



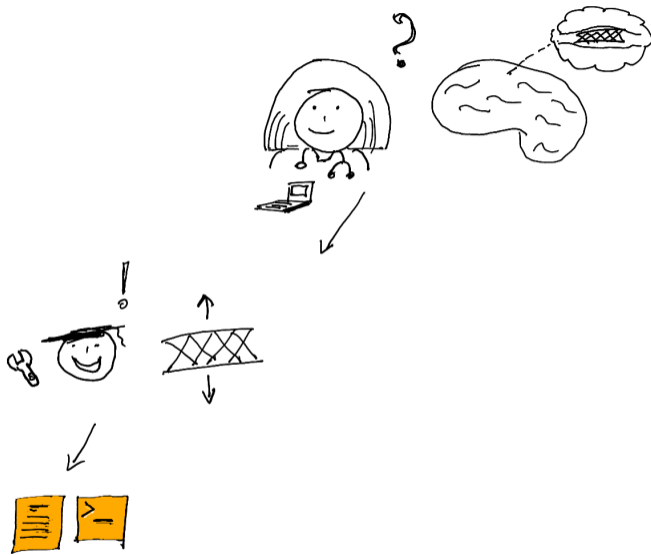
University of Stuttgart
Institute for Parallel and Distributed Systems

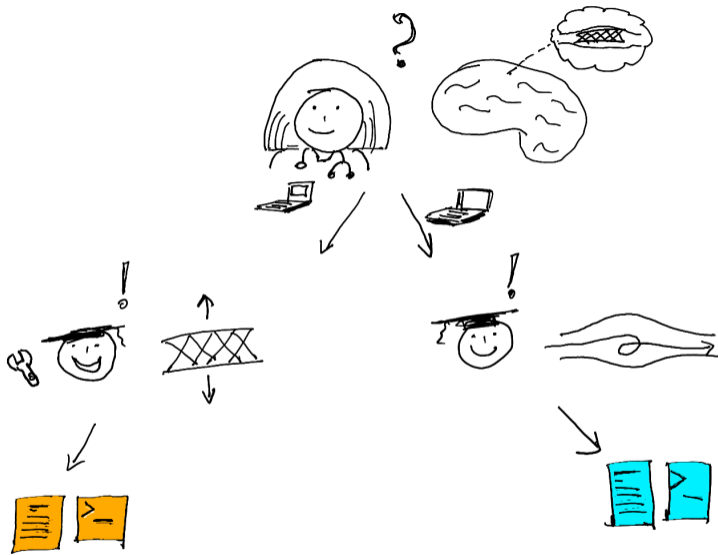
**Gerasimos
Chourdakis**

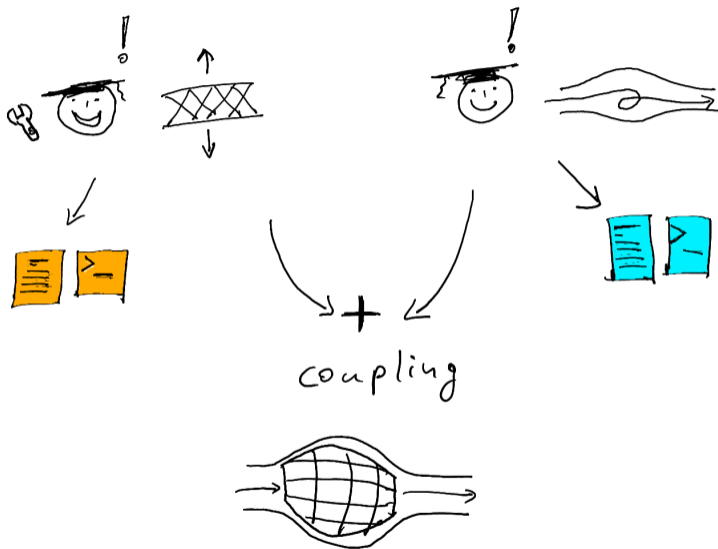
Standardizing the preCICE ecosystem

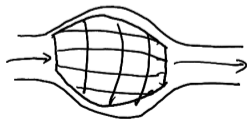
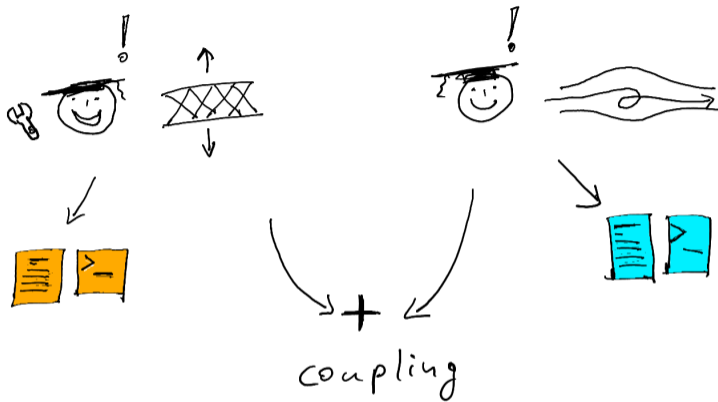






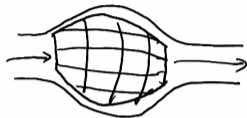








$$\boxed{\geq} + \text{preCICE} + \boxed{\geq}$$

coupling



 + preCICE + 



The preCICE ecosystem

Community numbers:

- 10 team members
- 50+ official repos
(github.com/precice)
- 20+ third-party
adapters
- 550+ forum
members
- ~50 workshop
participants p.a.

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Bundle of stable official components: preCICE Distribution

v2404.0

[doi:10.18419/darus-4167](https://doi.org/10.18419/darus-4167)

This is the first release that includes preCICE v3.x.

It comprises the following components:

- preCICE: [v3.1.1](#)
- Tools:
 - ASTE: [v3.1.0](#)
 - ci-images: commit [b421a49](#)
 - config-visualizer: [v1.1.3](#)
 - config-visualizer-gui: [v0.1.0](#) (new)
 - FMI runner: [v0.2.1](#)
 - Micro manager: [v0.4.0](#)
- Bindings:
 - Fortran module: commit [dc88c3b](#)
 - Julia bindings: [v3.1.0](#)
 - Matlab bindings: [v3.1.0](#) (now three-digit)
