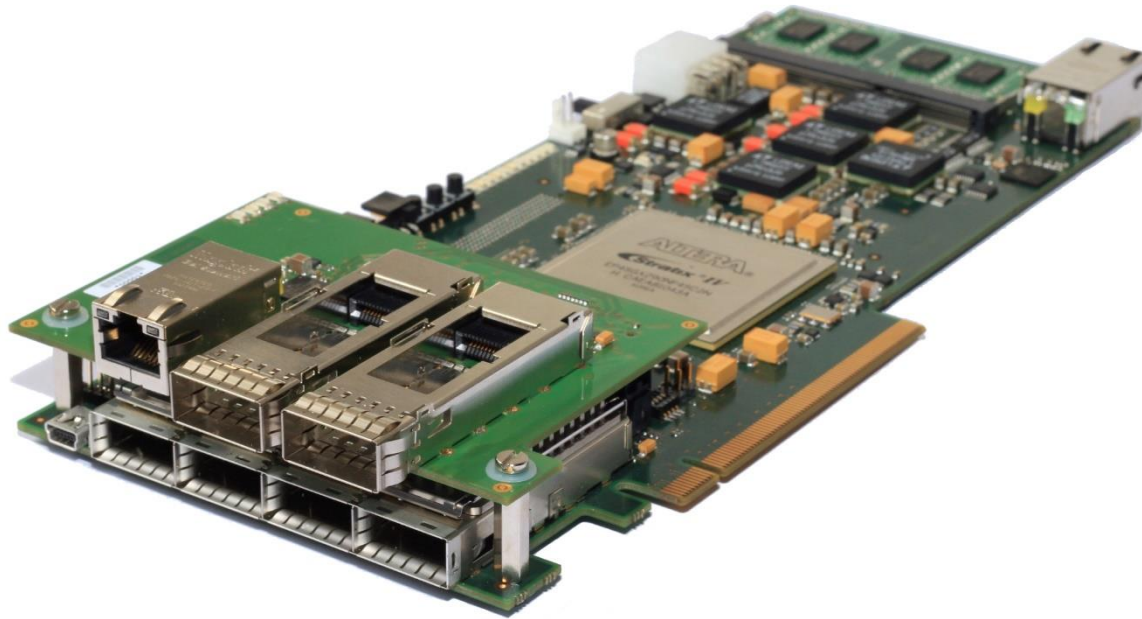


# SYSTEM FOR FAST COLLECTIVE COMMUNICATIONS



## PRIORITY NUMBER:

102016000071637

## KEYWORDS:

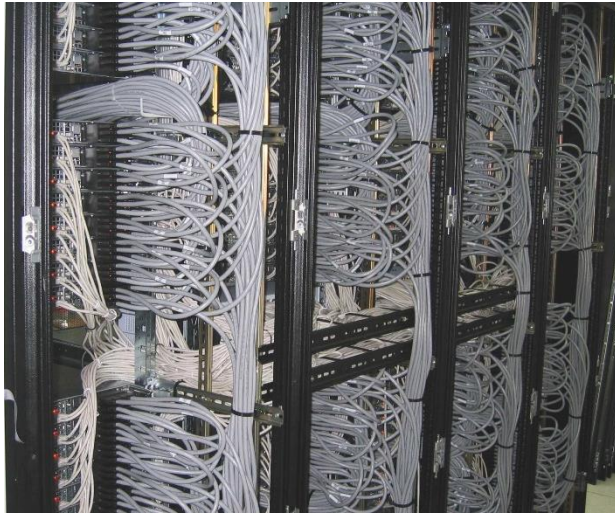
Collective communications  
Remote DMA  
High Performance Computing  
Broadcast  
Multicast

The patent regards a data transmission system to be used in an interconnection network between nodes.

Said system accelerates data transfer between nodes for a variety of collective operations such as broadcast (one at all), multicast (one to many), all-in-all in all its forms.



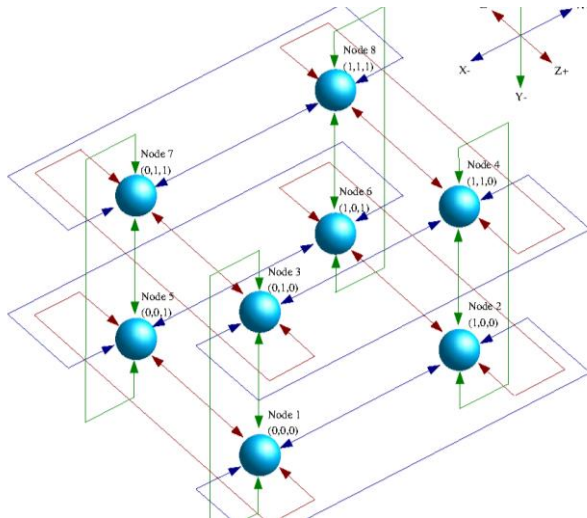
# SYSTEM FOR FAST COLLECTIVE COMMUNICATIONS



## DESCRIPTION :

The system is meant to be used within the logic of a network interface card interconnecting computing nodes in an arbitrary topology in the context of High Performance Computing. Collective communications are used in many classes of relevant scientific numerical simulations, being typically a bottleneck in overall system performances. The purpose of our invention is to minimize data transfer, and thus latency, between source node and destination nodes in the following cases:

- multicast: one node sends a buffer of local data to a subset of receiving nodes;
- broadcast: one node sends a buffer of local data to all other nodes in the network;
- all to all: one (or even all) node send a buffer (or different parts of a buffer) to all or a subset of other nodes.



## ADVANTAGES:

- Lower communication latency in the collective communications on a custom interconnection network in the context of High Performance Computing
- Lower host CPU workload for collective communication operations
- Collective communication optimization for point-to-point networks with native Remote DMA paradigm

## APPLICATIONS:

- Parallel computer interconnection networks for scientific high performance computing
- Network interface cards for custom interconnection networks