**Abstract:**

Two dimensional torus networks are popular interconnection architectures in multicomputers because of its many features. This paper presents an efficient multicast algorithm that uses both the wraparound horizontal and vertical channels of the two dimensional torus network; hence the name Torus with Two Wraparound channels (T2W) algorithm. The T2W algorithm is a deadlock-free path-based wormhole routing that requires at most two communication startup steps to multicast a message to a set of destinations. T2W algorithm defines a horizontal path called Horizontal Main Path (HMP) that starts from the source node to the last node such that the nodes on HMP can cover all destination nodes on columns of the torus network. HMP is selected in the first startup communication such that it may uses the horizontal wraparound channels and the paths branch from it may use the vertical wraparound channels to cover as many destinations as possible. An efficient routing function is designed and is used as a base for the proposed algorithm. Simulation results on different torus networks illustrate that the multicast latency of the proposed algorithm is superior to that of previous algorithms.