US 20040199567A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2004/0199567 A1

Lund (43) Pub. Date: Oct. 7, 2004

(54) SYSTEM AND METHOD FOR INTEGRATING MULTISERVER PLATFORMS

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(21) Appl. No.: **10/647,963**

(22) Filed: **Aug. 26, 2003**

Related U.S. Application Data

(60) Provisional application No. 60/458,719, filed on Mar. 28, 2003. Provisional application No. 60/448,656, filed on Feb. 18, 2003. Provisional application No. 60/456,831, filed on Mar. 21, 2003. Provisional application No. 60/463,014, filed on Apr. 15, 2003.

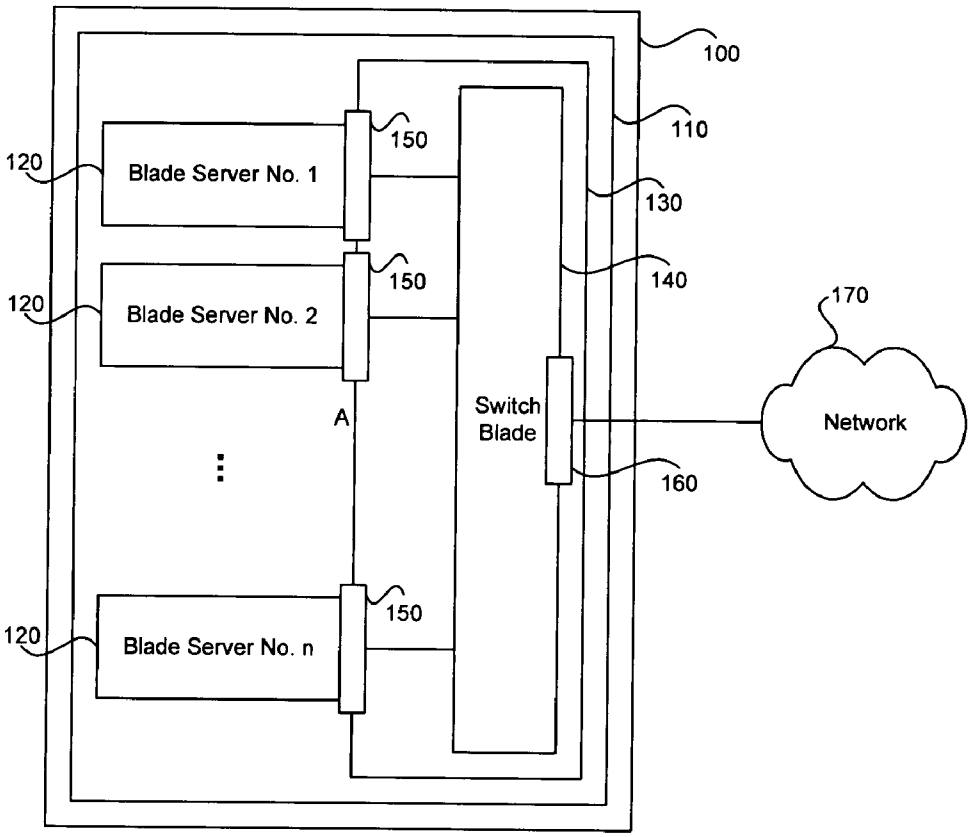
Publication Classification

(51) **Int. Cl.**[7] **G06F 15/16**

(52) **U.S. Cl.** **709/201**

(57) **ABSTRACT**

Aspects of the invention may include a first multiserver platform comprising a network interface and/or a first switch blade. A second multiserver platform comprising a second switch blade may be coupled to the first switch blade. A third multiserver platform comprising a third switch blade may be coupled to the second switch blade of the second multiserver platform and/or the first switch blade of the first multiserver platform. The first multiserver platform, second multiserver platform and third multiserver may be coupled in a daisy-chain configuration. Accordingly, the first multiserver platform and the third multiserver platform may communicate via the second multiserver platform. At least one central switch may be coupled to the first switch blade of the first multiserver platform and the second switch blade of the second multiserver platform. A third switch blade of a third multiserver platform may be coupled to the central switch.



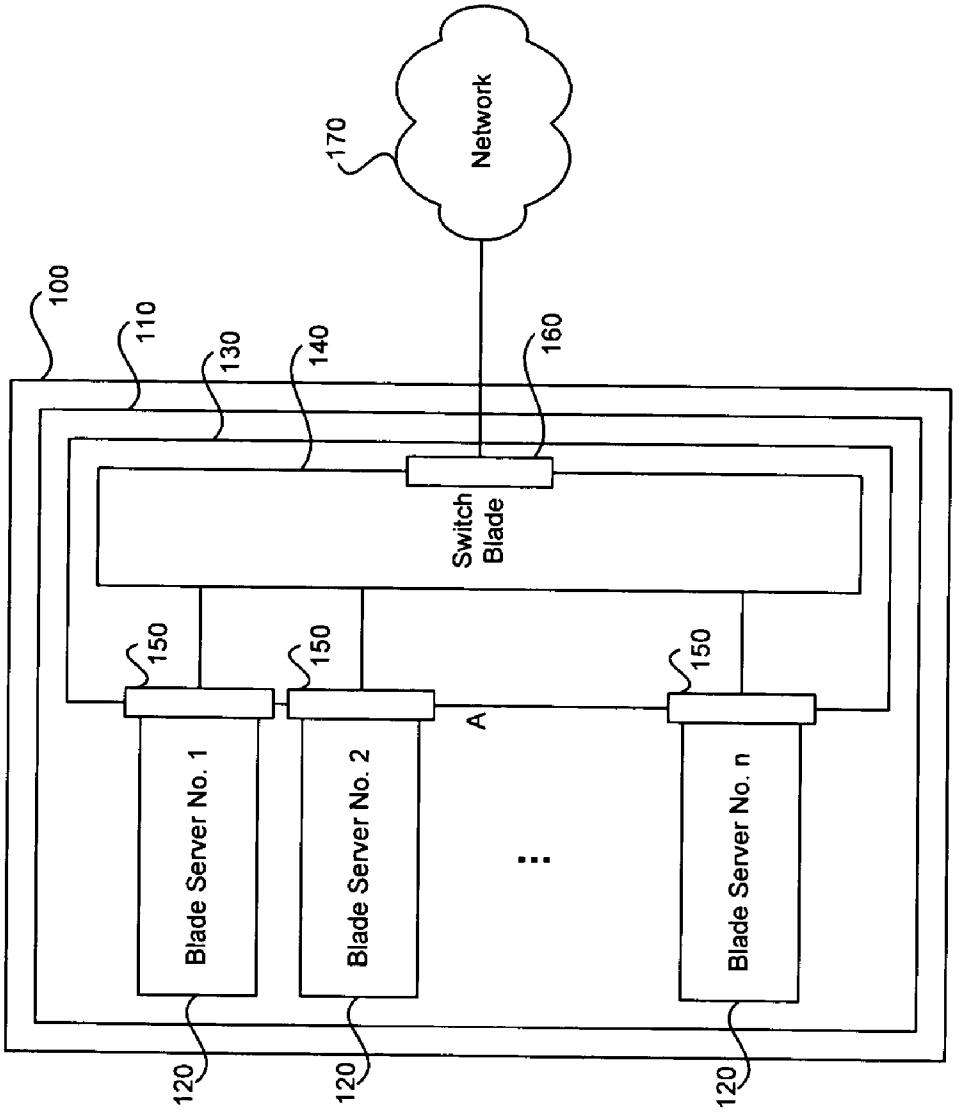

Network
170
100
110
130
140
160
Switch Blade
150
150
150
A
Blade Server No. 1
Blade Server No. 2
Blade Server No. n
120
120
120

