Project plan

CodeRefinery 4

The plan is an agreement between the project owner/orderer Tomasz Malkiewicz and Michaela Barth and the project manager Samantha Wittke.

It should be read together with the collaboration agreement which details the partner organization and NeIC contributions and commitments and is signed by all 9 partners + NeIC.

It is verified through a steering group decision.
Acceptance date: 04.12.2025

1 Background and connections

1.1 Background

CodeRefinery is a **community-driven initiative designed to empower students, researchers, staff, and research software engineers** with the skills and tools needed to develop high-quality, efficient, reusable, and reproducible research software. By focusing on practical training in areas such as version control, documentation, testing, sharing, and reproducible workflows, we bridge the gap between research and software engineering. Our mission is to foster collaboration, improve research output, and promote open-source principles across academic disciplines. Open science is an important goal for universities and research institutions, and CodeRefinery is a key component in working towards this goal.

Since its beginning in 2016, CodeRefinery has contributed to enhancing the software development capabilities of the academic community in the Nordics and beyond. Over the past nine years, we have developed a comprehensive, openly maintained curriculum of lessons and courses that has been taught at over 40 workshops. **We reach circa 500 learners each year at all career stages and across all disciplines** and with a diverse range of programming expertise. We achieve this with the help of around 30 instructors, organizers, and facilitators.

CodeRefinery has cultivated a vibrant, collaborative community of instructors, learners, helpers, and partner organizations. Together, **we have built a robust cross-border training network** and a foundation for long-term improvements in research software development. CodeRefinery also introduces researchers to the concept of Research (Software) Engineering and can serve as an entryway to becoming a Research (Software) Engineer.

The need to train the academic community in software development skills has not decreased over the course of the last nine years that the project has been running. On the contrary, we

see a growing demand and **we anticipate that this demand will continue to increase significantly** with the ongoing digital transformation of research and the omnipresence of machine learning (ML) and artificial intelligence (AI).

Together with our curriculum on FAIR (Findable Accessible Interoperable Reusable) research software development we also discovered the need for FAIR learning materials. We work in the open as much as possible and strive to make our materials as FAIR as possible (e.g. by providing stable versions with a DOI and linking them to other materials) with the resources available.

1.2 Connections with other organisations or projects

In phase 3 a governance charter for the project was written and approved. The document outlines the decision process and the community-facing aspect of the collaboration. The charter also defines what the project actually contains in terms of lessons, data, communication channels, and accounts, and clarifies responsibilities and ownership.

With the in-kind model we hope to keep it easy for new organizations to join the project, also possibly only for an event or only short-term. This will require us to communicate the value and benefits throughout the project. Going forward, we will however also seek national and European funding, and the governance charter gives the steering group the possibility to form a consortium applying for external funding on behalf of the CodeRefinery collaboration.

We are also in contact with several other organizations and projects, e.g. The Carpentries, Digital Research Academy, and Open Life Science and training and skills related projects in the UK. These organizations and projects work in the same space to integrate our results with other existing efforts through for example learning paths and instructor/helper exchange. We plan to strengthen our existing connections to research infrastructures like Elixir, European Open Science Cloud (EOSC), EuroCC and LUMI AI-Factory / MIMER AI Factory in terms of training collaborations and exchanging experiences. Multiple partners are already involved in these initiatives and common goals and potential collaborations are identified.

CodeRefinery, in its core, will continue to focus on enhancing training in robust research software engineering tools and techniques, but we aim to connect better to AI and research data management (RDM) topics.

1.3 Success factors

Outreach to potential learners, local hosts and instructors is key! This can be achieved through project partners, steering group members and our ambassador program. The steering group members connect to the partner organisations and keep in sync on ongoing developments and interests. The ambassador program aims to provide additional information for people who want to help us reach the learners in their organisations or communities. It also provides direct access to the project to provide feedback or give input on future proceedings.

Instructors and material developers with intrinsic motivation to contribute to the project will drive the project forward. For this, also their organizations, our project organizations, need to prioritize and support the work in the project.

2 Objective

2.1 Project idea

CodeRefinery contributes to better research through better software by teaching researchers small steps toward more reproducible computational practices.

2.2 Project objectives

CodeRefinery delivers workshops, learning materials, and guidance to help educate researchers in Research Software Engineering (RSE) practices.

