Issues in Building a Cache-Coherent Distributed Shared Memory Machine using Commercial SMPs

Boon Seong Ang and Arvind and Derek Chiou

December 8, 1994

Abstract

StarT-ng is a parallel machine that supports both fine-grained user-level message passing and cache-coherent distributed shared memory (CCDSM). A site in StarT-ng is an enhanced commercial PowerPC 620-based symmetric multiprocessor (SMP) connected to an MPP-class network. With the aid of a simple address capture device, a designated processor at each site executes cache-coherence protocols. Given the variety of memory models and ever growing complexity of coherence protocols, StarT-ng should provide a relatively cheap, low risk and flexible system to explore shared memory issues. This paper describes several difficulties we have encountered in implementing CCDSM using commercial SMPs. It offers some insights into the causes of these difficulties and possible remedies.

NB: StarT-ng *will be called* **XO** *in the paper order to avoid revealing our identity.*

Keywords: Distributed Shared Memory, Cache Coherence

Boon Seong Ang
545 Technology Square, Rm 205
Laboratory for Computer Science
Massachusetts Institute of Technology
Cambridge, MA 02139.
Phone:(617) 253-1536
Fax:(617) 253-6652
hahaha@abp.lcs.mit.edu

Arvind
545 Technology Square, Rm 210
Laboratory for Computer Science
Massachusetts Institute of Technology
Cambridge, MA 02139.
Phone:(617) 253-6090
Fax:(617) 253-6652
arvind@abp.lcs.mit.edu

Derek Chiou
545 Technology Square, Rm 203
Laboratory for Computer Science
Massachusetts Institute of Technology
Cambridge, MA 02139.
Phone:(617) 253-6871
Fax:(617) 253-6652
derek@abp.lcs.mit.edu