FIG. 1

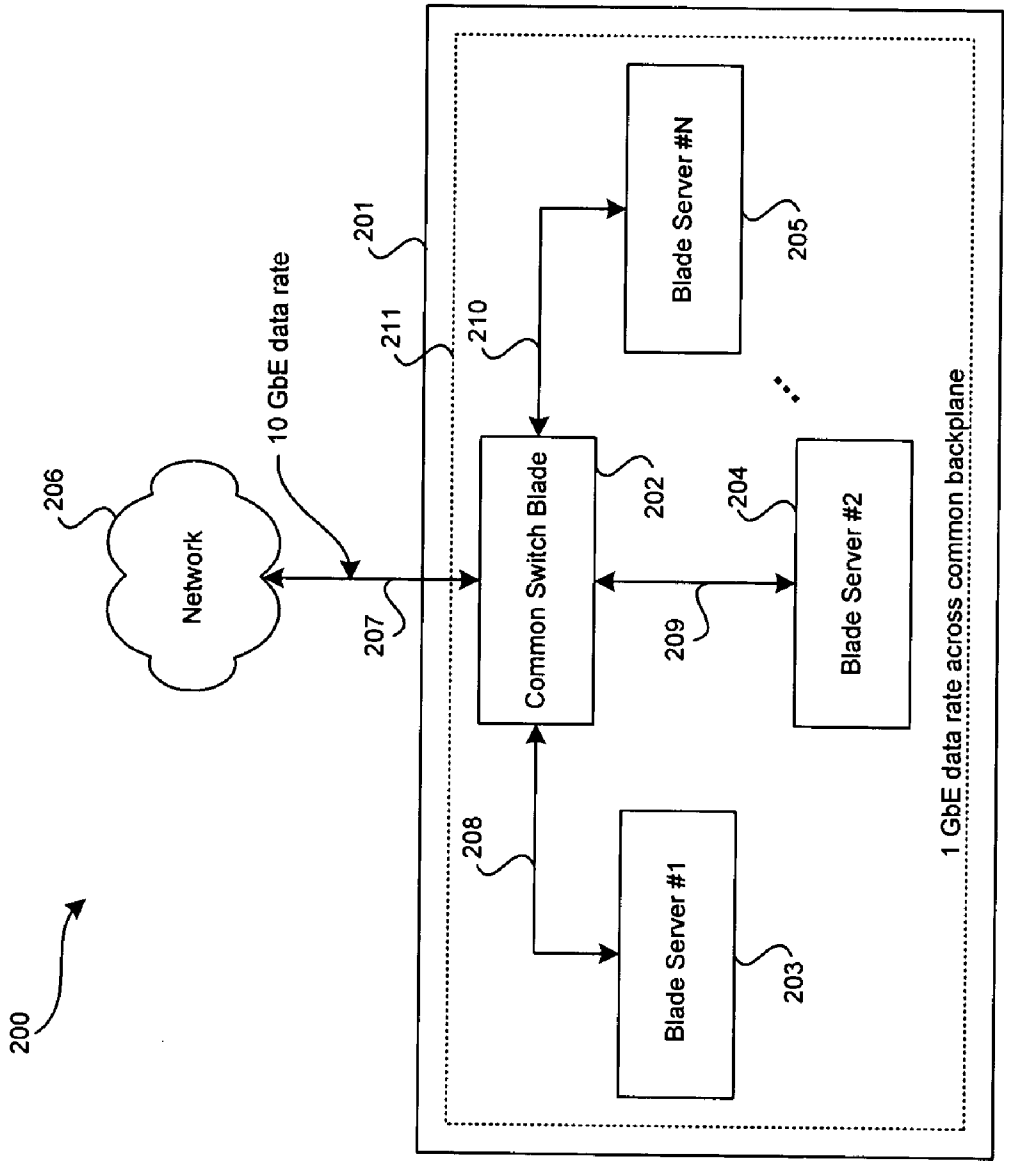

200
206
Network
10 GbE data rate
207
201
211
210
Common Switch Blade
202
208
209
204
Blade Server #1
203
Blade Server #2
Blade Server #N
205
1 GbE data rate across common backplane

FIG. 2

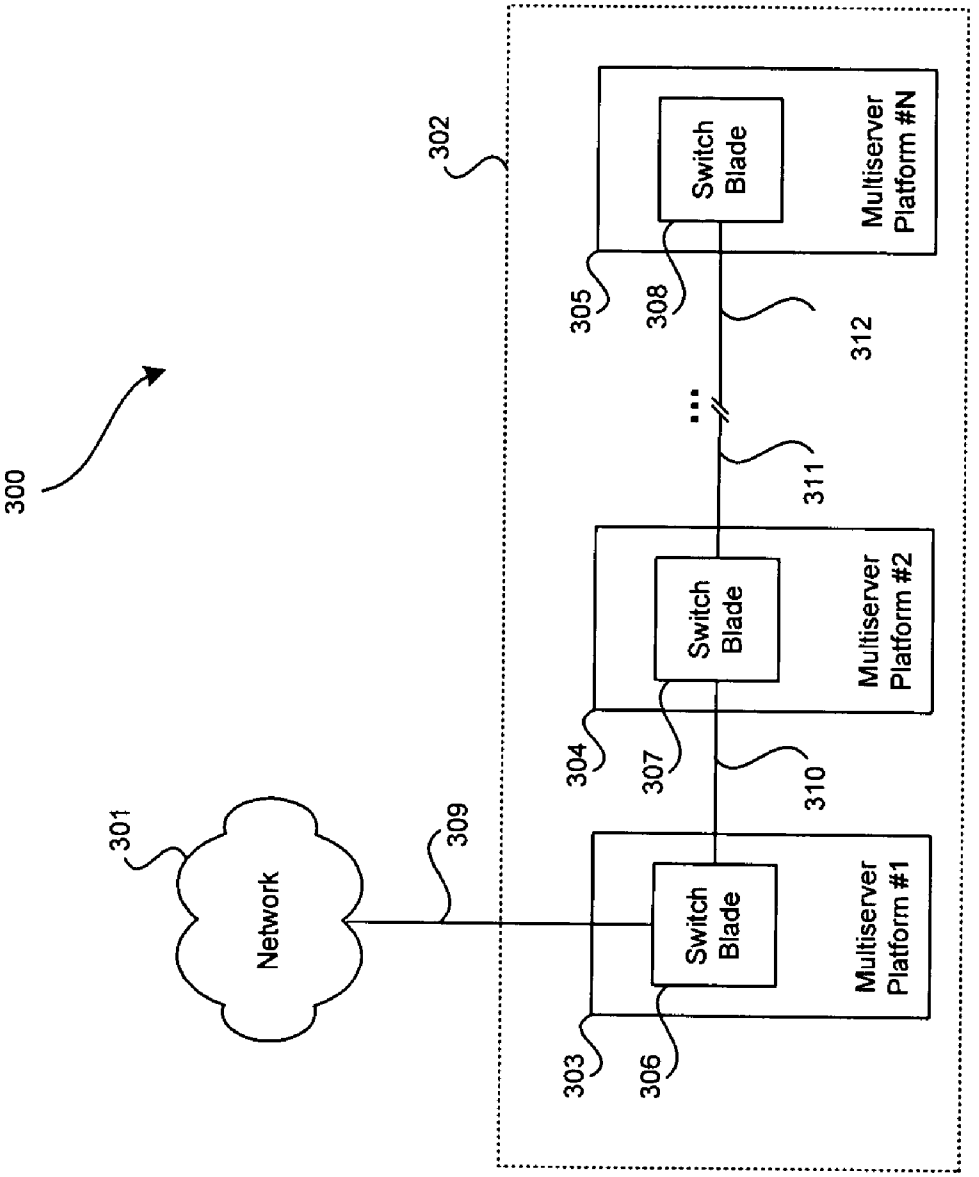

300
301
Network
302
309
303
304
305
306
307
308
310
311
312
Switch Blade
Switch Blade
Switch Blade
Multiserver Platform #1
Multiserver Platform #2
Multiserver Platform #N

