عنوان مقاله:

Reconfiguration of tree structure with saving more energy For SIMD structures

محل انتشار:

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خلاصه مقاله:

One of the different uses of trees, is in SIMD architecture That is mostly considered in image processing and parallel calculation and increasing its speed. But the thing that is more important, is using this multiprocessor systems in network on-chips (NOC) that makes it available for researchers to make different kinds of tree reconfigurations with least energy consumption. Here, Banyan and Benes networks are used under shuffle and butterfly algorithm in order to produce 64 different configuration of binary and 4-ary trees with 16 cores these network, too is make of 32 and more switches in form of some stages (for example stage_0 to stage_3 in Banyan network) and other 8 added switches are put in 2-D shape and parallel to end of stages. Running several configurations including trees, jungles, and graphs (232 cases with 32 switches) makes it necessary to find and architecture that reduces energy consumption with decreasing number of active hardwires, so the article's purpose, using it in order to make connection between some processor in NOCs and in the form of SIMD architecture, be achieved. In these architectures, for finding direction or in order words, for making 64 different configurations of binary and 4-ary, 6 bits are used, with giving it to algorithm, the programmer will be able to make the structure they want and use it. For example the code 000100 produces the binary tree. Thompson model was used to calculating of distance of between nodes in paths. Comparing suggested structure to other standard structures introduced, shows that although proposed structure has 27 switches, only 12 or 13 switches are active depending on requested configuration, but in other structures energy consumption is higher. the suggested architecture in this study, supplies reconfiguration of trees with less energy consumption (21.80% comparing to butterfly and 50.26% comparing to standard structure of Benes).

کلمات کلیدی:

trees, reconfiguration, Benes, Banyan, energy