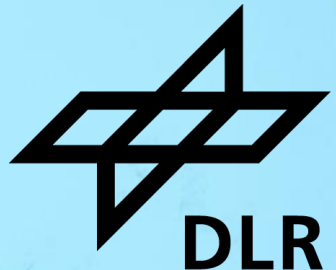
# HERMES: AUTOMATING SOFTWARE PUBLICATION WITH RICH METADATA

**Stephan Druskat**

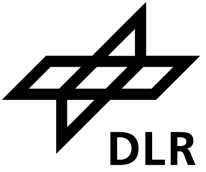
German Aerospace Center (DLR), Institute for Software Technology

DOI [10.5281/zenodo.7963967](https://doi.org/10.5281/zenodo.7963967)

License [CC-BY-4.0 International](https://creativecommons.org/licenses/by/4.0/)



# HERMES: Automating software publication with rich metadata

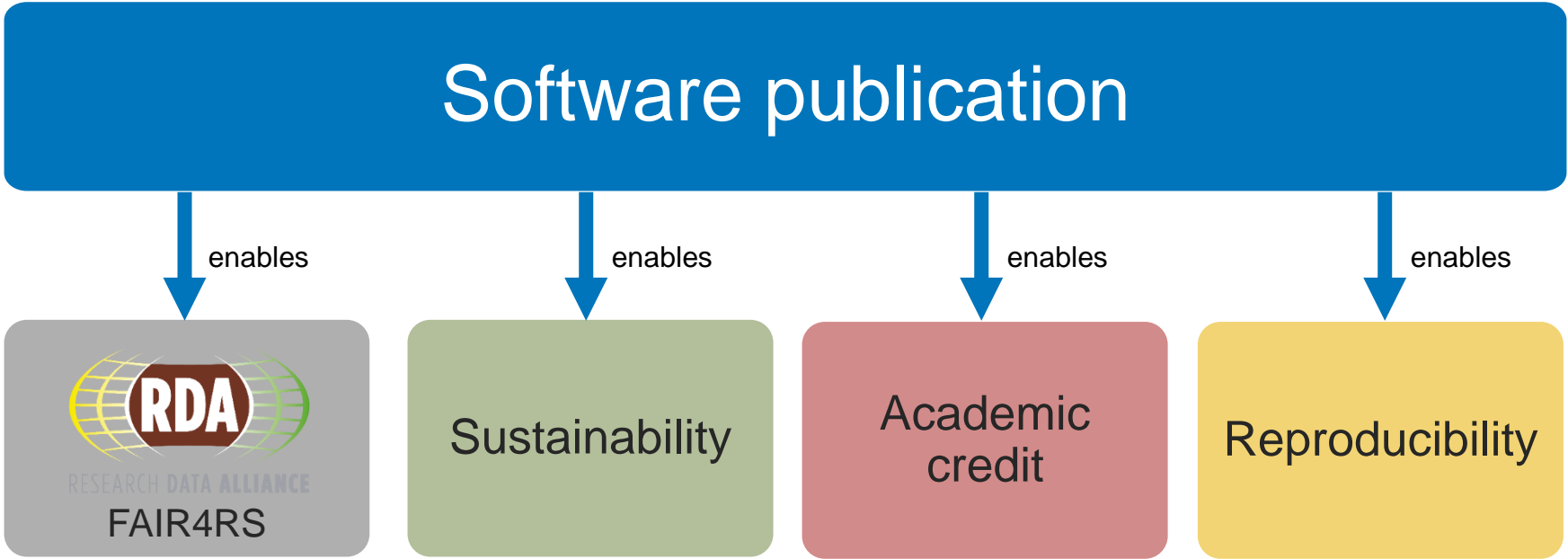


1. Why (and how to) publish your software?
2. HERMES: Software publication with rich metadata
3. Automatic software publication with HERMES in practice
4. Conclusion & outlook

The background of the slide is a high-resolution photograph of a satellite in orbit above Earth. The satellite is a rectangular platform with two long, thin solar panel arrays extending horizontally from its central body. The Earth's surface below is a mix of green landmasses and blue oceans, with white clouds scattered across the scene. The curvature of the planet is visible on the right side.