 - Python bindings: [v3.1.0](#) (now three-digit)
 - Rust bindings: [v3.1.0](#) (new)



Adapters:

- CalculiX adapter: [v2.20.1](#)
- code_aster adapter: commit [b797fcc](#)
- deal.II adapter: [4c6d092](#)
- DUNE adapter: commit [75edc33](#)
- DuMuX adapter: [v2.0.0](#) (new)
- FEniCS adapter: [v2.1.0](#)
- OpenFOAM adapter: [v1.3.0](#)
- SU2 adapter: [64d4aff](#) (largely re-written and updated)

Tutorials: [v202404.0](#)

• [vm: v202404.0.0](#)

• Website and documentation: [v202404.0.0](#), [libprecice3_3.3.1_docs_v202404.0.0.pdf](#)

<https://doi.org/10.18419/darus-4167>



click



Abcdefg
°F lb ft



run.sh



Abcdefg
°C kg m

Defining standards with the community

 [Quickstart](#) [Docs](#) [Tutorials](#) [Community](#) [Blog](#) [About](#) Search by  algolia

Save the date: [preCICE Workshop 2025, Hamburg, Sep 8-12](#)

Community

Overview & news
preCICE workshops ▼
preCICE minisymposia ▼
Support preCICE
Training
Stories
Contributors
Contribute ▲
Contribute to preCICE
Adapter guidelines
Application case guidelines
Community channels

Guidelines for adapters

Summary: Quality guidelines and standards for preCICE adapters and related tools

Table of Contents

- [Metadata](#)
- [Best practices](#)
 - [Required](#)
 - [Additional](#)
- [An adapter example](#)

 [Edit me](#)

