SOLLVE Thrust Areas Updates

Application Requirements

- Support of LLVM OpenMP for OpenMP backend In RAJA/Kokkos.
- ECP OpenMP hackathons working w/ applications: Lattice QCD, miniVite, GAMESS, QMCPack, ExaAM, Flash (ExaStar), E3SM.
- OpenMP feature wishlist ticketing system on Redmine

Specification Evolution

- Fall 2020 OpenMP virtual Face-to-Face meeting
- Release of OpenMP 5.1 (Nov. 2020) containing OpenMP 5.0

Examples and features for OpenMP 5.1 with features for running on GPUs and user-driven program transformations.

Compiler

- Implementation of user-driven loop transformations.
- Implementation of the OpenMP 5.0 declare mapper feature.
- Optimization of GPU unified memory performance.
- Implementation of performance portability features of OpenMP 5.0 such as declare variant.
- Support for OpenMP offload feature of asynchronous target regions
- Full support of math and complex in GPU code.

Runtimes

- Further optimizations of OpenMP thread scheduling for nested parallel regions in the BOLT 1.0 release.
- Enhanced interoperability with MPI systems including MPICH (v3.4b1) and Open MPI (v5.0) through BOLT at the Argobots layer, regularly tested by CI.
- Improved OpenMP tasking by combining gang-scheduling and work stealing for load-imbalanced applications such as SLATE.

Verification and Validation Suite

- Working with a number of compiler teams who have used the V&V Suite to evaluate their products.
- Improved V&V suite to assess features in OpenMP for a large number of different ECP systems.
- Further developed V&V suite to consider computational patterns and algorithmic strategies used in many ECP application, such as testing OpenMP tasks used in SLATE.

Training and Outreach

Webinars, Workshops, ECP Annual Meeting Tutorial and Breakout, Hackathons, Online Documentation

ECP Value

OpenMP Services

- Accelerator
- Affinity
- Parallelism
- Tasking
- Memory Management