FIG. 3

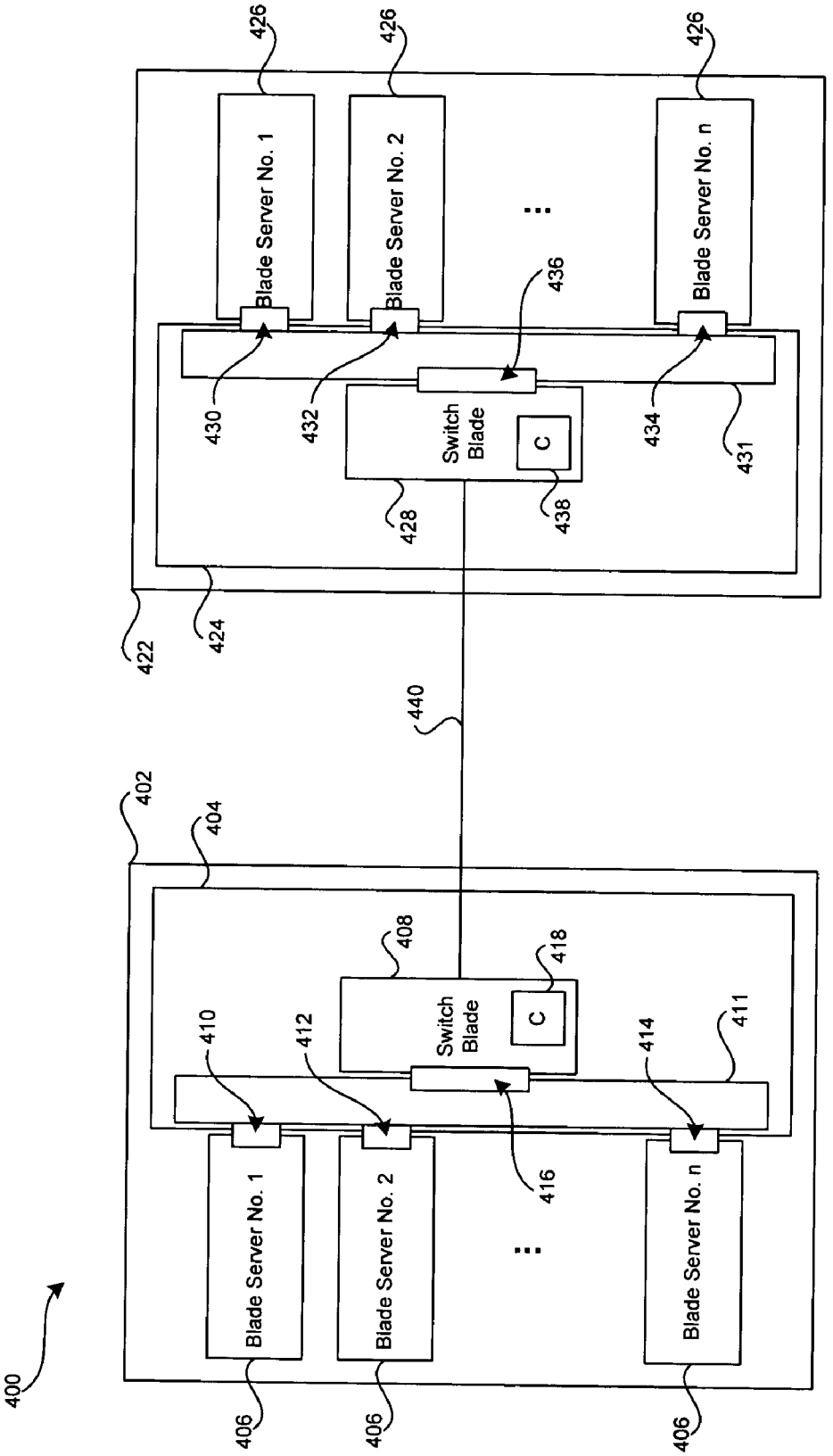

400
402
404
406
406
406
408
410
412
414
416
418
411
Switch Blade
C
Blade Server No. 1
Blade Server No. 2
Blade Server No. n
422
424
426
426
426
428
430
431
432
434
436
438
440
Switch Blade
C
Blade Server No. 1
Blade Server No. 2
Blade Server No. n

FIG. 4

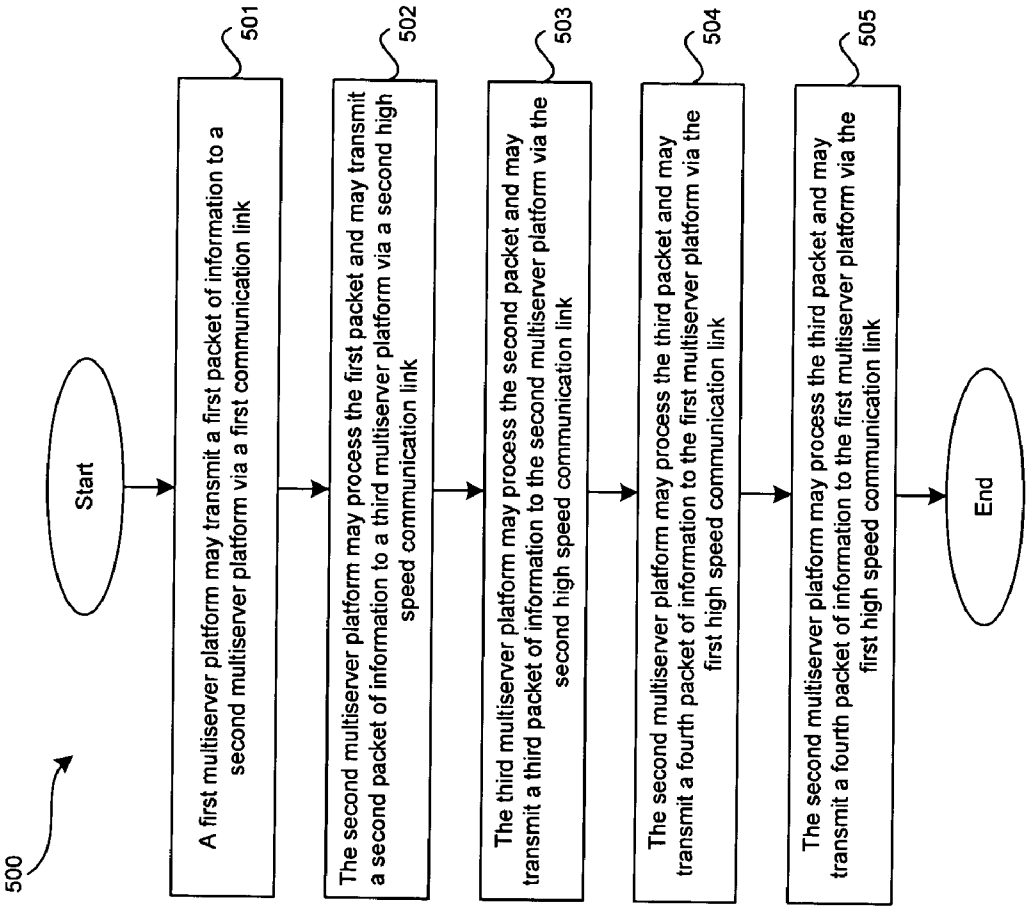

500
Start
A first multiserver platform may transmit a first packet of information to a second multiserver platform via a first communication link
501
The second multiserver platform may process the first packet and may transmit a second packet of information to a third multiserver platform via a second high speed communication link
502
The third multiserver platform may process the second packet and may transmit a third packet of information to the second multiserver platform via the second high speed communication link
503
The second multiserver platform may process the third packet and may transmit a fourth packet of information to the first multiserver platform via the first high speed communication link
504
The second multiserver platform may process the third packet and may transmit a fourth packet of information to the first multiserver platform via the first high speed communication link
505
End