Updated 23 Jan 25

v0.2, published on December 9, 2024

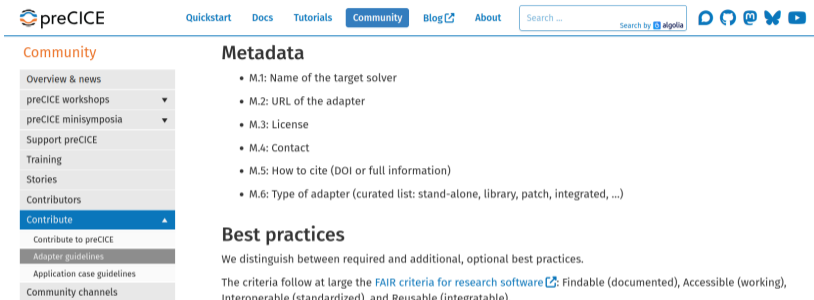
Are you developing a preCICE adapter or related tool? Follow these guidelines to make your adapter easier to publish, easier to integrate with the rest of the preCICE ecosystem, and more useful for the community.

We differentiate between adapters and application cases: For example, we consider the ["Nutils adapter"](#) to be a collection of application cases instead of an adapter. An [adapter](#) can be a stand-alone software project, but can also be a class, a patch, or something else with significant scholarly effort compared to the uncoupled solver. Other tools that interact with the preCICE API or configuration files can also be considered here, on a case-by-case basis.

For the guidelines, we distinguish between **metadata** and **best practices**. The best practices are split between required and optional. Adapters fulfilling all the required best practices are listed on the preCICE website as adapters conforming to the preCICE standards. Additional criteria bring further benefits and are visible individually for each adapter. Adapters not fulfilling all the required criteria can still be listed here as legacy adapters. By submitting your adapter for review, you can expect a thorough check from the preCICE team on whether these guidelines are met.

<https://precice.org/community-guidelines-adapters.html>

Defining standards with the community



The screenshot shows the top navigation bar of the preCICE website. The preCICE logo is on the left. The navigation menu includes links for Quickstart, Docs, Tutorials, Community (highlighted), Blog, and About. A search bar with the text 'Search ...' and 'Search by algolia' is on the right. Below the navigation bar is a sidebar for the 'Community' section. The sidebar contains a list of links: Overview & news, preCICE workshops, preCICE minisymposia, Support preCICE, Training, Stories, Contributors, Contribute (highlighted with a blue bar and an upward arrow), Contribute to preCICE, Adapter guidelines, Application case guidelines, and Community channels.

Metadata

- M.1: Name of the target solver
- M.2: URL of the adapter
- M.3: License
- M.4: Contact
- M.5: How to cite (DOI or full information)
- M.6: Type of adapter (curated list: stand-alone, library, patch, integrated, ...)

Best practices

We distinguish between required and additional, optional best practices.

The criteria follow at large the [FAIR criteria for research software](#): Findable (documented), Accessible (working), Interoperable (standardized), and Reusable (integratable).

Required

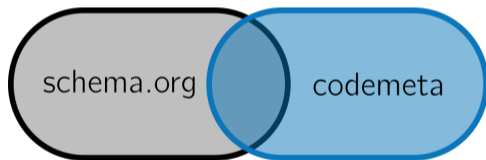
We consider an adapter fulfilling all of these criteria as conforming to the preCICE standards. This means that the adapter is working, documented, plays well with other adapters from the community, and feels part of the preCICE ecosystem. Others can find, build, and run the code, and they are able to understand what it does. The preCICE maintainers are, if necessary, able to maintain the adapter (e.g. update it to newer preCICE versions).

- ☐ R.1: The adapter is accompanied by one or more application cases to test it, covering an extensive part of the claimed functionality. These test cases must fulfill the required criteria of the [application case guidelines](#).
- ☐ R.2: There is a [README.md](#) file with at least the following information (or links to related resources):
 - ☐ application background and/or nature of coupling (e.g., surface vs. volume coupling; transient or steady-state; ...)

