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Repartitioning Strategies for Massively Parallel Simulation of Reacting Flow PATRICK PISCIUNERI, ANGEN ZHENG, PEYMAN GIVI, ALEXANDROS LABRINIDIS, PANOS CHRYSANTHIS, Univ of Pittsburgh —
The majority of parallel CFD simulators partition the domain into equal regions and assign the calculations for a particular region to a unique processor. This type of domain decomposition is vital to the efficiency of the solver. However, as the simulation develops, the workload among the partitions often become uneven (e.g. by adaptive mesh refinement, or chemically reacting regions) and a new partition should be considered. The process of repartitioning adjusts the current partition to evenly distribute the load again. We compare two repartitioning tools: Zoltan, an architecture-agnostic graph repartitioner developed at the Sandia National Laboratories; and Paragon, an architecture-aware graph repartitioner developed at the University of Pittsburgh. The comparative assessment is conducted via simulation of the Taylor-Green vortex flow with chemical reaction.

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