FIG. 5

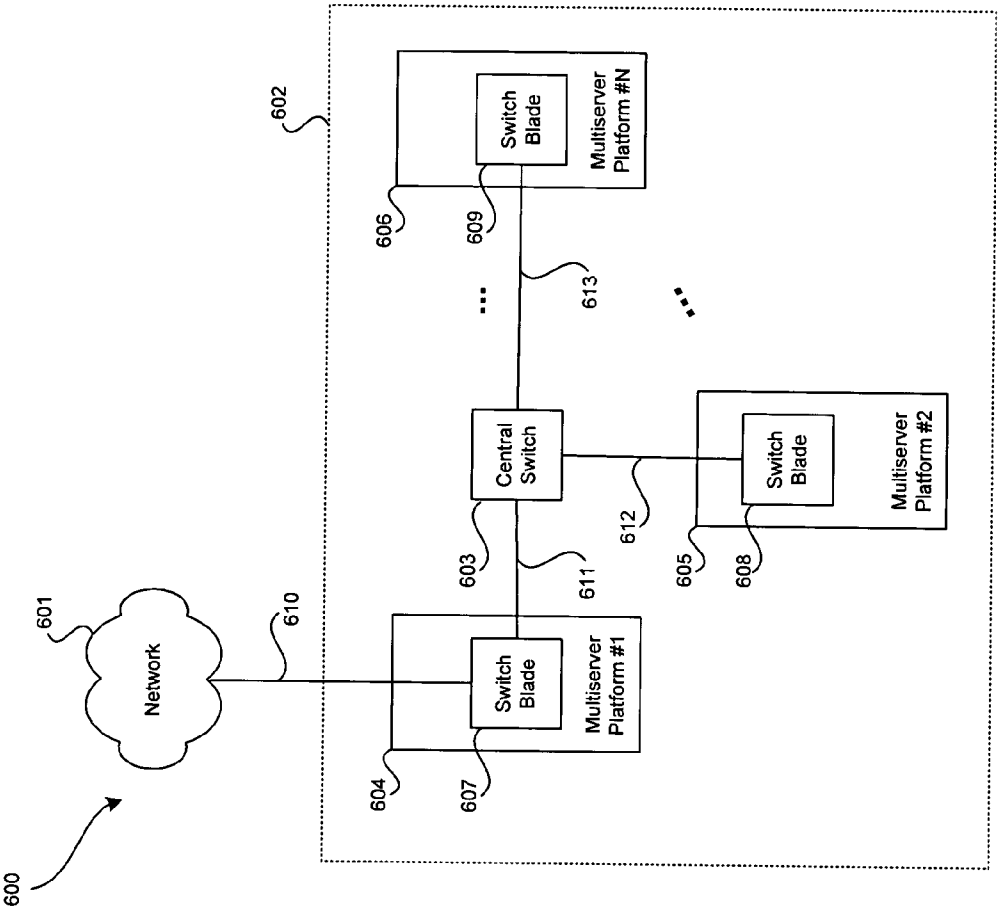

600
601
Network
610
602
Switch Blade
Multiserver Platform #N
606
609
613
Central Switch
603
611
612
Switch Blade
Multiserver Platform #2
605
608
Switch Blade
Multiserver Platform #1
604
607

FIG. 6

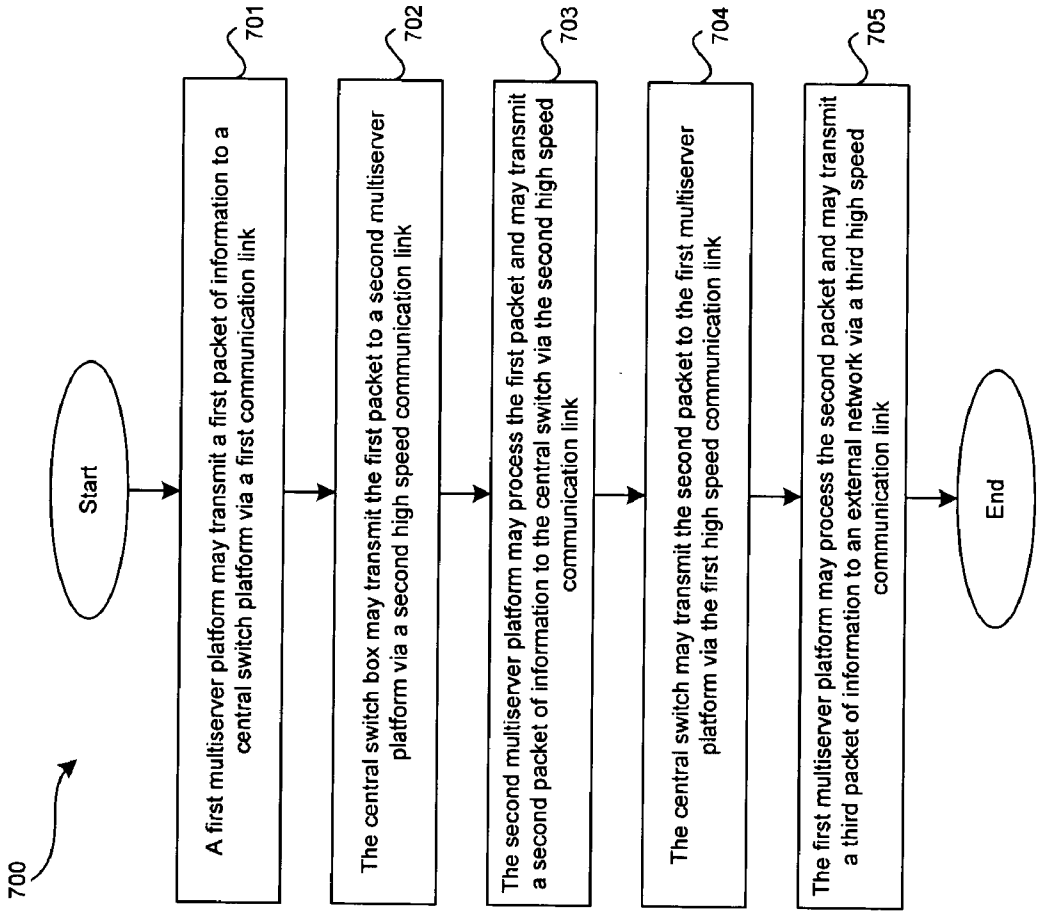

700
Start
701
A first multiserver platform may transmit a first packet of information to a central switch platform via a first communication link
702
The central switch box may transmit the first packet to a second multiserver platform via a second high speed communication link
703
The second multiserver platform may process the first packet and may transmit a second packet of information to the central switch via the second high speed communication link
704
The central switch may transmit the second packet to the first multiserver platform via the first high speed communication link
705
The first multiserver platform may process the second packet and may transmit a third packet of information to an external network via a third high speed communication link
End

FIG. 7

SYSTEM AND METHOD FOR INTEGRATING MULTISERVER PLATFORMS

CROSS-REFERENCE TO RELATED APPLICATIONS/INCORPORATION BY REFERENCE

[0001] This application makes reference to, and/or claims priority to and/or claims benefit to:

[0002] U.S. Provisional Patent Application Serial No. 60/458,719, entitled "Method and System to Provide Inter-Chassis Blade Server Integration for Scalability" and filed on Mar. 28, 2003;

[0003] U.S. Provisional Patent Application Serial No. 60/448,656, entitled "A Method and System to Provide External Communication Using a Multiserver Platform Having a Single Switch Backplane" and filed on Feb. 18, 2003;

[0004] U.S. Provisional Patent Application Serial No. 60/456,831, entitled "Method and System to Provide Inter-Blade Server Communication Using a Single Switch Backplane" and filed on Mar. 21, 2003; and

[0005] U.S. Provisional Patent Application Serial No. 60/463,014, entitled "Method and System to Selectively Steer Data Traffic to Service Blades Using a Single Switch Backplane" and filed on Apr. 15, 2003.

