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Sustainable Development of Research Software - Case Study of an Open Source Approach

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Typical use cases covered by research software comprise the management of research data sets (e.g. collected observation data) or tools for analysing data gathered in experiments or observation campaigns. These aspects are core activities of the Sensor Web, Geoprocessing, and Spatio-Temporal Data Science labs of the open source initiative 52°North.

Within this contribution we will introduce the approach followed by 52°North open source initiative which has been active in the field of open source research software development for more than ten years. Within our presentation we will present the 52°North Sensor Web activities as a case study to illustrate how the open source publication of research software can be achieved in a sustainable manner. This comprises especially the following challenges:

Continuity: Often, research software results from the activities of specific research projects. As soon as such projects are completed, a common challenge is that the project teams move on to new tasks which leads to a risk that the development of project results is not continued. Thus, an approach is needed to ensure that the development of software is continued beyond the duration of the initial project. To address this challenge it is necessary to ensure a sufficient funding for continued research activities to further advance the software projects and to ensure their maintenance.

Open source publication: The publication of research software under open source licenses helps to increase the user and developer community as the functionality of the software can be analysed and modified by interested researchers. However, at the same time the publication of open source software projects requires specific consideration of further aspects such as license types, license compatibility, and funding models.

Community involvement: To ensure a broader re-use of research software projects and to ensure a continuous evolution, it is important to build, maintain and involve a user and developer community. This helps to identify future research directions and requirements, to validate new developments and ideas, and to create an ecosystem of contributor which help to advance and promote the research software projects.

Within our contribution we will illustrate how these challenges are addressed as part of the 52°North research and development activities as well as in selected research projects such as SeaDataCloud and WaCoDiS. Furthermore, we will report on experiences gained during the development and community management processes over the last ten years.