<https://precice.org/community-guidelines-adapters.html>

preCICE metadata

Idea: Extend `codemeta.json` with preCICE-specific terms



preCICE metadata

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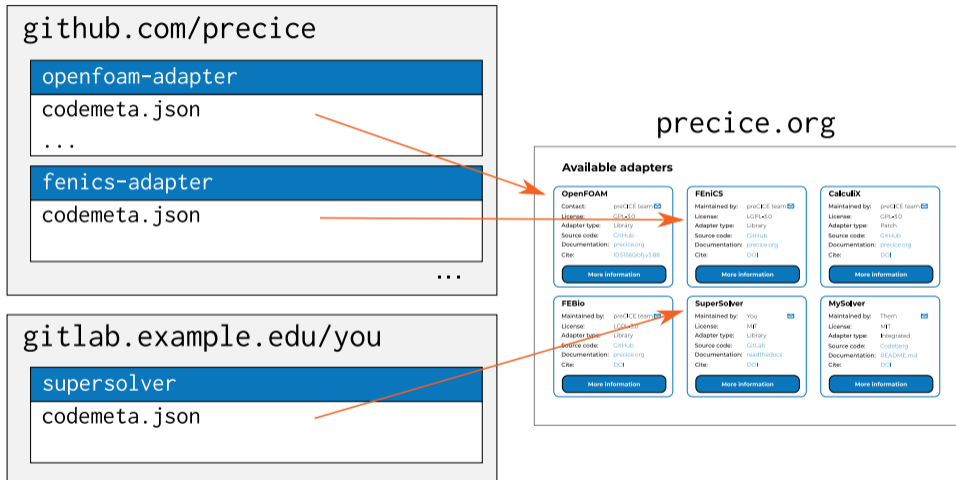
A preCICE metadata file in each repository (concept)

In a `codemeta.json` file:

```
{  
  "@context": {  
    "codemeta": "https://doi.org/10.5063/schema/codemeta-2.0",  
    "precice": "http://precice.org/schema/precicemeta-1.0"  
  },  
  "@type": "SoftwareSourceCode",  
  "codemeta:name": "My preCICE adapter for some solver",  
  "precice:apiVersion": "3"  
}
```

Q: What if an adapter is directly implemented in a larger software package?

From metadata to a rendered list



Also: easier software publication, SBOM generation, ...

Goal: A “preCICE store” of plug-and-play components

Available adapters

OpenFOAM
Contact: [preCICE team](#)
License: [GPL-3.0](#)
Adapter type: [Library](#)
Source code: [GitHub](#)
Documentation: [precice.org](#)
Cite: [10.51560/ofj.v3.88](#)
[More information](#)

FEniCS
Maintained by: [preCICE team](#)
License: [LGPL-3.0](#)
Adapter type: [Library](#)
Source code: [GitHub](#)
Documentation: [precice.org](#)
Cite: [DOI](#)
[More information](#)

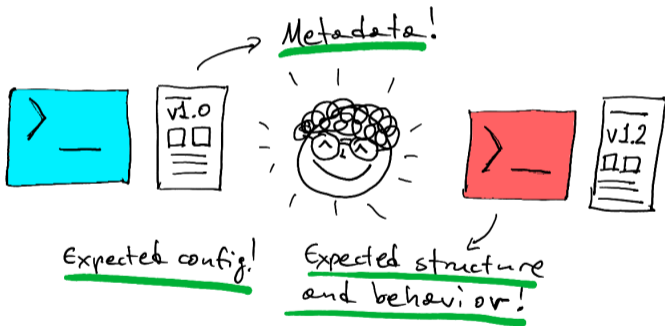
CalculiX
Maintained by: [preCICE team](#)
License: [GPL-3.0](#)
Adapter type: [Patch](#)
Source code: [GitHub](#)
Documentation: [precice.org](#)
Cite: [DOI](#)
[More information](#)

FEBio
Maintained by: [preCICE team](#)
License: [LGPL-3.0](#)
Adapter type: [Library](#)
Source code: [GitHub](#)
Documentation: [precice.org](#)
Cite: [DOI](#)
[More information](#)

SuperSolver
Maintained by: [You](#)
License: [MIT](#)
Adapter type: [Library](#)
Source code: [GitLab](#)
Documentation: [readthedocs](#)
Cite: [DOI](#)
[More information](#)

