

OpenPALM, an open source code coupler for massively parallel multi-physics/multi-components applications and dynamic algorithms

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Abstract

After many years of development and regular use, the PALM (CERFACS) and CWIPI (ONERA) libraries are distributed since January 2011 under the Open Source project named OpenPALM.

Since 1996 CERFACS has been developing the PALM parallel coupler, which is currently used for more than 50 research and industrial projects ranging from operational data assimilation to multi-physics modeling, from climate change impact assessment to fluid and structure interaction. It can be defined as a dynamic coupler for its ability to deal with situations where the component execution scheduling and the data exchange patterns cannot be entirely defined before execution.

Based on the EDF libraries bft and fvm, CWIPI aims at providing a fully parallel communication layer for mesh based coupling. CWIPI functionalities involve the construction of the communication graph between distributed geometric interfaces, interpolation on non coincident meshes and exchange of coupling fields for massively parallel applications.

The presentation provides some highlights on the design of OpenPALM and on the main implementation choices and complementarities of the two libraries and a brief description of some representative applications.