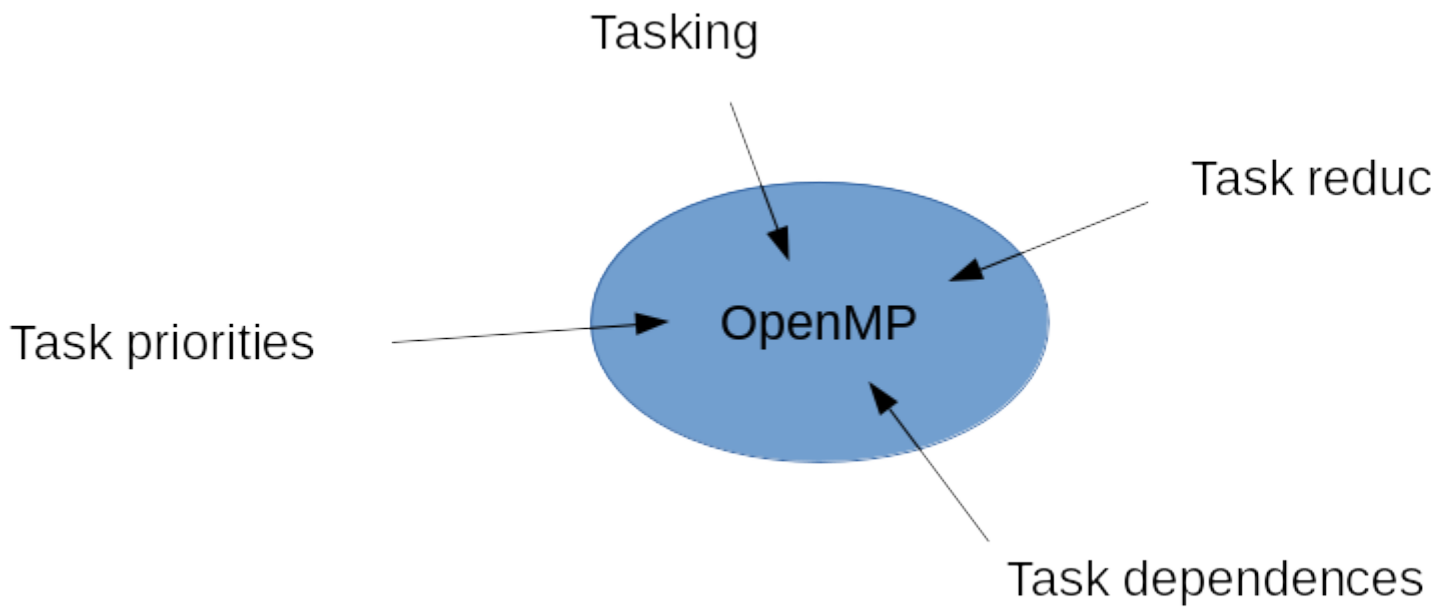# OpenMP Extensions

The Programming Models team at BSC contributes to the OpenMP standard through its participation on the OpenMP ARB and Language committees and the different subcommittees (tasking, affinity, FORTRAN...).

Summary

The parallel programming model group has been working with the OpenMP specification since the creation of BSC in 2005. First becoming part of the cOMPunity group (since 1998) and later on as an auxiliary member (since 2013).

Many of the ideas from OmpSs and StarSs have been introduced into the OpenMP specification. Starting from the version 3.0, released on May 2008, OpenMP included the support for asynchronous tasks. BSC provided the reference implementation using the Nanos4 run-time library and the Mercurium C/C++ source-to-source compiler. This reference implementation was used to measure the benefits that tasks can provide to the programming model. Later, on its version 4.0 released on July 2013, OpenMP introduced tasks dependences, which allow fine-grain synchronization between tasks and that were included in StarSs/OmpSs as part of its main philosophy. The last 4.5 specification (November 2015) includes the task priority clause, allowing the programmers to provide hints to the runtime task scheduler about the importance of a task. Currently we are working on a task reduction mechanism which will allow task to participate in the computation of a reduction pattern.

Objectives

The main goal of this research line is to serve as the technology transfer process within the parallel programming model group. Investigate different programming techniques which are currently at the research stage and push them into the OpenMP specificatioy to ensure these technological developments can be applied in real systems.

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