Activity A: Management and coordination

- A-1: Coordination of CodeRefinery workshops
- A-2: Facilitation of events
- A-3: Ongoing community building
- A-4: Administration and reporting
- A-5: Feedback monitoring and implementation
- A-6: Keep track of and stay in contact with other initiatives/projects
- A-7: Support collaboration on other related workshops
- A-8: Support integration of CodeRefinery workshops into university curriculum
- A-9: Support the formation of a governance group

Activity B: Operations

- B-1: Delivering CodeRefinery workshops
- B-2: Curriculum development
- B-3: Lesson development and maintenance
- B-4: Instructor training and development
- B-5: CodeRefinery MOOC
- B-6: Manuals maintenance and additions
- B-7: Website maintenance
- B-8: Lesson contribution and reusability guide
- B-9: FAIR-ification of lesson materials
- B-10: Processes for lesson (material) update, maintenance and sunsetting

Activity C: Outreach

- C-1: Engagement of ambassador community
- C-2: Onboarding program for instructors, organizations and new team members
- C-3: Conference contributions

- C-4: Social media
- C-5: Newsletters
- C-6: Blog / Stories
- C-7: Community chat
- C-8: Outreach to early-career digital research technical professionals

All of the activities will be carried out by different team members coming from different organizations, enhancing cross-organization and cross-border cohesion.

2.3 Priorities of the objectives

CodeRefinery is result managed: 0.8 Result, 0.1 Time, 0.1 Cost

2.4 Limitations

- Support email (support@coderefinery.org) is tracked on a best effort basis by the project manager.
- The project website at https://coderefinery.org will be the primary site sharing project goals, mission, vision, metrics, progress, reports, composition of team, steering group, and governance. However, the project will not duplicate this information on other websites such as the NeIC external and internal wiki or https://neic.no but rather link from these to https://coderefinery.org.

2.5 Recipients and approval criteria

Delivery object (concrete outcome of the project)	Recipient, delivery (who gets something out of this)	Recipient, transferral in case of project end (who will take over when project ends)	Benefit objects (relation to high level goals)
CodeRefinery tools workshop	Learners, instructors, organizations	N/A. Possibly anyone could run the workshop after no longer run by CodeRefinery	Improved software quality, increased competences, training portfolio, RSE collaboration
CodeRefinery tools workshop lesson materials	Learners, support personnel in partner organizations (and more), instructors	Same as github organization (see below *), Zenodo community: governance group	Improved software quality, increased competences, training portfolio, RSE collaboration

Long-term post workshop survey	Team, NeIC, project partners	Summary: Same as github organization (see below *)	Increased competences, self evaluation and improvement, funding applications
Workshop registration data (participants) and statistics	NeIC, project partners	Data: neic.indico until deleted according to privacy policy, Statistics: Same as github organization (see * below)	Introducing RSE
Blog posts	Community	Same as github organization (see * below)	Increased competences, Introducing RSE, RSE collaboration
Newsletter	Community	CSC (mailing list archive)	Training portfolio
Other workshops and events	Learners, instructors, partner organizations	Same as github organization (see * below), N/A	Improved software quality, increased competences, training portfolio , instructor development, RSE collaboration
Workshop video recordings	Learners, instructors	Same as youtube channel (see below*)	Improved software quality, increased competences, instructor development
Ambassador newsletter	Ambassadors -> Broader community	CSC (mailing list archive)	Community engagement
Project reports	NeIC + partners	Same as github organization (see * below)	Shared knowledge
Manuals	Team + broader community	Same as github organization (see * below)	Shared knowledge, community engagement, instructor development
Open House	Team + broader community	N/A	Community engagement, RSE collaboration

Website	Broader community	Content: Same as github organization (see * below); domain: governance group	Community engagement, Introducing RSE
Train the trainer workshops + materials	Team and new instructors	Same as github organization (see * below)	Instructor development, community engagement, shared knowledge, RSE collaboration
Zulip chat	Team + broader community	Nordic RSE association	Shared knowledge, RSE collaboration

* The CodeRefinery GitHub organization contains all CodeRefinery materials, including the website content, lesson materials, manuals and other public project documents. Recipient transferral for the CodeRefinery GitHub organization will be the Governance group (see 4.1 Project organisation). The CodeRefinery YouTube channel and CodeRefinery twitch channel will be kept alive by the Governance group after the project ends for the workshop recordings to stay available. The CodeRefinery governance group may keep some channels alive as they see fit.

Benefit objects are explained in more detail in the Benefit realization plan.

