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PALM: An efficient tool for dynamic coupled applications

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The PALM software is a general coupler allowing to easily integrate high performance computing application in a flexible way. It has originally been designed for data assimilation for the French operational oceanography project MERCATOR but it can in fact be used for every kind of dynamic coupled applications.

The concept of dynamic coupling came from the observation that different data assimilation algorithms can be obtained with different execution sequences of the same basic units and operators. In the framework of PALM, an application is split into elementary components that exchange data. The dynamic coupling algorithm is realized by PALM which assembles the components in different execution sequences which can include complex control structures like loops, ‘‘if” constructs and ‘‘select” switches; the components can therefore be started or stopped dynamically during the run.

The main features of PALM are therefore the dynamic launching of the components, the full independence of the components from the coupled algorithm, the parallel data exchanges with redistribution, and the separation of the physics from the algebraic manipulations that can be performed by the PALM algebra toolbox.

Today, the PALM software is freely available for research purposes and is used in several projects, dealing with data assimilation in oceanography and in atmospheric chemistry, but is also used for CFD coupled simulations.