Routability-driven partitioning-based IO assignment for flip-chip designs

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Abstract

Given a set of n IO buffers and a set of n bump balls on a re-distribution routing layer, an $O(n(\log n)^2)$ routability-driven partition-based IO assignment is proposed to assign n IO connections for RDL routing in a flip-chip design. Firstly, based on the recursive partition of bump balls and IO buffers, the partition-based IO assignment can be obtained by using the geometrical mapping between bump balls and IO buffers. Furthermore, according to the routability definition of all the IO connections, the unroutable IO connections are reassigned. The experimental results show that our proposed partition-based IO assignment can maintain 100% routability for RDL routing in tested circuits. Compared with the Delaunary-triangulation-based IO assignment[4] in total wirelength and CPU time, our partition-based IO assignment only increases the total wirelength by 0.17% and saves the CPU time by 23.8% on the average.

Keyword：Flip-chip design, IO assignment, Routability