# SOFTWARE PUBLICATION

# Software publication



# Software publication state of the practice



- Publication of metadata and artifacts\* for software **versions** in publication repositories
- Persistent identifier (DOI) for each version
- **Not** software publication:
  - Software available on a source code platform (GitHub, GitLab, etc.)
  - A paper *about* the software
- Interim solution: software journals
- Challenge: quality assurance

zenodo Search Upload Communities Log in Sign up

August 30, 2022 Software Open Access

## Hexatomic

Druskat, Stephan; Krause, Thomas; Lachenmaier, Clara; Bunzeck, Bastian

Hexatomic is an extensible, OS-independent platform for deep multi-layer linguistic annotation of corpora. It is being developed for sustainability, in order to support research software re-use rather than new development of software with each new research project. Using Hexatomic, linguistic research projects can implement what they need on top of an existing platform. To safeguard compatibility, Hexatomic works on instances of Salt projects. Salt is a generic metamodel for linguistic data.

If you use this software, please cite it as below.

Preview

hexatomic-v1.0.1.zip

The preview is not showing all the files

- hexatomic-hexatomic-4fa5704
  - all-contributorsrc 1.7 kB
  - checkstyle 505 Bytes
  - github
    - ISSUE\_TEMPLATE
      - bug\_report.md 742 Bytes
      - feature\_request.md 928 Bytes
    - PULL\_REQUEST\_TEMPLATE.md 2.3 kB
    - workflows
      - archive.yml 317 Bytes
      - release.yml 5.1 kB
      - test.yml 1.8 kB
  - githignore 76 Bytes
  - mvn 193 Bytes

Files (8.7 MB)

Name	Size	Preview	Download
hexatomic/hexatomic-v1.0.1.zip	8.7 MB	<input type="checkbox"/>	<input type="checkbox"/>

md5:4ca6b45d34222149f5d4431a7036e8e4

Citations (0)

Show only:  Literature (0)  Dataset (0)  Software (0)  Unknown (0)  Citations to this version

No citations.

Available in: GitHub, OpenAIRE

Publication date: August 30, 2022

DOI: [10.5281/zenodo.7034163](https://doi.org/10.5281/zenodo.7034163)

Related identifiers: Supplement to <https://github.com/hexatomic/tree/v1.0.1>

License (for files): Apache License 2.0

Versions

Version	Date
Version 1.0.1	Aug 30, 2022
Version 1.0.0	Aug 23, 2022
Version 0.14.0	Aug 23, 2022
Version 0.13.0-SNAPSHOT	Jul 25, 2022

Cite all versions? You can cite all versions by using the DOI [10.5281/zenodo.6900689](https://doi.org/10.5281/zenodo.6900689). This DOI represents all versions, and will always resolve to the latest one. [Read more.](#)

The background of the slide is a high-resolution photograph of a satellite in orbit above Earth. The satellite is a rectangular platform with two long, parallel solar panel arrays extending outwards. The panels are covered in a grid of small solar cells. The satellite's main body is gold-colored and features various instruments and antennas. Below the satellite, the Earth's surface is visible, showing a mix of green landmasses and blue oceans, partially obscured by white clouds. The curvature of the Earth and the blackness of space are visible at the top and right edges of the frame.

# SOFTWARE PUBLICATION WITH RICH METADATA

# Continuous software publication with better metadata: GitHub + Citation File Format → Zenodo



March 16, 2022 Software Open Access

sdruskat/campussource: v0.1.0

Stephan Druskat

A release without a CFF file.

Preview

- campussource-0.1.0.zip
- sdruskat-campussource-a46ecd3
  - README.md

49 Bytes

```
1 cff-version: 1.2.0
2 message: "If you use this software, please cite it as below."
3 authors:
4 - family-names: "Druskat"
5   given-names: "Stephan"
6   orcid: "https://orcid.org/0000-0003-4925-7248"
7 title: "CampusSource Example Deposit"
8 version: 0.2.0
9 doi: 10.5281/zenodo.1035710
10 date-released: 2022-03-16
11 url: "https://www.campussource.de/events/e2203hagen/#Programm"
```

March 16, 2022 Software Open Access

CampusSource Example Deposit

Druskat, Stephan

This is a release WITH a CITATION.cff file :tada:.

If you use this software, please cite it as below.

