Abstract

The BBN Butterfly Parallel Processor can support a user model of computation that is based on either shared memory or message-passing. A description is given of the results of experiments with the message-passing model. The goal was to analyze the tradeoffs between the shared memory model, as exemplified by the BBN Uniform System package, and a simple message-passing model. The two models are compared with respect to performance, scalability, and ease of programming. It is concluded that the particular model of computation used is less important than how well it is matched to the application.
Traditionally, shared memory and message passing have been the two programming models for interprocess communication and synchronization in computations performed on a distributed system. Message passing has been the preferred way of handling interprocess communication in loosely-coupled systems, because the computers forming a distributed system do not share physical memory. Shared Virtual Memory on Loosely Coupled Multiprocessors. PhD thesis, Department of Computer Science, Yale University, September 1986. [15] K. Li. Distributed Shared Memory in a Loosely Coupled Distributed System. In Proc. of the ACM SIGCOMM'87 Workshop on Frontiers in Computer Communications Technology, pages 317–327, August 1987.

11. reliability. q Multiprocessors refers to tightly coupled processors whose coordination and usage is controlled by a single operating system and that usually share memory through a shared address space q Multicores when all cores are in the same chip (named manycores when more than 32 cores) q Multiple Instruction Multiple Data (MIMD). Prof. Cristina Silvano, Politecnico di Milano. q In a coherent multiprocessor the caches should provide both migration and replication of shared data items. q Migration: movement of data (faster access). q Which is better, Shared Memory or Message Passing? Ø It depends on the program! Ø Both are “communication Turing complete” § i.e. can build Shared Memory with Message Passing and vice-versa. 54.