What is claimed is:

1. A system for using free-space optics to interconnect a plurality of computing nodes, the plurality of computing nodes comprising a plurality of processing nodes and a plurality of memory nodes arranged so that the plurality of processing nodes are not electrically coupled to all of the plurality of memory nodes, the system comprising:

a plurality of node optical transceivers that are electrically coupled to at least some of the plurality of computing nodes;

a router that is configured to communicate with the plurality of computing nodes via free-space optical communications;

a plurality of router optical transceivers that are coupled to the router, wherein the plurality of router optical transceivers are distinct from the plurality of node optical transceivers, wherein optical transmissions between the plurality of router optical transceivers and the plurality of node optical transceivers enable the free-space optical communications between the router and the plurality of computing nodes;

a network fabric that interconnects the plurality of computing nodes so that the plurality of computing nodes are accessible to one another via the network fabric, the network fabric comprising the plurality of node optical transceivers, the plurality of router optical transceivers, and the router, the network fabric being configured so that all of the plurality of memory nodes are accessible to all of the plurality of processing nodes via the network fabric;

a plurality of light sources, wherein the plurality of light sources comprise at least one distinct light source for each node optical transceiver among the plurality of node optical transceivers and for each router optical transceiver among the plurality of router optical transceivers; and

a plurality of photodetectors, wherein the plurality of photodetectors comprise at least one distinct photodetector for each node optical transceiver among the plurality of node optical transceivers and for each router optical transceiver among the plurality of router optical transceivers.

2. The system of claim 1, wherein:

the plurality of node optical transceivers are not electrically coupled to the router; and

the plurality of router optical transceivers are not electrically coupled to the plurality of computing nodes.

3. The system of claim 1, wherein:

a first computing node is electrically coupled to a first node optical transceiver;

a first router optical transceiver is optically coupled to the first node optical transceiver;

a second computing node is electrically coupled to a second node optical transceiver;

a second router optical transceiver is optically coupled to the second node optical transceiver;

the first router optical transceiver is configured to receive a first modulated light beam from the first node optical transceiver and demodulate the first modulated light beam to extract data;

the router is configured to route the data to the second router optical transceiver; and

the second router optical transceiver is configured to transmit a second modulated light beam to the second node optical transceiver, the second modulated light beam comprising the data.

4. The system of claim 1, wherein the router comprises at least one of:

an electrical crossbar switch that performs routing operations;

a microelectromechanical systems (MEMS) device that performs the routing operations; and

a prism that performs the routing operations.