Preview

- campussource-0.2.0.zip
- sdruskat-campussource-1
  - CITATION.cff
  - README.md

### Versions

Version 0.2.0	Mar 16, 2022
10.5072/zenodo.1035737	
Version 0.1.0	Mar 16, 2022
10.5072/zenodo.1035711	

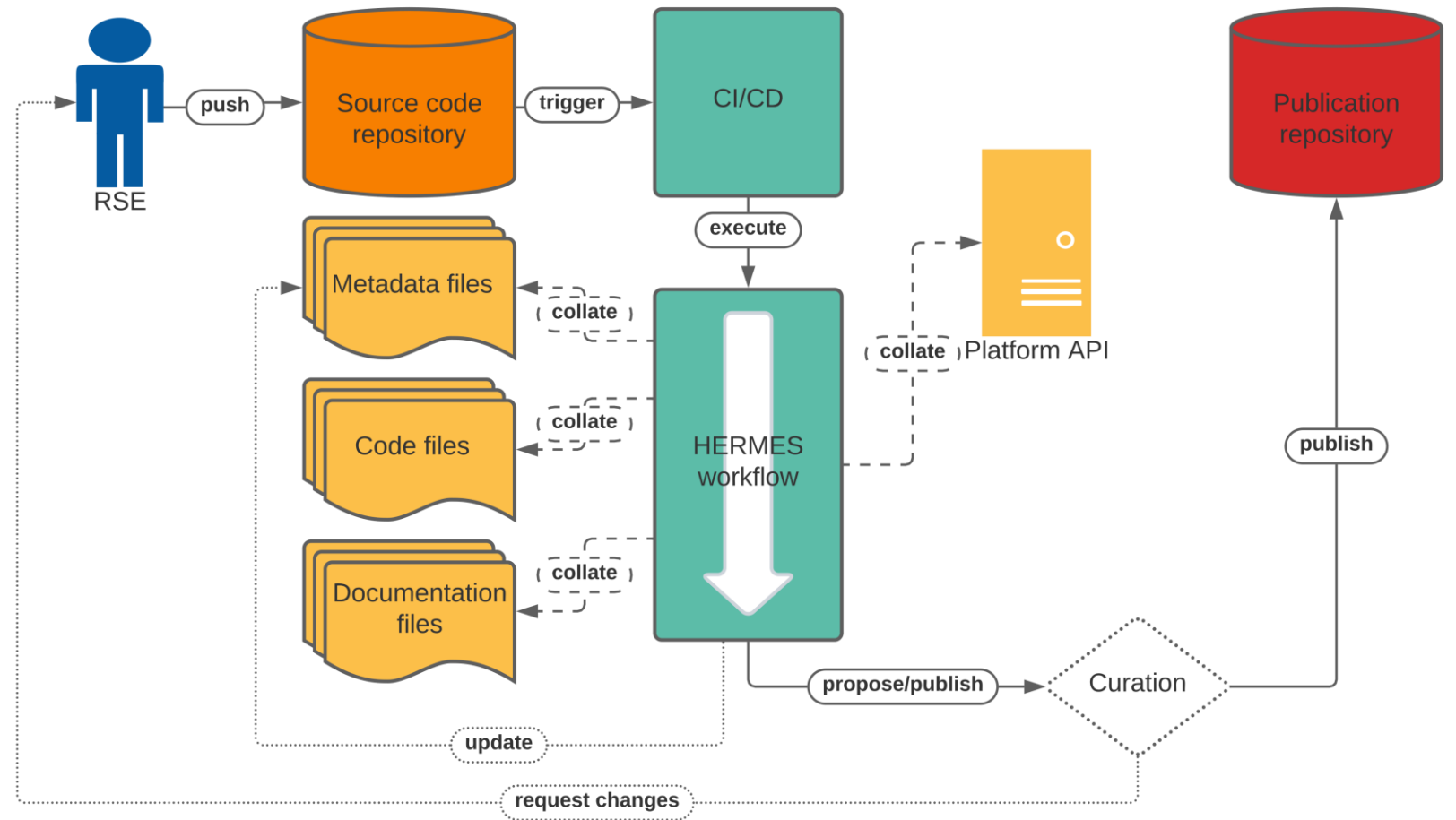
**Cite all versions?** You can cite all versions by using the DOI [10.5072/zenodo.1035710](https://doi.org/10.5072/zenodo.1035710). This DOI represents all versions, and will always resolve to the latest one. [Read more.](#)

# Advanced continuous software publication

## HERMES: <https://software-metadata.pub>



- Automating software publication via CI
- Harvest and merge existing metadata
- Proactive pushes
- Supports different platform combinations
- Curation & FAIR metadata-only publication
- Details: [10.48550/arXiv.2201.09015](https://doi.org/10.48550/arXiv.2201.09015)

