

CLAIMS

1. A system for using free-space optics to interconnect a plurality of computing nodes, comprising:
 - a plurality of optical modules coupled to the plurality of computing nodes;
 - a plurality of optical transceivers that facilitate free-space optical communications with the plurality of optical modules, wherein each optical module of the plurality of optical modules has a line of sight to an area including one or more optical transceivers of the plurality of optical transceivers; and
 - a router that is coupled to the plurality of optical transceivers and that is configured to route the free-space optical communications among the plurality of computing nodes using the line of sight.
2. The system of claim 1, wherein the plurality of computing nodes are positioned horizontally relative to the area and the plurality of optical modules are coupled to a top portion of the computing nodes, or
 - wherein the plurality of computing nodes are positioned vertically relative to the area and the plurality of optical modules are coupled to an edge portion of the computing nodes.
3. The system of claim 1, wherein the plurality of computing nodes are positioned at an angle relative to the area and the plurality of optical modules are coupled to an edge portion of the computing nodes or a top portion of the computing nodes.
4. The system of claim 1, wherein the plurality of computing nodes are positioned using a combination of a horizontal position, a vertical position, or an angled position.
5. The system of claim 1, wherein each optical module among the plurality of optical modules comprises a modulator and an optics system;
 - the modulator within a particular optical module is configured to modulate a light beam received from at least one light source to produce a modulated light beam; and
 - the optics system within the particular optical module is configured to direct the modulated light beam toward an optical transceiver among the plurality of optical transceivers using the line of sight.
6. A system for using free-space optics to interconnect a plurality of computing nodes, comprising:
 - a plurality of optical modules coupled to the plurality of computing nodes;
 - a plurality of optical transceivers that facilitate free-space optical communications with the plurality of optical modules, wherein each optical module of the plurality of

optical modules has a line of sight to an area including one or more optical transceivers of the plurality of optical transceivers;

an enclosure with a plurality of openings, wherein each opening of the plurality of openings holds a computing node of the plurality of computing nodes in a position to provide the line of sight for the optical module of the computing node to the area; and

a router that is coupled to the plurality of optical transceivers and that is configured to route the free-space optical communications among the plurality of computing nodes using the line of sight.

7. The system of claim 6, wherein the plurality of openings of the enclosure are angled in a cone shape.

8. The system of claim 6, wherein the plurality of openings of the enclosure create a circle, and wherein the plurality of computing nodes are placed in the enclosure in a vertical or upward position and the plurality of optical modules are coupled to an edge portion of the computing nodes, or

wherein the plurality of openings of the enclosure are angled and the plurality of computing nodes are placed in the enclosure in an upward position with the plurality of optical modules coupled to an edge portion of the computing nodes.

9. The system of claim 6, wherein the plurality of openings of the enclosure are horizontal and spaced apart from one another in a stepping pattern.

10. The system of claim 6, further comprising:

a plurality of optical transceivers coupled to the plurality of computing nodes, wherein the plurality of optical transceivers have the line of sight to the area including the one or more optical transceivers of the plurality of optical transceivers and the optical transceivers are used for the free-space optical communications.

11. The system of claim 6, wherein the plurality of computing nodes have a common shape or size.

12. A system for using free-space optics to interconnect a plurality of computing nodes, comprising:

a plurality of optical modules electrically coupled to a plurality of computing nodes, wherein the plurality of optical modules are located on a portion at a distance separate from the computing node;

an enclosure with a plurality of openings, wherein each opening of the plurality of openings holds a computing node of the plurality of computing nodes;

a plurality of optical transceivers that facilitate free-space optical communications

with the plurality of optical modules, wherein each optical module of the plurality of optical modules has a line of sight to an area including one or more optical transceivers of the plurality of optical transceivers; and

a router that is coupled to the plurality of optical transceivers and that is configured to route the free-space optical communications among the plurality of computing nodes using the line of sight.

13. The system of claim 12, wherein each of the plurality of optical modules are positioned individually to provide the line of sight to the area.

14. The system of claim 13, wherein the plurality of openings of the enclosure are horizontal and the plurality of computing nodes are in a horizontal position, or wherein the plurality of openings of the enclosure are vertical and the plurality of computing nodes are in a vertical position, or

wherein the plurality of openings of the enclosure are angled and the plurality of computing nodes are in an angled position.

15. The system of claim 12, wherein the plurality of optical modules are positioned using a micromachine.