[0006] The above stated applications are hereby incorporated herein by reference in their entirety.

FIELD OF THE INVENTION

[0007] Certain embodiments of the invention relate to communication among servers. More specifically, certain embodiments of the invention relate to a method and system for integrating multiserver platforms.

BACKGROUND OF THE INVENTION

[0008] A server may be a computer system in a network that may be accessed by one or more users and/or other computers. The server may provide, for example, access to information such as files, and to services such as communications, printing or other types of services that may be available through a network. In some cases, a special network operating system (OS) may run on a dedicated server, for example, in a large network. A personal computer (PC) operating system may run on a non-dedicated server having, for example, peer-to-peer networking software running thereon.

[0009] Generally, a server may have one or more advanced or more powerful central processing units (CPUs), a larger memory, a larger cache and more storage space than a typical single user workstation or personal computer. The server may include, for example, multiple processors which may be dedicated to a particular service or provide a particular function such as e-mail handling, printing or communications. The server may also include devices such as, large power supplies, backup power capabilities such as an uninterruptible power supply (UPS) and various fault tolerant or redundant features such as redundant array of independent disks (RAID) technologies.

[0010] A single server may exist in a standalone enclosure and may interface with a network via one or more network interfaces. Multiple standalone boxes may be situated in a central computing center with each standalone box coupled to a network via a respective cable. Each server may interface to the network separately at a particular data rate such as, for example, approximately 1 gigabits/second (Gb/s) for a Gigabit Ethernet or approximately 10 Gb/s for a 10 Gigabit Ethernet.

[0011] Thus, the single server in a standalone enclosure may inefficiently utilize large amounts of space and/or power. Furthermore, since each single server may be connected to the network directly via a respective cable, a room full of servers might be overflowing with cables possibly necessitating detailed cable maps which may be quite time-intensive and costly to produce. In addition, single servers in a standalone enclosure may not be easily replaced during failure, particularly when there may be multiple failures. Consequently, the conventional single server in a standalone box may ultimately suffer from a substantial total cost of ownership (TCO).

[0012] Further limitations and disadvantages of conventional and traditional approaches will become apparent to one of skill in the art, through comparison of such systems with some aspects of the present invention as set forth in the remainder of the present application with reference to the drawings.

BRIEF SUMMARY OF THE INVENTION

[0013] Certain embodiments of the invention provide a method and system for communicating information in a server platform. Aspects of the method for communicating information in a server platform may include receiving at least one packet from at least one of a first switch blade associated with a first multiserver platform. The method may also include determining a second server blade associated with a second multiserver platform that may receive at least a portion of the received packet. In this regard, at least a portion of the received packet may be routed to the second blade server. The packet may be received by a third switch blade and/or a central switch. In instances where the packet may be received by the central switch, at least a portion of the received packet may be communicated to the second switch blade via at least one communication link that may couple the central switch directly to the second switch blade. The routed portion of the received packet may be processed by the second blade server.

[0014] Another embodiment of the invention may provide a machine-readable storage, having stored thereon, a computer program having at least one code section for communicating information in a server platform. The at least one code section may be executable by a machine, thereby causing the machine to perform the steps as described above for communicating information in a server platform.

[0015] Aspects of the system for processing information in a multiserver platform may include a first multiserver platform having a network interface and/or a first switch blade. At least a second multiserver platform comprising a second switch blade may be coupled to the first switch blade of the first multiserver platform. A third multiserver platform comprising a third switch blade may be coupled to the second switch blade of the second multiserver platform and/or the

first switch blade of the first multiserver platform. The first multiserver platform, the second multiserver platform and the third multiserver platform may be coupled in a daisy-chain configuration. In this regard, the first multiserver platform and the third multiserver platform may communicate via the second multiserver platform.

[0016] In another embodiment of the invention, at least one central switch may be coupled to the first switch blade of the first multiserver platform and the second switch blade of the second multiserver platform. At least a third switch blade of a third multiserver platform may also be coupled to the central switch. The first multiserver platform, second multiserver platform and third multiserver platform may communicate via the central switch.

[0017] These and other advantages, aspects and novel features of the present invention, as well as details of an illustrated embodiment thereof, will be more fully understood from the following description and drawings.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

[0018] **FIG. 1** is a block diagram of an embodiment of a multiserver platform in accordance with an embodiment of the invention.

[0019] **FIG. 2** is a block diagram illustrating an embodiment of a communication system including a multiserver platform and an external network in accordance with various aspects of the invention.

[0020] **FIG. 3** is a block diagram illustrating an embodiment of a communication system including an external network and N multiserver platforms coupled in a daisy-chain configuration in accordance with an embodiment of the invention.

[0021] **FIG. 4** is a block diagram illustrating the coupling of two switch blades in accordance with an embodiment of the invention.

[0022] **FIG. 5** is a flowchart illustrating exemplary steps for providing communication within the daisy-chain configuration of **FIG. 3** in accordance with an embodiment of the invention.

[0023] **FIG. 6** is a block diagram illustrating an exemplary central switch configuration for the multiserver platform of **FIG. 1**, in accordance with various aspects of the invention.

[0024] **FIG. 7** is a flowchart illustrating exemplary steps for providing communication in the central switch configuration of **FIG. 6** in accordance with an embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0025] Certain embodiments of the invention provide a method and system for communicating information in a server platform. Aspects of the method for communicating information in a multiserver platform may include receiving at least one packet from a first switch blade associated with a first multiserver platform. Another aspect of the method may include determining a second server blade associated with a second multiserver platform that may receive at least a portion of the received packet. In this regard, at least a portion of the received packet may subsequently be routed to the second blade server and the routed portion of the received packet processed by the second blade server. In another aspect of the invention, the packet may be received by a third switch blade and/or a central switch. Accordingly, in instances where the packet may be received by the central switch, at least a portion of the received packet may be communicated to the second switch blade via one or more communication links that may be utilized to couple the central switch directly to the second switch blade.

[0026] **FIG. 1** is a block diagram of an embodiment of a multiserver platform **100** in accordance with an embodiment of the invention. The multiserver platform **100** may include a chassis **110**, a backplane **130**, a switch blade **140**, blade server interfaces **150**, and a plurality of blade servers No. **1**, No. **2**, . . . , No. n, collectively referenced as **120**.

[0027] The chassis **110** may include the backplane **130**. However, although only one backplane **130** is shown, the invention is not so limited and a plurality of backplanes may be provided within the chassis **110**. In this regard, one or more backplanes may be coupled together. In a case where the chassis **110** may include a single backplane, the backplane may be regarded as a common backplane, which may provide connectivity for the blade servers **120**. The chassis **110** may be part of a single installation enclosure that includes a plurality of blade server slots which may be adapted for receiving one or more of the blade servers **120**.

[0028] The backplane **130** may include, for example, one or more blade server interfaces collectively referenced as **150**, which may be referred to as blade server interconnects. In this regard, the chassis **110** may include a plurality of blade server slots that may be adapted to facilitate connection between the blade servers and the blade server interfaces **150**. In other words, the blade server slots may provide a conduit for coupling the blade servers **120** to the blade server interfaces **150**. The backplane **130** may also include one or more interfaces such as a network interface **160**. The network interface **160** may be referred to as network interconnect.

