Consistency Models
of Distributed Shared Memory Systems[1]

Jerzy BRZEZIŃSKI

Poznań University of Technology, Institute of Computing Science
ul. Piotrowo 3a, 60-965 Poznań, Poland
e-mail: Jerzy.Brzezinski@cs.put.poznan.pl

Abstract. Distributed Shared Memory (DSM) refers to virtual memory of loosely coupled distributed systems that are equipped with a software component, based on message-passing communication environment, providing a shared-memory abstraction to programmers. To reduce the access delay and communication overhead in these systems, replication is usually used as the fundamental technique. However, replication raises a problem of consistency maintenance among replicas. In this paper different consistency models of DSM systems are formally presented and compared with respect to their restrictiveness. The comparison is important from the practical point of view as the more restrictive model is, the programming is simpler but potential concurrency and so efficiency is decreased. Analysis concerns both general access consistency models (atomic, sequential, causal, pipelined RAM, coherence, processor) and synchronisation access consistency models (weak, release, entry and scope).

Key words: distributed systems, distributed shared memory, consistency models, coherence protocols