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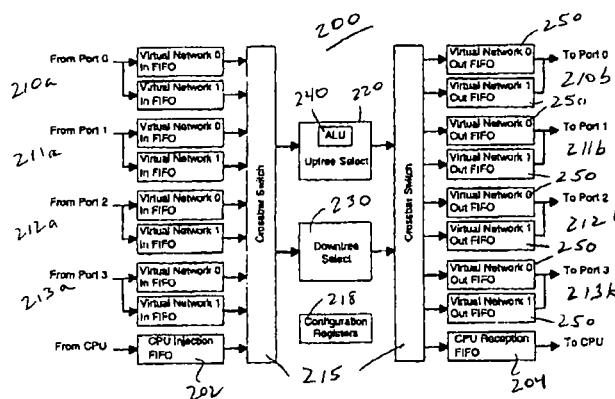
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(54) Title: A GLOBAL TREE NETWORK FOR COMPUTING STRUCTURES



(57) Abstract: A system and method for enabling high-speed, low-latency global tree communications among processing nodes interconnected according to a tree network structure. The global tree network (100) optimally enables collective reduction operations to be performed during parallel algorithm operations executing in a computer structure having a plurality of the interconnected processing nodes. Router devices (200) are included that interconnect the nodes of the tree via links to facilitate performance of low-latency global processing operations at nodes of the virtual tree and sub-tree structures. The global operations include one or more of: global broadcast operations downstream from a root node (110) to leaf nodes (120) of a virtual tree, global reduction operations upstream from leaf nodes to the root node (110) in the virtual tree, and point-to-point message passing from and any node to the root node (110) in the virtual tree. One node of the virtual tree network is coupled to and functions as an I/O node for providing I/O functionality with an external system for each node of the virtual tree. The global tree network (100) may be configured to provide global barrier and interrupt functionality in asynchronous or synchronized manner. Thus, parallel algorithm processing operations, for example, employed in parallel computing systems, may be optimally performed in accordance with certain operating phases of the parallel algorithm operations. When implemented in a massively-parallel supercomputing structure, the global tree network (100) is physically and logically partitionable according to needs of a processing algorithm.

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