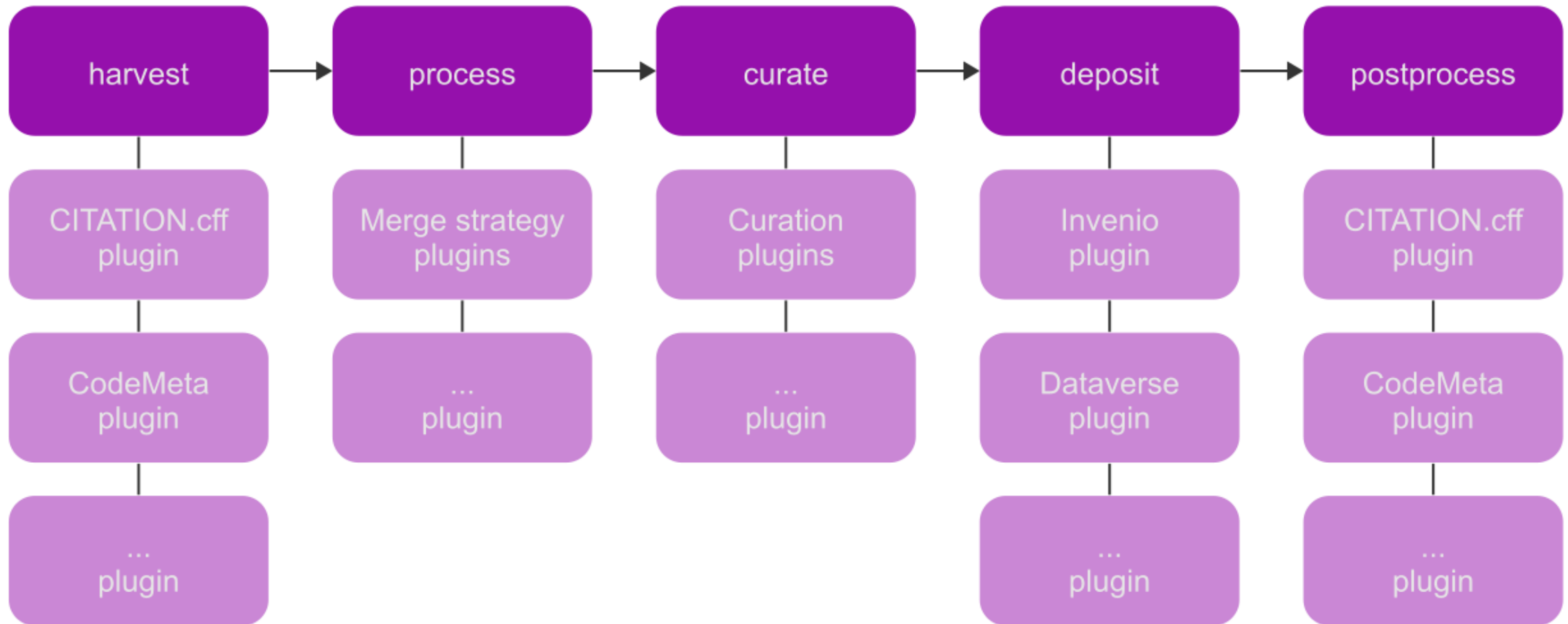


HERMES workflow, high-level view, HERMES project ([CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/))



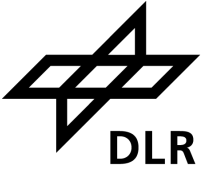
# Extensible workflow implementation:

hermes – <https://github.com/hermes-hmc/workflow>



# HERMES collaborative project (07/2021 – 06/2023)

[DLR, HZDR, FZJ]



- [software-metadata.pub](https://software-metadata.pub)
- [team@software-metadata.pub](mailto:team@software-metadata.pub)
- [github.com/hermes-hmc](https://github.com/hermes-hmc)
- Funding:  
Helmholtz Metadata Collaboration  
(grant ZT-I-PF-3-006)

## Proof-of-concept:

- Publication workflow tool (Python CLI)
- CI support:  
GitHub Actions, GitLab CI, Jenkins
- Platform support:  
InvenioRDM (Zenodo), Dataverse

