

## 基于网络演算的片上网络重组缓存上界的预测方法

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**摘要:** 多路径路由片上网络(Network on Chip,NoC)中,业务流之间的冲突导致数据包乱序到达目的节点,在目的节点处的重组缓存通过暂存乱序到达的数据包以保证数据包按照发包的先后顺序输出.传统方法通过全遍历所有路径得到重组缓存的最大值,即重组缓存上界,对于较大规模的网络,全遍历耗时长且效率低.对此提出一种得到重组缓存上界的预测方法:通过冲突矩阵,推导出每条目标子业务流的冲突系数,进而选出冲突系数最大的无交叉路径组,通过路径组来预测重组缓存上界.相比于全遍历方法,该预测方法可以缩短分析时间,简化算法复杂度,提高效率,从而有效减少重组缓存区面积,降低片上网络设计成本.

**关键词:** 多路径最短路由;片上网络;重组缓存;预测方法

## A Prediction Method for Upper Bound of Reorder Buffer of

## NoCs Based on Network Calculus

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**Abstract:** In multi-path routing NoCs, the problem of packets disorder will occur due to the conflicts among flows. Reorder buffer at target node can keep the order of sending the packets by storing the packets temporarily. Traditional way is traversing all the paths to get the maximal value of reorder buffer, which is the upper bound of reorder buffer. As to a network of larger scale, traversal way is a time-consuming and low efficiency process. An prediction method to calculate the upper bound of reorder buffer was proposed: derive conflict coefficient of each target sub-flow from conflict matrix, and select the non-cross path pairs which have maximal conflict coefficient, predict the upper bound of reorder buffer through these path pairs. Compared to traditional way, this prediction method can shorten analysis time, simplify algorithm complexity, improve efficiency, and thus effectively reduce reorder buffer area and the design cost of NoC.

**Key words:** multi-path routing; network on chip; reorder buffer; network calculus

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