Abstract
Parallel computing using MPI has become ubiquitous on multi-node computing clusters. A common problem while developing parallel codes is determining whether or not a deadlock condition can exist. Ideally we do not want to have to run a large number of examples to find deadlock conditions through trial and error procedures. In this paper we describe a methodology using both static analysis and symbolic execution of a MPI program to make a determination when it is possible. We note that using static analysis by itself is insufficient for realistic cases. Symbolic execution has the possibility of creating a nearly infinite number of logic branches to investigate. We provide a mechanism to limit the number of branches to something computable. We also provide examples and pointers to software necessary to test MPI programs.