

PHASTA File-less Integration with Mesh Adaptation
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The functional interfaces to the PHASTA flow solver and adaptation components support implementation of a driver that reads the flow system state from restart files, solves the flow, adapts the mesh, using iterative solution transfer, and then prepares and writes flow solver data structures to file for the next flow solve. This solve-then-adapt half cycle ran successfully on a 32 processor water bubble in circular pipe poiseuille flow case.

Portability of these components is supported by the use of the GNU Autotools buildsystem. The build system was successfully tested on a Debian based AMD Magny-cours cluster with both Intel and GNU compilers and with the Intel compilers on the NERSC Cray XE6, Hopper.

Support for the closed adaptive loop requires flow solver interface functionality to allocate and deallocate memory for field and mesh data produced by the adaptation component. Likewise, mesh adaptation and flow solver component interfaces must support the deallocation of memory associated with the fields they produce. Implementation of these functionalities will be the principle activity for SCOREC researchers in the next period.

In the next period the mesh adaptation component will be re-factored to limit the scope of its global variable and function names. These symbols can cause run-time and linking problems with other libraries that define the same symbols and thus limit its interoperability.