3 Schedule and resource needs

3.1 Prerequisites and outer dependencies

3.1.1 Prerequisites

This project is entering phase 4 on 15.05.2025 and will last 3 years and a lot of material and experience is present to deploy workshops even with minimal central resources. The project work has already started and the first workshop of 2025 (last week of March + first week of April) was held.
From the partners, one requirement is that the promised in-kind contributions are doable. In order to reach out to the broader community, and let people know about the resources available, travel money is needed, both by NeIC and the home organizations. Travel money is also needed for collaborative in-person workshops and instructor/helper exchange to learn from each other. In order to reach people within the partner organizations, the support of the partner organizations communication teams is needed.

3.1.2 Outer dependencies

To reach learners also beyond the partner organizations, the support of CodeRefinery ambassadors is needed. The project currently relies on GitHub's free services for workshops and project materials. However, other services exist that can be set up in place.

3.2 Project schedule

All project activities for the 3 year project duration are listed in section 2.2. Most are not fixed in time and depend on when it fits with other work of the project team. We will aim for at least one CodeRefinery workshop per year, including instructor training, and newsletter beforehand. Each workshop is followed by a post workshop survey approximately half a year later. Reports will be delivered to the partner organizations and NeIC at mid term and project end. Other activities are continuous or have no strict timeline.

3.3 Decision points

The project consists of workshops and other continuous activities. It therefore does not contain milestones which are fixed in time and content.
A number of formal decisions must be made by the steering group. Leaning on a specially adapted version of the TietoEvry PracticalProjectSteering Model, the most relevant decision points for this project fall in the following categories without a fixed time:

- Decision to start part of the project execution before the final project plan is in place (DP4p)
- Decision to approve the project plan (DP3)
- Decision to continue, change or interrupt the project based on findings during the execution phase (DP5)
- Decision to transfer the responsibility for a delivery, typically to operations in a receiving organization (DP7)
- Decision to approve the final report and terminate the project (DP8)

For this project DP5 type decisions will be taken on the basis of activities listed in 2.2 and the deliverables listed in 2.5 to be able to link them to benefits in the benefit realisation plan.

3.4 Resource needs

3.4.1 Resources, skills and competencies

Instructors:

- Competence in FAIR software practises
- Interest in online streamed teaching to large audience
- Pedagogical skills
- Patience with supporting students and researchers without technical background about software tools and techniques
- Persons who like working with others since the teaching always happens in collaboration with others

Material developers:

- GitHub account
- Skills in open source collaborative lesson development; fits well as learning by doing!

Local classroom host:

- Interest and patience in supporting students and researchers without technical background about software tools and techniques
- Some coordination skills

All:

- Communication skills (a significant part of the project is to communicate with others)

3.4.2 Training

CodeRefinery provides its own instructor training, which builds upon the Carpentries instructor training. It is not necessary but helpful to have the possibility to visit the Carpentries instructor training or similar training before becoming a CodeRefinery instructor.

3.4.3 Resources, equipment, etc

Partner organization:

- Place to work at home organization
- Computers provided by home organisations
- Good video cameras and microphones for streaming and recording, provided by home organization for instructors

Partner organization / NeiC:

- Server for video processing and streaming
- Indico registration platform
- Issue tracker connected to the support@coderefinery.org email, Freshdesk
- Domain, coderefinery.org
- Meeting platform, Zoom

3.4.4 Phase out and conclusion

Return of equipment and closure/removal of team accounts.

3.5 Purchases

Does not apply

4 Organisation

4.1 Project organisation

At the launch of CodeRefinery 4:
Project owner: Tomasz Malkiewicz, from October 2025: Michaela Barth
Steering group: Approves changes to the project plan, supports project manager

- One member per project partner
- Community representative: Speaks on behalf of community in SG meetings

Project manager: Samantha Wittke. Coordinates the work outlined in this project plan. Reports to project owner, NeIC, and the steering group.
Staff provided in-kind by the partners: Executes work outlined in this project plan
In accordance with the Collaboration Agreement and the Governance charter the CodeRefinery4 Steering Group will endeavour to agree on a more permanent governing structure for this initiative after the Project is concluded. The foreseen structure is a governance group consisting of a group of individuals who volunteer to keep the spirit of CodeRefinery alive even after the project ends according to CodeRefinery Code of Conduct, Privacy Policy and Governance charter.

