



Object-oriented numerics with FOSS: comparing PyPy & NumPy, GCC/Clang & Blitz++ and Gfortran

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Employment of object-oriented programming (OOP) techniques may help to improve code readability, and hence its auditability and maintainability - both being arguably crucial for scientific software.

OOP offers, in particular, the possibility to reproduce in the program code the mathematical "blackboard abstractions" used in the literature. There exist a number of free and open-source tools allowing to obtain this goal without sacrificing performance.

An OOP implementation of the MPDATA advection algorithm used as a core of weather, ocean and climate modelling systems will serve as an example for briefly highlighting some relevant recent FOSS developments including:

- NumPy support in the PyPy just-in-time compiler of Python.
- the Blitz++ library coupled with the C++11 support in GCC and Clang;
- support for OOP constructs from Fortran 2003/2008 in GFortran;

A brief overview of other performance-related packages for Python like Numba and Cython will be also given.

This poster will describe and extends key findings presented in <http://arxiv.org/abs/1301.1334>