**S. Druskat, M. Meinel, T. Schlauch**  
German Aerospace Center (DLR)



**J. Kelling, O. Knodel, D. Pape, G. Juckeland**  
Helmholtz-Zentrum Dresden-Rossendorf



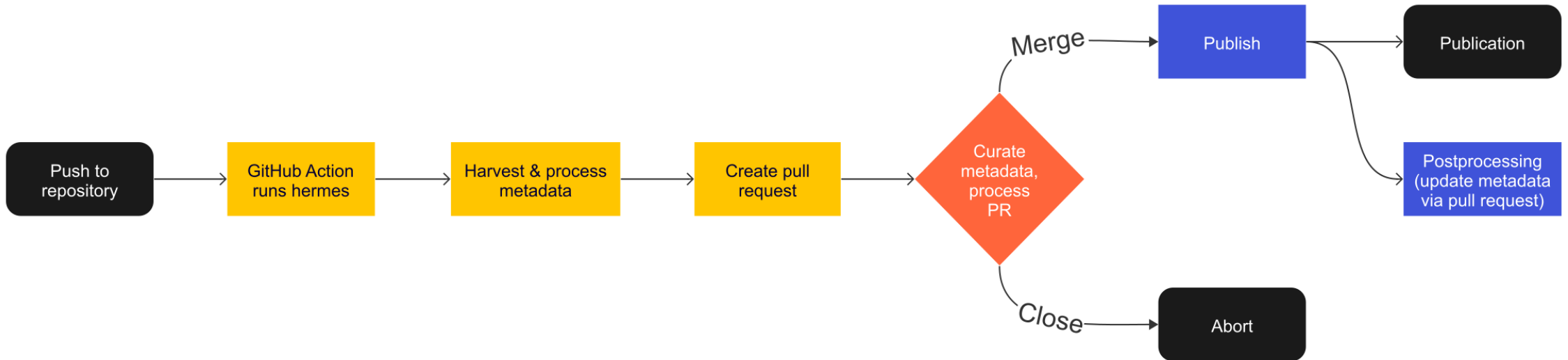
**O. Bertuch**  
Research Center Jülich



The background of the slide is a high-resolution photograph of a satellite in orbit above Earth. The satellite is the central focus, featuring a central body with various instruments and two long, rectangular solar panel arrays extending outwards. The Earth's surface below is a mix of green landmasses and blue oceans, with white clouds scattered across the scene. The curvature of the planet is visible on the right side.

# AUTOMATING SOFTWARE PUBLICATION IN PRACTICE

# Automated software metadata curation and publication



# Demo based on GitHub → Zenodo Sandbox tutorial

<https://s.dlr.de/hermes-tutorial>



## HERMES Workflow Docs

Overview

### TUTORIALS

[Set up automatic software publishing](#)

### DEVELOPERS

Contribution Guidelines

Tutorial: Get started w/ development

HERMES Data Model

Architectural Decision Records



API Reference



### RELATED

Project Website [↗](#)

Concept Paper [↗](#)



## Set up automatic software publishing

### Note

This tutorial works for repositories hosted on GitHub, and shows how to automatically publish to [Zenodo Sandbox](#). Zenodo Sandbox is a “toy” repository that can be used to try things out.

This tutorial should also work with the “real” [Zenodo](#).

## Configure your .gitignore

The HERMES workflow ([hermes](#)) uses temporary caches in `.hermes/`. Ignore this directory in your git repository.

Add `.hermes/` to your `.gitignore` file:

```
.gitignore
```

```
.hermes/
```

### Contents

[Configure your .gitignore](#)

[Provide additional metadata using CITATION.cff](#)

[HERMES configuration](#)

[Get a personal access token for Zenodo Sandbox](#)

[Configure a GitHub Action to automate publication](#)

[Automatic publication workflow](#)

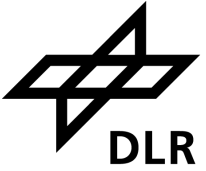
See <https://github.com/sdruskat/datacite-demo>

# Conclusion & outlook



1. Now: ready for **cautious** user testing (<https://s.dlr.de/hermes-tutorial>)
2. June 2023:
  - Proof-of-concept implementation with more metadata sources
  - Templates for continuous integration systems
  - Documentation and training materials
3. Implementation for new platforms:
  - MyCoRe (with TU Braunschweig)
  - DSpace
4. Implementation of custom plugins
  - Partners: The Carpentries
5. Improved metadata curation (UI)
  - BA thesis at DLR, looking for collaboration partners

# Thanks!



**HERMES:** <https://software-metadata.pub>

Funded by *Initiative & Networking Fund* of the Helmholtz Association (ZT-I-PF-3-006)

✉ [team@software-metadata.pub](mailto:team@software-metadata.pub)

**Stephan Druskat**

✉ [stephan.druskat@dlr.de](mailto:stephan.druskat@dlr.de) | Fediverse: [@sdruskat@scholar.social](https://scholar.social/@sdruskat)

ORCID: <https://orcid.org/0000-0003-4925-7248>