

Software Transactional Distributed Shared Memory

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We present a new transaction-based approach to distributed shared memory, an object caching framework, language extensions to support our approach, path-expression-based prefetches, and an analysis to generate path expression prefetches. To our knowledge, this is the first prefetching approach that can prefetch objects whose addresses have not been computed or predicted.

Our approach makes aggressive use of both prefetching and caching of remote objects to hide network latency while relying on the transaction commit mechanism to preserve the simple transactional consistency model that we present to the developer. We have evaluated this approach on microbenchmarks and four shared memory parallel benchmarks. We have found that our approach enables our benchmark applications to effectively utilize multiple machines and benefit from prefetching and caching of objects.