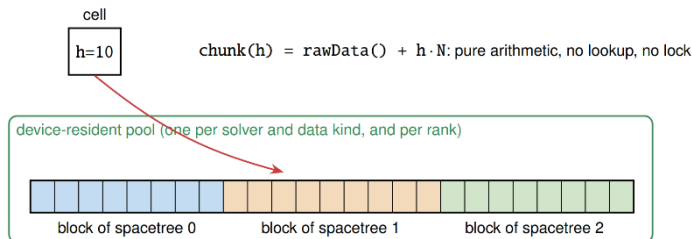


ExaHyPE: Vertical tasks updates

Current progress

- Memory pools are in place. ExaHyPE can offload to GPUs with zero transfer between CPU-GPU (exceptions: output plotting, dynamic AMR)
- Computation (time stepping) is now split from traversals
 - Traversals are for bookkeeping, filling the solver-owned memory pools in parallel
 - After grid construction, traversals are disabled
 - Pure computation/time stepping on GPU (or CPU) remains
 - Traversals are enabled again, only when the grid is triggered to change (dynamic AMR) and load needs to be rebalanced (dynamic load balancing)
 - Only then, the memory pools are updated for the new topology
- Everything stays lock-free
- GPU-aware P2P communication of halo data (via dedicated boundary memory pools)



ExaHyPE: Vertical tasks updates

Next steps

- Cleanup code, validation tests, and performance / strong scaling tests
- Overlap of computation and communication
- Test and benchmark with dynamic AMR and load balancing
- Profiling and optimizations of (GPU) compute kernels

POP MUST MPI correctness analysis (SLSR_014)

- Finished
- No major concerns found
- Minor issues: Leaked MPI resources during shutdown (e.g. MPI datatypes; fixed now)
- One data race found in the point source initialization in ExaHyPE (fixed now)
- ExaHyPE contributed to some MUST fixes:

MUST - False alert for overlap checks



- MUST falsely report overlaps between ongoing nonblocking Allreduce operations
- Manual checking of the overlap revealed it was a false alert and the corresponding analysis in MUST was fixed

MUST - False alert for lost message



- MUST did not have support for Probe and Matched Probe & Receive Operations (Improbe & Mrecv)
- This would lead to reports of unmatched Send operations (those that are matched with the Improbe/Mrecv)
- The issue was fixed during the assessment by adding initial support for Probe (including Matched Probe & Receive) in MUST
 - Full support is in active development
 - Currently Mrecv is treated as a usual Recv, which may lead to false alerts in certain communication patterns
 - The problematic communication pattern does not occur in ExaHyPE 2