[0029] The switch blade **140** may be part of the backplane **130**. In this regard, the switch blade **140** may be integrated within the backplane **130** or it may be a plug-in card that may be plugged into the backplane **130**.

[0030] The blade servers **120** may be coupled to the backplane **130** via the blade server interfaces **150**. Each of the blade servers **120** may therefore be coupled to a corresponding one of the server interfaces **150**. For example, each of the blade servers **120** may be plugged into or removably mounted in a corresponding blade server slot in the chassis **110** so that it interfaces with a corresponding one of the server interfaces. In this regard, the blade servers **120** may be coupled to the backplane **130**.

[0031] Once the blade servers **120** are mounted or plugged into the chassis **110**, the blade servers **120** may be coupled to the switch blade **140** of the backplane **130** via the blade server interfaces **150**. The backplane **130** may be adapted to provide connectivity, for example, between two or more of the blade servers **120**. Furthermore, the backplane **130** and/or the switch blades **140** may provide connectivity between the one or more of the blade servers **120** and the network **170**.

[0032] The network interface **160** facilitates connectivity between the backplane **130** and the network **170**. In this regard, the network interface **160** may couple backplane **130** and/or one or more of the plurality of switch blades **140** to the network **170**.

[0033] **FIG. 2** is a block diagram illustrating an embodiment of a communication system **200** including a multiserver platform **201** and an external network **206**, in accordance with various aspects of the invention. The multiserver platform **201** may include a chassis having a common backplane **211**, a common switch-blade **202** and a plurality of blade servers including, a blade server #**1203**, a blade server #**2204**, . . . , blade server #N **205**, where N may be any integer number.

[0034] Each of the blade servers #**1**, #**2**, . . . , #N may be a server that has been integrated on a single plug-in card or blade that may be plugged into a blade server slot of the chassis with the common backplane **211**. The chassis with a common backplane **211** may provide a single installation enclosure for the multiple blade servers #**1**, #**2**, . . . , #N.

[0035] The chassis with the common backplane **211** may also serve a common interface between each blade server **203**, **204**, **205** and the common switch blade **202**. For example, common backplane **211** may provide a common backplane interface **208** between blade server #**1203** and the common switch blade **202**. Common backplane **211** may also provide a common backplane interface **209** between blade server #**2204** and the common switch blade **202**. Finally, common backplane **211** may provide a common backplane interface **210** between blade server #N **205** and the common switch blade **202**. In this regard, the common backplane interfaces **208**, **209**, **210** are part of the common backplane **211**.

[0036] The common switch blade **202** may include N+1 interfaces and at least a portion of these interfaces may be adapted to perform packet switching of data frames between the N blade servers and the external network **206**, in accordance with an embodiment of the invention. The common switch-blade may include intelligence that may manage and distribute data traffic to the relevant blade servers including blade server #**1**, #**2**, . . . , #N. The common switch-blade **202** may interface with each of the N blade servers via the common backplane **211**. The common switch-blade **202** may also interface with the external network **206**, thereby resulting in N+1 interfaces.

[0037] In accordance with an embodiment of the invention, the external network **206** may include a 10 Gigabit Ethernet network connection and interface. The external interface **207** between the common switch blade **202** and the external network **206** may include a 10 Gigabit Ethernet (GbE) interface, operating at a data rate of 10 Gb/s. In this regard, bi-directional network communication capability may be provided between the external network **206** and the common switch blade **202**. In order to facilitate Gigabit Ethernet communication, the common backplane **211** may include a plurality of Gigabit Ethernet (GbE) interfaces. The switch blade **202** may communicate with each of the N blade servers independently over the common backplane **211** at a data rate of 1 Gb/s. For example, the blade server #**1203** may communicate in a bi-directional manner with the common switch-blade **202** via the common backplane interface **208**. The blade server #**2204** may also communicate in a bi-directional manner with the common switch blade **202** via the common backplane interface **209**. Finally, the blade server #N **105** may communicate in a bi-directional manner with the common switch blade **202** via the common backplane interface **210**.

[0038] In accordance with an embodiment of the invention, the common switch blade **202** may have the capability to handle communication with the multiple blade servers **203**, **204**, **205** at the same time. In this regard, the common blade server **202** may facilitate the simultaneous transfer of information between any of the blade servers **203**, **204**, **205**.

[0039] **FIG. 3** is a block diagram illustrating an embodiment of a communication system **300** including an external network **301** and N multiserver platforms coupled in a daisy-chain configuration in accordance with an embodiment of the invention. The daisy-chain configuration includes N multiserver platforms referenced as **303**, **304**, . . . , **305** and labeled as multiserver platform #**1**, multiserver platform #**2**, . . . , multiserver platform #N, respectively. Referring to **FIG. 3**, the multiserver platform #**1303** may include a common switch blade **306**. The multiserver platform #**2304** may include a common switch blade **307** and the multiserver platform #N **305** includes a common switch blade **308**.

[0040] The external network **301** may interface with the switch blade **306** of the multiserver platform #**1303** via, for example, a high speed communication link **309**. The multiserver platform #**1**, multiserver platform #**2**, . . . , multiserver platforms #N referenced as **303**, **305**, . . . , **305** may be coupled together in a daisy-chained arrangement via, for example, high speed communication links. For example, the switch blade **306** of the multiserver platform #**1303** may interface with the switch blade **307** of the multiserver platform #**3** via a high speed communication link **310**. The switch blade **307** of the multiserver platform #**2304** may also interface with the switch blade of another multiserver platform via a high speed communication link **311**. The switch blade **308** of the multiserver platform #N **305** may also interface with the switch blade of some other multiserver platform via a high speed communication link **312**.

[0041] The high speed communication links **309**, **310**, **311**, . . . , **312** may be bi-directional communication links although the invention is not so limited. In accordance with an embodiment of the invention, the high speed communication links may be of the order of 1-10 Gigabit per second or higher and may be Ethernet links. Notwithstanding, the high speed communication links may be fibre channel links or other type of communication link, for example. Also, in accordance with an embodiment of the invention, the switch blades **306**, **307**, . . . , **308** of the multiserver platforms may be adapted to simultaneously communicate with each other via the high speed communication links. Similarly, the switch blade **306** may be adapted to communicate with the external network **301** and the switch blade **307** at the same time over the high speed communication links **309** and **310**. In this regard, information may be simultaneously transferred by the switch blades **306**, **307**, . . . , **308** among the multiserver platforms **303**, **304**, . . . , **305** and the external network **30**. The data communication rate between any of the multiserver platforms **303**, **304**, . . . , **305** may be any standard or non-standard data rate, in accordance with various embodiments of the invention.

[0042] **FIG. 4** is a block diagram illustrating the coupling of two switch blades in accordance with an embodiment of the invention. Referring to **FIG. 4**, there is shown a first multiserver platform **402** coupled to a second multiserver platform **422**. In this regard, reference **402** may include an enclosure or chassis of the first multiserver platform **402** and reference **422** may include an enclosure or chassis of the multiserver platform **422**. Notwithstanding, the first multiserver platform **402** may include a backplane **404**, a plurality of n blade servers collectively referred to as **406**, a switch blade **408** and a bus **411**. Also shown are bus transceivers **410**, **412**, **414**, **416** and a controller **418**. Each of the bus transceivers **410**, **412**, **414**, **416** may include at least one transmitter that may transmit electrical signals onto the bus **411** within the backplane **404**. Each of the bus transceivers **410**, **412**, **414**, **416** may also include at least one receiver that may receive electrical signals onto the bus **411** within the backplane **404**. The bus **411** may be a time division multiplexed (TDM) bus, a frequency division multiplexed (FDM) bus, or any other suitable type of bus. Accordingly, the bus transceivers **410**, **412**, **414**, **416** may be suitable time division multiplexed bus transceivers and/or frequency division multiplexed bus transceivers, for example. As communication link **440** may couple the first multiserver platform **402** to the second multiserver platform **422**. The communication link **440** may be similar to the communication links that couple the multiserver platform #**1**, multiserver platform #**2**, . . . , multiserver platform #N referenced as **303**, **304**, . . . , **305** in the daisy-chain arrangement of **FIG. 3**.

