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# Software Coupling shaped by Organisational Needs in Interdisciplinary Research

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For interdisciplinary research, software engineering has to take into consideration the different scientific perspectives on interacting processes, non-matching terminologies and the coordination of research teams from multiple institutions. This contribution presents an example from the field of water quality modelling in rivers, that requires the coupling of a complex biological model to a physical transport model in flowing water in order to simulate the spatio-temporal evolution of concentrations of ecologically important substances.

After meanwhile 40 years of development of the water quality model QSim, including the transition from one-dimensional to multi-dimensional approaches and coupling to a range of physical transport models, the choices on software design can be reviewed: While offline coupling turned out to be crucial for the success of the development due to limitations in both computing speed and development resources, non-standard interfaces and data formats, unsystematic data structures and lack of modularity proved to be a serious obstacle to further development of this legacy code. The integration into larger open-source software communities was started and yield promising results.

An example is given, why interdisciplinary collaboration needs to be organised not only during coding and testing but also in the application of coupled software. Software design must suit the fact, that necessary expertise is not always available at the same place at the same time. Different teams or different modes of collaboration might require different coupling options. Whether software development requires larger and ample interdisciplinary teams can be discussed.

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