[0030] Preferably, the path interconnection architecture used in the data center path switch according to the present application is capable of scaling to several thousand ports with equivalent reliability and performance and can be designed as a modular architecture.

[0031] In an alternate embodiment, the path interconnection architecture in the data center path switch according to the present application permits the selective establishment of test monitor taps and multicast or broadcast connections with no power level signal loss or latency in the outgoing side of the path interconnection architecture.

[0032] Preferably, the data center path switch according to the present application can provide end to end path identification using, for example, managed connectivity interfaces capable of identifying each of the cables connected to the data center path switch.

[0033] An example of an embodiment of the data center path switch according to the present application includes a set of ports, a path interconnection unit, and a control unit. Each port within the set of ports is configured to receive data streams from an external medium, and to transmit data streams to an external medium. The path interconnection unit has an ingress side with a set of paths equal to the number of ports in the set of ports connected between the set of ports and the ingress side of the path interconnection unit in a one-to-one arrangement, an egress side with a set of paths equal to the number of paths on the ingress side connected between the set of ports and the egress side of the path interconnection unit in a one-to-one arrangement. The path interconnection also includes an electrical based switching fabric that is configured to switch data streams on any one ingress side path to any one egress side path such that data streams received on any one of the set of ports and be transmitted on any one of the set of ports, or to multiple egress side paths. The latency of data streams switched from a receiving port to a transmitting port is less than 500 nsec. The control unit is connected to the path interconnection unit and is configured to control the switching fabric to switch data streams from a path on the ingress side to one or more paths on the egress side.

[0034] Another example of an embodiment of the data center path switch according to the present application includes a set of ports in a one RU configuration having a capacity that is scalable from 16 ingress ports and 16 egress ports to at least 128 ingress ports and 128 egress ports. Each port within the set of ports is configured to receive data streams from an external medium, and to transmit data streams to an external medium. A path interconnection unit is also provided. The path interconnection unit has an ingress side

with a set of paths equal to the number of ports in the set of ports connected between the set of ports and the ingress side of the path interconnection unit in a one-to-one arrangement, an egress side with a set of paths equal to the number of paths on the ingress side connected between the set of ports and the egress side of the path interconnection unit in a one-to-one arrangement, and an electrical based switching fabric that is configured to switch data streams on any one ingress side path to any one or more egress side paths such that data streams received on any one of the set of ports and be transmitted on any one of the set of ports. A control unit is connected to the path interconnection unit and is configured to control the switching fabric to switch data streams from a path on the ingress side to a path on the egress side.

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] Fig. 1 is a block diagram of a data center network switch architecture within the prior art;

[0036] Fig. 2 is a block diagram of the data center network switch architecture of Fig. 1, detailing the switch logic;

[0037] Fig. 3 is a block diagram of an exemplary embodiment of a data center path switch according to the present application, illustrating a general path interconnection unit with ingress and egress sides;

[0038] Fig. 4 is a block diagram of an exemplary embodiment of a data center path switch according to the present application, illustrating a multistage non-blocking path interconnection unit with ingress and egress sides;

[0039] Fig. 5 is a block diagram of an exemplary embodiment of a data center path switch according to the present application, illustrating a multistage non-blocking path interconnection unit with ingress and egress sides and a port with a WDM transceiver configuration;

[0040] Fig. 6 is a block diagram of another exemplary embodiment of a data center path switch according to the present application, implementing a multicast application;

CLAIMS

What is claimed is:

1. A data center path switch, comprising:

a set of ports, wherein each port within the set of ports is configured to receive data streams from an external medium, and to transmit data streams to an external medium;

a path interconnection unit having an ingress side with a set of paths equal to the number of ports in the set of ports connected between the set of ports and the ingress side of the path interconnection unit in a one-to-one arrangement, an egress side with a set of paths equal to the number of paths on the ingress side connected between the set of ports and the egress side of the path interconnection unit in a one-to-one arrangement, and an electrical based switching fabric that is configured to switch data streams on any one ingress side path to any one egress side path such that data streams received on any one of the set of ports and be transmitted on any one of the set of ports; and

a control unit connected to the path interconnection unit configured to control the switching fabric to switch data streams from a path on the ingress side to a path on the egress side; and

wherein the latency of data streams switched from a receiving port to a transmitting port is less than 500 nsec.

2. The data center path switch according to claim 1, wherein the latency of data streams switched from a receiving port to a transmitting port is less than 10 nsec.

3. The data center path switch according to claim 1, wherein the set of ports and path interconnection unit are configured as a non-blocking path switch.

4. The data center path switch according to claim 1, wherein the path interconnection unit comprises a matrix of switches of sufficient size such that a data stream on the ingress side can be switched to any one of the paths on the egress side.

5. The data center path switch according to claim 1, wherein the switching fabric is configured to switch data streams on any one ingress side path to more than one egress side path.

18. A data center path switch, comprising:

a set of ports in a one RU configuration having a capacity that is scalable from 16 ingress ports and 16 egress ports to at least 128 ingress ports and 128 egress ports, wherein each port within the set of ports is configured to receive data streams from an external medium, and to transmit data streams to an external medium;

a path interconnection unit having an ingress side with a set of paths equal to the number of ports in the set of ports connected between the set of ports and the ingress side of the path interconnection unit in a one-to-one arrangement, an egress side with a set of paths equal to the number of paths on the ingress side connected between the set of ports and the egress side of the path interconnection unit in a one-to-one arrangement, and an electrical based switching fabric that is configured to switch data streams on any one ingress side path to any one or more egress side paths such that data streams received on any one of the set of ports and be transmitted on any one of the set of ports; and

a control unit connected to the path interconnection unit configured to control the switching fabric to switch data streams from a path on the ingress side to a path on the egress side.