[0043] Each of the blade servers **406** and the switch blade **408** of the first multiserver platform **402** may include a bus transceiver that may be coupled to the bus **411**. In this regard, blade server No. **1** includes a bus transceiver **410**, server blade No. **2** includes a bus transceiver **412**, and server blade No. n includes a bus transceiver **414**. The switch blade **408** may also include a bus transceiver **416** and a bus controller **418**. Although the bus controller **418** is illustrated as a separate entity within the switch blade **408**, the invention is not so limited. Accordingly, one or more functions provided by the bus controller **418** may be provided by the switch blade **408**. In a case where all of the functions offered by the bus controller may be provided by the switch blade, this may eliminate a need for an additional bus processing entity such as the bus controller **418**.

[0044] Notwithstanding, the bus controller **418** and/or the switch blade **408** of the first multiserver platform **402** may be adapted to control the transfer of messages between the blade servers **406** and the switch blade **408**. In this regard, the bus controller **418** may handle functions such as bus access and bus arbitration. The bus controller **418** and/or the switch blade **408** may also provide a switching function that may permit messages to be transferred among the blade servers **406** via the switch blade and from an external source such as the network **170** (**FIG. 1**) to any one or more of the blade servers **406**. For example, one or more messages received from the network **170** may be steered by the switch blade **408** to one or more of the blade servers **406** based on a message type and a function provided by one or more of the blade servers **406**. U.S. patent application Ser. No. _____ (Attorney Docket No. 14221US02) filed Aug. 26, 2003, discloses a method and system for selective steering of data traffic of various data types to functionally dedicated blade servers which application is incorporated herein by reference in its entirety.

[0045] The bus controller **418** and/or the switch blade **408** of the first multiserver platform **402** may include suitable hardware and/or software that may be adapted to control, for example, bus access, bus arbitration and/or switching among the blade servers **406** and the switch blade **408**. The hardware and/or software may therefore control the manner in which messages may be received from a first blade server and transferred, routed or switched to a second blade server via the switch blade **408**.

[0046] The second multiserver platform **422** may include a backplane **424**, a plurality of n blade servers collectively referred to as **426**, a switch blade **428** and a bus **431**. Also shown are bus transceivers **430**, **432**, **434**, **436** and a controller **438**. Each of the bus transceivers **430**, **432**, **434**, **436** may include at least one transmitter that may transmit electrical signals onto the bus **431** within the backplane **424**. Each of the bus transceivers **430**, **432**, **434**, **436** may also include at least one receiver that may receive electrical signals onto the bus **431** within the backplane **424**. The bus **431** may be a time division multiplexed (TDM) bus, a frequency division multiplexed (FDM) bus, or any other suitable type of bus. Accordingly, the bus transceivers **430**, **432**, **434**, **436** may be suitable time division multiplexed bus transceivers and/or frequency division multiplexed bus transceivers, for example.

[0047] Each of the blade servers **426** and the switch blade **428** of the second multiserver platform **422** may include a bus transceiver that may be coupled to the bus **431**. In this regard, blade server No. **1** includes a bus transceiver **430**, server blade No. **2** includes a bus transceiver **432**, and server blade No. n includes a bus transceiver **434**. The switch blade **428** may also include a bus transceiver **436** and a bus controller **438**. Although the bus controller **438** is illustrated as a separate entity within the switch blade **438**, the invention is not so limited. Accordingly, one or more functions provided by the bus controller **438** may provided by the switch blade **428**. In a case where all of the functions offered by the bus controller may be provided by the switch blade, this may eliminate a need for an additional bus processing entity such as the bus controller **438**.

[0048] Notwithstanding, the bus controller **438** and/or the switch blade **428** of the second multiserver platform **422** may be adapted to control the transfer of messages between the blade servers **426** and the switch blade **428**. In this regard, the bus controller **438** may handle functions such as bus access and bus arbitration. The bus controller **438** and/or the switch blade **428** may also provide a switching function that may permit messages to be transferred among the blade servers **426** via the switch blade and from an external source such as the network **170** (**FIG. 1**) to any one or more of the blade servers **426**. For example, one or more messages received from the network **170** may be steered by the switch blade **428** to one or more of the blade servers **426** based on a message type and a function provided by one or more of the blade servers **426**.

[0049] The bus controller **438** and/or the switch blade **428** of the second multiserver platform **422** may include suitable hardware and/or software that may be adapted to control, for example, bus access, bus arbitration and/or switching among the blade servers **426** and the switch blade **428**. The hardware and/or software may therefore control the manner in

which messages may be received from a first blade server and transferred, routed or switched to a second blade server via the switch blade **428**.

[**0050**] **FIG. 5** is a flowchart **500** illustrating exemplary steps for providing communication within the daisy-chain configuration **302** of **FIG. 3** in accordance with an embodiment of the invention. Referring to **FIG. 5**, in step **501**, a first multiserver platform may transmit a first packet of information to a second multiserver platform via a first high speed communication link. In step **502**, the second multiserver platform may process the first packet and transmit a second packet of information to a third multiserver platform via a second high speed communication link. In step **503**, the third multiserver platform may process the second packet and transmit a third packet of information to the second multiserver platform via the second high speed communication link. In step **504**, the second multiserver platform may process the third packet and transmit a fourth packet of information to the first multiserver platform via the first high speed communication link. In step **505**, the first multiserver platform may process the fourth packet and transmit a fifth packet of information over an external network via a third high speed communication link.

[**0051**] **FIG. 6** is a block diagram **600** illustrating an exemplary central switch configuration **602** for the multiserver platform of **FIG. 1**, in accordance with various aspects of the invention. The central switch configuration **602** may include a central switch, a switching element or a switch **603**, a multiserver platform #**1604**, a multiserver platform #**2605**, up to and including a multiserver platform #N **606**. The multiserver platform #**1604** may include a common switch blade or switch blade **607**. The multiserver platform #**2605** may include a switch blade **608** and the multiserver platform #N **606** may include a switch blade **609**.

[**0052**] The external network **601** may interface with the switch blade **607** of the multiserver platform #**1604** via a high speed communication link **610**. The multiserver platform #**1404** may be coupled to the central switch **603** via a high speed communication link **611**. The multiserver platform #**2605** may be coupled to the central switch **603** via the high speed link **612** and in a similar manner, the multiserver platform #N **606** may be coupled to the central switch **603** via the high speed communication link **613**. In this regard, the switch blade **607** of the multiserver platform #**1404** may interface with the central switch **603** via the high speed communication link **611**. The switch blade **608** of the multiserver platform #**2605** may connect with the central switch **603** via the high speed communication link **612**. In a similar manner, the switch blade **609** of the multiserver platform #N **606** may connect to the central switch **603** via the high speed communication link **613**.

[**0053**] In operation, the central switch may coordinate the high speed switching or routing of packets among the various multiserver platforms **604**, **605**, . . . , **606**. One advantage of the central switch configuration of **FIG. 6** over the daisy-chain configuration of **FIG. 3** is that, in the central switch configuration of **FIG. 6**, a packet may be transmitted from any given multiserver platform **604**, **605**, . . . , **606**, through the central switch **603**, to any other multiserver platform. In the daisy-chain configuration or arrangement, a packet of data may have to be passed through a plurality of intermediate multiserver platforms in order to be transferred to from a source platform to a destination platform.

