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Sommario/riassunto	Multicore architectures are an important contribution in computing technology since they are capable of providing more processing power with better cost-benefit than single-core processors. Cores execute instructions independently but share critical resources such as L2 cache memory and data channels. Clusters using multicore architectures or multiprocessors chips (MPC's) suggest a hierarchical memory environment. Parallel applications should take advantage of such memory hierarchy to achieve high performance. This paper presents a performance analysis of a synthetic application in a multicore cluster and introduces a preliminary architecture model that considers communication through both shared memory and data channels and its impact on the application performance.