4.2 Authority and responsibility

Project manager's authority:

- Decision about expenses which are allocated in the project plan budget
- Represent the project at conferences and meetings

Project manager's responsibilities:

- Reporting about the progress towards NeIC and the steering group
- Task distribution
- Onboarding and offboarding of staff
- Organise steering group meeting
- Support steering group agenda preparation
- Support project owner in Business Benefit Realisation Management (BRM)

Project owner's authority:

- Decision about expenses requested by the project manager which are not allocated in the project plan budget
- Represent owner's interests at steering group meetings

Project owner's responsibilities:

- Business Benefit Realisation Management (BRM), monitoring the realisation of the benefits until the expected benefit has been achieved
- Prepare steering group agenda
- Chair steering group meetings

Staff responsibilities:

- Engage in project activities

Steering group responsibilities:

- Decision making
- Disseminating the project results and informing about the project within the partner organizations

- Enabling own organizations staff to contribute the time promised to the project

5 Working methods

5.1 Requirement dialogue

Does not apply

5.2 Delivery and transferral

- Instructor training
- Collaboration/Contribution guide -> Manuals

5.3 Production models

- CodeRefinery lesson template

5.4 Monitoring and learning

We will monitor the following metrics:

- Feedback during workshops
- Post-workshop surveys - long term impact, once per year
- Workshop/event registration statistics
- Workshop number of watchers (live and recording)
- Citation, access or linking metrics for lessons
- Number of certificate requests
- MOOC registrations and certificates

We will also track and report public awareness through metrics like social media engagement or mailing list growth.

Workshop/event lessons learned will be shared via blog if applicable.
Our ways of working are documented in public manuals.

5.5 Change control

Anyone can request to change the project plan via change request to the project manager. The project manager decides when change is within the frame of the project. The steering group decides when change would affect schedule, budget, functionality or delivery content.

5.7 Information distribution

All output of the project is public by default and will be communicated and listed via meetings, the project website, blog posts, newsletters, and GitHub organisation.

5.8 Document management

Documents on lessons, proposals, statistics will be stored on https://github.com/coderefinery/ in public repositories (private only where necessary) and https://hackmd.io/team/coderefinery. Workshop/event registration data is stored on https://indico.neic.no/, accessible only by project manager, project owner and registration coordinators. The project manager is responsible for inviting people to the team on GitHub and HackMD. Website updates are reviewed by the team.

5.9 Quality assurance

The main project output is course material and events. Quality assurance is achieved through continuous review and feedback mechanism in form of workshop feedback, GitHub issues, and GitHub pull requests.

5.10 Confidentiality

The project is not classified as confidential.

5.11 Environment

We avoid any unnecessary travel and meetings. Most workshops, courses, and events will be held online to minimise travel costs and negative impact, and to improve accessibility and reach.

5.12 Administrative routines

Since all contributions to this project are in-kind, detailed time-tracking is not reasonable. The project manager will collect approximate person months per year from each partner.

Travel is organised and reimbursed with the own employer unless explicitly agreed otherwise with the project manager and/or NeIC management (example: NeIC all-hands meetings).

Project staff get read and write access to GitHub repositories and documents.

6 Risks and risk management

1. Partners not invested in contributing to the CodeRefinery material development but only developing their local material
2. Partners not invested in providing local support to learners around the workshop
3. Staff with mostly 10% in-kind cannot significantly contribute beyond showing up at meetings and reading messages
4. Project partners are not interested in project leadership in case current leaders leave
5. Insufficient outreach/promotion of service portfolio
6. Lesson portfolio moves away from FAIR software practises, diluting the CodeRefinery brand
7. Reporting and monitoring duties are not adjusted to the small size of the project

8. We miss the opportunity to inform and onboard out of fear of storing GDPR-sensitive data about persons
9. Tools used within the project will be discontinued or increase their fees

Risks will be regularly followed up in steering group meetings.

Risk mitigation, (number of risk it relates to in parentheses):

- The project manager keeps the team on track to follow the activities outlined in this project plan (6).
- We keep our documents as public as possible and where sensible in public repositories with a DOI, raw formats in plain text to make switching tools possible, if necessary. We also limit the amount of different tools and use those already used by multiple partners (9).
- We (project members and steering group) work with NeIC and our partners outreach and marketing staff to promote the project and do outreach (5).
- We make collaboration attractive and with a low entry barrier, by providing training and documentation (e.g. contribution guide) to new members (1,2).
- The project manager encourages people to take the lead in working groups or represent the project in different forums (4).
- The project manager makes sure to also spend time on community management, beside the project management, to keep the community engaged and with a shared goal (1,5,6,7).
- The Steering group members try to provide every contributor to the project with more than 10% of working time (3).
- We update our privacy policy when necessary to inform about data retention (8).

7 Project cost estimate

Project costs are indicated in Collaboration Agreement Attachment 2 with administrative routines described in 5.12.

8 Edition history (after approval)