Deliverable 7.3 Open-sourcing and training plan

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Central element of Task 7.3 is the deployment of the tools to potential users. Through the training and dissemination activities, the aim is also to build an active user community that will continue to use and develop the model also in the future. We will organize training workshops as side events of energy related conferences and workshops such as Wind and Solar Integration Workshops, EERA workshops and IEEE events. In addition, a workshop will be organized in Brussels in M45 as part of one of the Spine workshops. Training is also provided through webinars.

Spine project will also produce exploitable results. The task leader together with the relevant project participants will process the case study results into concise conclusions that can be communicated to the stakeholders according to the planned communications (section 2.2.2 of the proposal). The task will also be responsible for carrying out the communications that the exploitation plan has set out. Discussions with policy makers, regulators, transmission system operators, energy companies and toolbox users. The task will also produce and publish replies to the questions posed by the Spine Toolbox users. These efforts will be shared between the project partners depending on the expertise needed for each exploitation support.

All partners of WP7 will participate in deploying the open source tools whenever it concerns the work they are involved with. The open sourcing will include the following elements:

- Deploy documentation and rules for contributions to the open source tools
- Deploy test systems and contribution validation
- Make examples how Spine Toolbox can be used in energy system modelling in collaboration with some of the case studies – and disseminate them
- Generate charts showing how to access model dimensions together with WP3 – and deploy them
- Place code and case studies in public servers (also conversion tools and primary data when possible)

**D7.3 Open-sourcing and training plan:** A more detailed plan for the open-sourcing and training activities in the Task 7.3. Success criteria: guides the implementation of open-sourcing and training.

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<th>KUL</th>
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**Comments**

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1. INTRODUCTION

The main objective of the Spine project is to develop and validate an end-to-end energy modelling toolbox for open, practical, flexible and realistic planning of future European Energy grids. Spine Toolbox and Spine Model will be open source software in order to combine efforts, not just of the project partners, but also of all the energy modelers interested in the Spine approach and tools\(^1\). Thus, communication and feedback is very relevant for the development of the Spine toolbox. In addition to disseminating all materials produced by the project, communicating with the stakeholders and initiating a user community, WP7 also supports the development of the user and developer community, and fosters it through workshops and easy access materials like tutorials.

Task 7.3 is primarily responsible for model exploitation and training activities. A central element of the task is the deployment of the tools to potential users or co-developers. Through the training and dissemination activities, Task 7.3 aims to get together an active user community. The aim is that the user community will continue to use and further develop the Spine toolbox and the Spine model, as well as connect different types of models (e.g., game-theoretic, equilibrium or systems-dynamics models) to the Spine toolbox, also after the Spine project has ended. To contribute to this aim, an open source community is built during the project. The members of the community will be Spine project parties and other interested persons. Through this open source community, the exploitation of Spine Toolbox will continue.

The purpose of this open-sourcing and training plan is to establish a well-founded plan on the training and open sourcing activities of the Spine project.

2. OPEN SOURCE RELEASE AND DEVELOPMENT

Spine Toolbox and Spine Model will be released with an open-source license on month 12 of the project. The preferred license is the GNU Lesser General Public License version 3.0 (LGPLv3) because it allows for linking to and using the Spine software interfaces also in proprietary software (or under any terms), but disallows distributing complete derivatives as proprietary software \(^1\). The Spine project aims for a wide application of the created tools and software, and therefore aims to keep the core components, including Spine Model, open.

The public versions of the software will be uploaded to a cloud-based source code hosting service. As denoted in Deliverable 1.1, we will use distributed version control software Git. Table 1 shows some of the pros and cons of the free plans of some of the most popular cloud-based Git hosting services. With the highest share among open source developers and offering unlimited number of public repositories, GitHub provides the Spine project the desired findability and availability. The hosting service also provides tools to track the popularity (no. users, downloads) of the Spine software.

\(^{1}\) See Deliverable 7.1 Communication plan

2018-05-11
Table 1: Pros and cons of selected cloud-based Git hosting services, only free plans included

<table>
<thead>
<tr>
<th>Service</th>
<th>Plan</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>GitHub</td>
<td>Free</td>
<td>Unlimited public repositories, most common among open source developers [2]</td>
<td></td>
</tr>
<tr>
<td>Bitbucket</td>
<td>Free</td>
<td>Unlimited private repositories [3]</td>
<td>Up to 5 users [3]</td>
</tr>
<tr>
<td>GitLab.com</td>
<td>Free</td>
<td>Unlimited private projects and collaborators [4], open source [2]</td>
<td></td>
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</table>

Before releasing the first public versions of the Spine software components (Spine Toolbox and Spine Model), the quality of the source code needs to be ensured, and restructured if needed. Also, documentation and instructions for contributing will be written and published alongside the source code. The first public alpha release\(^2\) of the software will be in month 12 of the project (Milestone 3). The first feature-complete beta release\(^3\) of the software in month 20 will be communicated to a wide audience in order to get more feedback at that stage (Milestone 5).

Two test case tutorials including the data are planned to be published by month 24. The Spine Toolbox software is predicted to be more stable at that point, and Spine Model will be used in modelling for the test cases. By month 36 we expect all relevant software components to be stable and free of major bugs (version 1.0) and published in open source repositories (Milestone 7).

