

Many multistage interconnection networks (MINs) and single stage interconnection networks (SSINs) have been proposed for parallel computer systems and for fast packet switching in high speed networks. The cost, performance, and fault-tolerance capability of the interconnection networks (INs) becomes very important in the design considerations of a multiprocessor systems. Several types of INs have been proposed, notably multistage and single-stage interconnection networks. There have been extensive studies on MIN (e.g., performance analysis, methods to improve the throughput, priority, etc.), but relatively little work on SSINs has appeared in the literature. In this paper we evaluate the unbuffered Beta topology of SSIN using stochastic Petri nets. We present an approximate analytical model. We analyze the random delay experienced by a message traversing the network for uniform traffic. Messages can have different sizes. Each sender can accept one packet per cycle and route it to the appropriate receiver. It is shown that the bandwidth increases when the data transfer increases. In addition, it is shown that the average transfer time increases slowly compared to the increase of processors. The power of this model is that, firstly, it presents an acceptable number of states, and secondly, the model can be easily generalized