MySolver
Maintained by: [Them](#)
License: [MIT](#)
Adapter type: [Integrated](#)
Source code: [Codeberg](#)
Documentation: [README.md](#)
Cite: [DOI](#)
[More information](#)

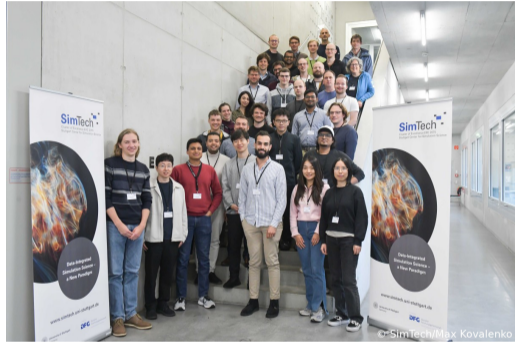
Review process: Expectation



Review process: User reaction



Review process: Collecting feedback










Annual preCICE Workshop: <https://precice.org/precice-workshop.html>

Reviewing pilot project examples on GitHub – Everything open


Review process: Collecting feedback


Feedback on guidelines for adapters (preECO project)

**Makis**   Developer

Find the guidelines for adapters on [preCICE.org](#)



 [preCICE.org](#)




**Guidelines for adapters**

Quality guidelines and best practices


How do these fit into your project? Please let us know, and what do you think we should improve?

Listening to your feedback: Updates on the ecosystem standardization

**Makis**   Developer

2d

DOI: [10.5281/zenodo.14712506](https://doi.org/10.5281/zenodo.14712506) 

Summary: We updated the guidelines for [adapters \(v0.2\)](#) and [application cases \(v0.2\)](#). We switched from a "bronze-silver-gold" tiering system to "required-additional", made the goals of these guidelines and the listing system clearer, and further emphasized interoperability. But we still need your feedback.

During the [last preCICE Workshop](#), we discussed our plans to [set standards to facilitate community contributions](#) ¹. The standardization aims to make it easier to mix together contributions developed by different groups, and start developing your own, knowing that the world will be able to discover, obtain, (re-)use, and extend them. In other words, make them FAIR, with a particular emphasis on important technical aspects unique to preCICE.

Before the workshop, we published a first draft of guidelines for [adapters \(v0.1 - old\)](#) and [application cases \(v0.1 - old\)](#), distributed them to the workshop participants, and we were convinced we were making preCICE spark joy! 🌈

Jan 21

1 / 1

Jan 21

2d ago

<https://precice.discourse.group/>

Outlook

Next steps:

- Implement a first metadata schema
- Implement the rendering on the website
- Discuss guidelines with the community
- Develop training for best practices

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- Developing auxiliary tooling
- Incorporating system tests

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See also in other sessions:

- *“Data Model Creation with MetaConfigurator”* **Felix Neubauer**, yesterday at 14:50 (metadata)
- *“Organizing successful software community workshops”* **Jean-Noël Grad** and me, today at 16:40 (community)

The team and the funding



preECO – A community-driven ecosystem of adapters and application cases for the coupling library preCICE



DFG call on research software usability

Funding number: 528693298

Years running: 2023–2026

The preCICE team has received funding from DFG, SimTech, the BMUV, KONWIHR, SPPEXA, and the EU: precice.org/about.html.

Missing from the picture (new):
Felix Neubauer



University of Stuttgart

Institute for Parallel and Distributed Systems

Gerasimos Chourdakis, M.Sc.



e-mail	gerasimos.chourdakis@ipvs.uni-stuttgart.de
GitHub	MakisH
Find me in	teachingRSE working group de-RSE Munich chapter OpenFOAM RSE SIG preCICE community

Current questions

- Should the combined file be called `codemeta.json`? – yes
- Can we have multiple metadata files per directory?
- Codemeta: what is the intention of `hasSourceCode` and `isSourceCodeOf`?
- How do we deal with stand-alone projects that work with preCICE?
- How do we deal with private repositories?