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Preparing hypre for Emerging Architectures

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The hypre software library provides high performance preconditioners and solvers for the solution of large sparse linear systems on massively parallel computers. One of its attractive features is the provision of conceptual interfaces, which include a structured, a semi-structured interface, and a traditional linear-algebra based interface. These interfaces give application users various means for describing their linear systems, and provide access to methods such as structured multigrid solvers, which can take advantage of the additional information beyond just the matrix, as well as unstructured multigrid solvers. In this presentation, we describe our efforts to prepare hypre for emerging architectures with both CPUs and GPUs, and present any insights and/or results we have gained by then.