[**0054**] The high speed communication links **610**, **611**, **612**, **613** may be bi-directional communication links. In accordance with an embodiment of the invention, the high speed communication links may be links of the order of 1-10 Gigabits per second. Notwithstanding, these links may be Ethernet links or fibre channel links. Also, in accordance with an embodiment of the invention, the switch blades **607**, **608**, **609** of the multiserver platforms **604**, **605**, **606** may have the capability to simultaneously communicate with the central switch **603** via the high speed communication links **611**, **612**, . . . , **613**. Similarly, the switch blade **607** may also have the capability to communicate with the external network **601** and the central switch **603** at the same time over the high speed communication links **610** and **611**. The data communication rate between any of the multiserver platforms **604**, **605**, . . . , **606** and the central switch **403** may be any standard or non-standard data rate, in accordance with various embodiments of the invention.

[**0055**] **FIG. 7** is a flowchart **700** illustrating exemplary steps for providing communication in the central switch configuration of **FIG. 6** in accordance with an embodiment of the invention. Referring to **FIG. 7**, in step **701**, a first multiserver platform may transmit a first packet of information to a central switch via a first high speed communication link. In step **702**, the central switch may transmit the first packet to a second multiserver platform via a second high speed communication link. In step **703**, the second multiserver platform may process the first packet and may transmit a second packet of information to the central switch via the second high speed communication link. In step **704**, the central switch may transmit the second packet to the first multiserver platform via the first high speed communication link. In step **705**, the first multiserver platform may process the second packet and may transmit a third packet of information over an external network via a third high speed communication link.

[**0056**] In accordance with various embodiments of the invention, the multiserver platforms may communicate data and/or control information among each other via one or more high speed communication links that may be coupled to the switch blades of the multiserver platforms and/or the central switch where present. The control information may include pertinent information related the multiserver platforms. For example, some control information may indicate the blade server associated with a particular multiserver platform from which a particular packet may have originated. Other exemplary information may include synchronization information, security information, and provisioning and security.

[**0057**] In accordance with another embodiment of the invention, any one or more of the multiserver platforms may each provide a plurality of server functions. Alternatively, each of the multiserver platforms may be dedicated to providing a different, specific server function. Notwithstanding, the configurations of **FIG. 3** and **FIG. 6** may provide blade server scalability by utilizing at least two multiserver platforms to increase server performance and/or system capacity, for example. In this regard, multiserver platforms may be added or removed to facilitate increased and decreased traffic, respectively.

[0058] Aspects of the invention provide a method and system for inter-platform blade server integration using a plurality of multiserver platforms. The configurations of **FIG. 3** and **FIG. 6**, for example, may provide blade server scalability using a plurality of multiserver platforms to increase server performance and/or system capacity. In this regard, by integrating a plurality of multiserver platforms, a larger virtual server platform is effectively created.

[0059] In particular, for example, aspects of the system for processing information in a server platform may include a first multiserver platform **303** (**FIG. 3**) having at least one network interface **309** and/or a first switch blade **306**. At least a second multiserver platform **304** comprising a second switch blade **307** may be coupled to the first switch blade **306** of the first multiserver platform **303**. A third multiserver platform **305** comprising a third switch blade **308** may be coupled to the second switch blade **304** of the second multiserver platform **307** and/or the first switch blade **306** of the first multiserver platform **303**. The first multiserver platform **303**, the second multiserver platform **304** and the third multiserver platform **305** may be coupled in a daisy-chain configuration. In this regard, the first multiserver platform **303** and the third multiserver platform **305** may communicate via the second multiserver platform **304**.

[0060] In another embodiment of the invention, for example, at least one central switch **603** (**FIG. 6**) may be coupled to the first switch blade **607** of the first multiserver platform **604** and the second switch blade **608** of the second multiserver platform **605**. At least a third switch blade **609** of a third multiserver platform **606** may also be coupled to the central switch **603**. The first multiserver platform **604**, second multiserver platform **605** and third multiserver platform **606** may communicate via the central switch **603**.

[0061] Accordingly, the present invention may be realized in hardware, software, or a combination of hardware and software. The present invention may be realized in a centralized fashion in one computer system, or in a distributed fashion where different elements are spread across several interconnected computer systems. Any kind of computer system or other apparatus adapted for carrying out the methods described herein is suited. A typical combination of hardware and software may be a general-purpose computer system with a computer program that, when being loaded and executed, controls the computer system such that it carries out the methods described herein.

[0062] The present invention may also be embedded in a computer program product, which comprises all the features enabling the implementation of the methods described herein, and which when loaded in a computer system is able to carry out these methods. Computer program in the present context means any expression, in any language, code or notation, of a set of instructions intended to cause a system having an information processing capability to perform a particular function either directly or after either or both of the following: a) conversion to another language, code or notation; b) reproduction in a different material form.

[0063] While the present invention has been described with reference to certain embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the present invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the present invention without departing from its scope. Therefore, it is intended that the present invention not be limited to the particular embodiment disclosed, but that the present invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A method for communicating information in a server platform, the method comprising:

receiving at least one packet from at least one of a first switch blade associated with a first multiserver platform;

determining at least a second server blade associated with a second multiserver platform for receiving at least a portion of said received at least one packet; and

routing at least a portion of said at least one received packet to at least said second server blade.

2. The method according to claim 1, wherein said receiving further comprises receiving said at least one packet by at least one of a third switch blade and a central switch.

3. The method according to claim 2, further comprising if said at least one packet is received by said central switch, communicating said at least a portion of said at least one received packet to at least said second switch blade via at least one communication link that couples said central switch directly to said at least said second switch blade.

4. The method according to claim 1, further comprising processing said routed at least a portion of said at least one received packet by said at least said second blade server.

5. A machine-readable storage having stored thereon, a computer program having at least one code section for communicating information in a server platform, the at least one code section being executable by a machine for causing the machine to perform steps comprising:

receiving at least one packet from at least one of a first switch blade associated with a first multiserver platform;

determining at least a second server blade associated with a second multiserver platform for receiving at least a portion of said received at least one packet; and

routing at least a portion of said at least one received packet to at least said second server blade.

6. The machine-readable storage according to claim 5, further comprising code for receiving said at least one packet by at least one of a third switch blade and a central switch.

7. The machine-readable storage according to claim 6, further comprising code for communicating said at least a portion of said at least one received packet to at least said second switch blade via at least one communication link that couples said central switch directly to said at least said second switch blade, if said at least one packet is received by said central switch.

8. The machine-readable storage according to claim 5, further comprising code for processing said routed at least a portion of said at least one received packet by said at least said second blade server.

9. A system for communicating information in a server platform, the system comprising:

a first multiserver platform comprising at least one of a network interface and a first switch blade; and

at least a second multiserver platform comprising a second switch blade coupled said first switch blade of said first multiserver platform.

10. The system according to claim 9, further comprising at least a third multiserver platform comprising a third switch blade coupled to at least one of said second switch blade of said second multiserver platform and said first switch blade of said first multiserver platform.

11. The system according to claim 10, wherein said first multiserver platform, said second multiserver platform and said third multiserver are coupled in a daisy-chain configuration.

12. The system according to claim 10, wherein said first multiserver platform, and said third multiserver platform communicate via said second multiserver platform.

13. The system according to claim 9, further comprising at least one central switch coupled to at least said first switch blade of said first multiserver platform and said second switch blade of said second multiserver platform.

14. The system according to claim 13, further comprising at least a third switch blade of a third multiserver platform coupled to said at least one central switch.

15. The system according to claim 14, wherein said first multiserver platform, said second multiserver platform and said third multiserver platform communicate via said central switch.

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