We will use a feature branch workflow\(^5\) to separate feature development and bug fixes to separate branches of the code. That is, development of new features and corrections of bugs will be done in separate code branches, which will be merged to the master, production ready, branch when they are complete and fully tested. If needed, the master branch could be protected to allow additional control over the main version of the software. For collaborators outside the project team, we will allow forking (creating a personal copy of the code) and pull requests to propose changes to the code (forking workflow, \(^{5}\)).

In order to facilitate an orderly transition from an EU project to a community project, a development roadmap will be made during the final stage of the project. A non-profit organization will be setup to oversee the development (legally founded by month 42, Milestone 8). Future development and maintenance will be assisted by the contribution guidelines developed during the project. These will govern how new contributions are to be designed, documented and tested in order to be accepted to Spine Toolbox and Spine Model.

Information on the development of the Spine software will be published in various channels including a mailing list\(^1\). The number of subscribers to the mailing list gives an indication of the number of individual users of the Spine software.

**KPI: Over 150 downloads for the Spine Toolbox**

**KPI: Over 40 registered users for the Spine Toolbox**

**KPI: Publication of contribution guidelines and development roadmap.**

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\(^2\) A potentially unstable software version, which demonstrates the main functionalities but does not contain all planned features of the software [6].

\(^3\) A software version, which implements all planned features but likely contains a number of bugs or performance issues [6].
3. TRAINING ACTIVITIES

The training activities aim to increase awareness of and distribute information on the new, publicly available software. In this regard, two different types of user groups are identified: (i) the users who adopt Spine Toolbox or Spine Model and use it for their applications, and (ii), the users who adopt Spine Toolbox or Spine Model and further develop it. An active and stable user community requires both types of user groups. Different training activities are planned to reach out to both these user groups.

The training on Spine Toolbox and Spine Model will take place through training workshops, which will be organized as side events of major modelling conferences, which could include e.g. IEEE General Meeting, The Power Systems Computation Conference, The International Energy Workshop, IAEE International Conference or The European Energy Market conference. Separate training or tutorial workshops are also organized. In addition, up-to-date documentation serves as an entry point to the software.

3.1 Toolbox users (industry, consultancy, research and students)

Spine Toolbox and Spine Model can be exploited by producers, retailers, transmission and distribution system operators, consumers, consultants, researchers and students to investigate how energy systems may be operated or evolve, how specific assets may fare in the future or consider the business potential of new investments or technology concepts. The Spine project will help new users in the following ways:

- The project will develop two tutorials on how to perform an energy system modelling task with the Toolbox. These tutorials consists of step-by-step walk-throughs as to how to use Spine Toolbox to generate and solve a problem using Spine Model. These walk-throughs will guide the user through the modelling work stream: data acquisition, scenario setup, modelling and analysis. Some of the planned case studies (WP6) will be used for the development of the walk-throughs. In this regard, the development of the walk-throughs will be organized in collaboration between WP7 and the selected case studies.
- Through the Spine mailing list and the social media profiles, the project partners will reply to questions about Spine Toolbox, Spine Model and the case studies. These questions and answers will be published in the Spine website (www.spine-model.org). Eight workshops for potential users of Spine Toolbox and Model will be organized during the final year of the project (m37–m48).
- Clear documentation of how to access the model capabilities in the different dimensions (geography, technologies, time, energy vectors, energy markets, uncertainties etc.) will be produced and published. Publications based on research utilizing Spine Toolbox and Spine Model as well as the generated open data should include references to the source code and data repositories in order to include community awareness of the project results.

KPI: At least two test cases with tutorials available in open repositories by month 24.
KPI: Publish a reply to at least 30 questions related to the Spine Toolbox, the Spine Model and the case studies.
KPI: Present Spine in at least 8 different events covering audiences from academy, applied research, and industry to consultancy.
3.2 Toolbox developers (researchers, students, industry)

Some of the Spine Toolbox and Model workshops will also include sessions on how to contribute and join the development community after the public release of the software. The target is to build an active community of developers (in addition to the project partners) already during the project lifetime.

Development of Spine Toolbox and Spine Model will continue as a collaborative open source effort after the Spine project. The project partners will replace several existing tools with Spine software and consequently they will be at the core of the open source effort also after the Spine project ends. Development contributions will be managed so that the Toolbox will remain useful, functional and well documented.

3.3 Project partners

In addition to external users and developers, the project partners will replace existing tools and models with Spine Toolbox and Spine model. They can also enhance the uptake of Spine Model within their institutions by organizing internal workshops within the partner institutions. Four of the partner organizations have tens to hundreds of people using and developing energy system models of different scope. All partners (excluding Energy Reform) will arrange two internal workshops during months 24–44 of the project.

Members of the project team involved in software development will be introduced to open source development practises. In addition, training could be organised for other interested staff members of the partner organisations or other interested parties.

KPI: Organize at least eight internal events where the Spine Toolbox and the Spine Model are presented.
4. SUMMARY ROADMAP FOR OPEN-SOURCING AND TRAINING
5. REFERENCES


