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(54) **METHOD AND SYSTEM FOR HANDLING TRAFFIC FOR SERVER SYSTEMS**

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(57) **ABSTRACT**

Aspects for processing data in a server may include receiving a packet and determining a function associated with the packet. A blade server handling the function associated with the packet may be determined and the packet may be steered to that blade server. At least one association may be generated or created between a particular characteristic of a packet and a particular function associated with that packet. At least one blade server may be assigned to handle the particular function associated with a packet. The particular characteristic of the packet may include, for example, a packet type, a field within the packet and/or a flag within a portion of the packet. Steered packets may be processed by one or more blade servers that may be adapted to handle the function associated with the packets. A switch blade may be utilized to control steering of the received packets.

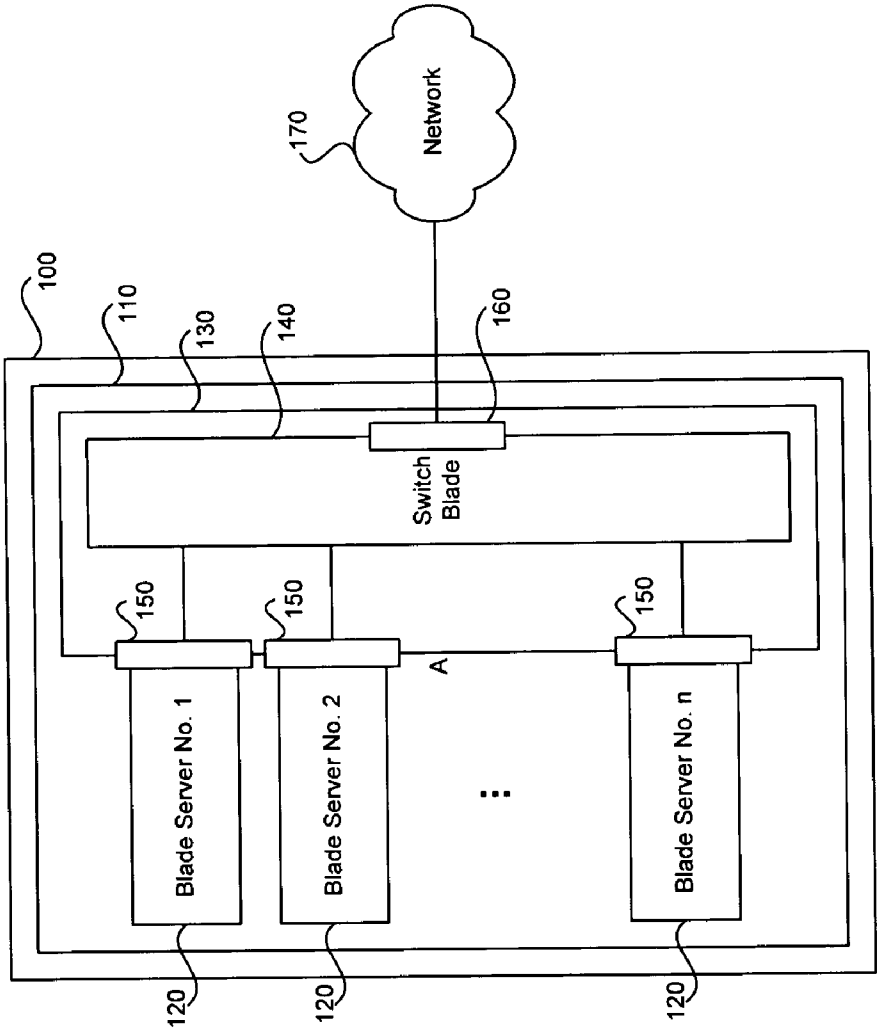
Network
170
100
110
130
140
160
Switch Blade
150
150
150
A
Blade Server No. 1
Blade Server No. 2
Blade Server No. n
120
120
120

FIG. 1

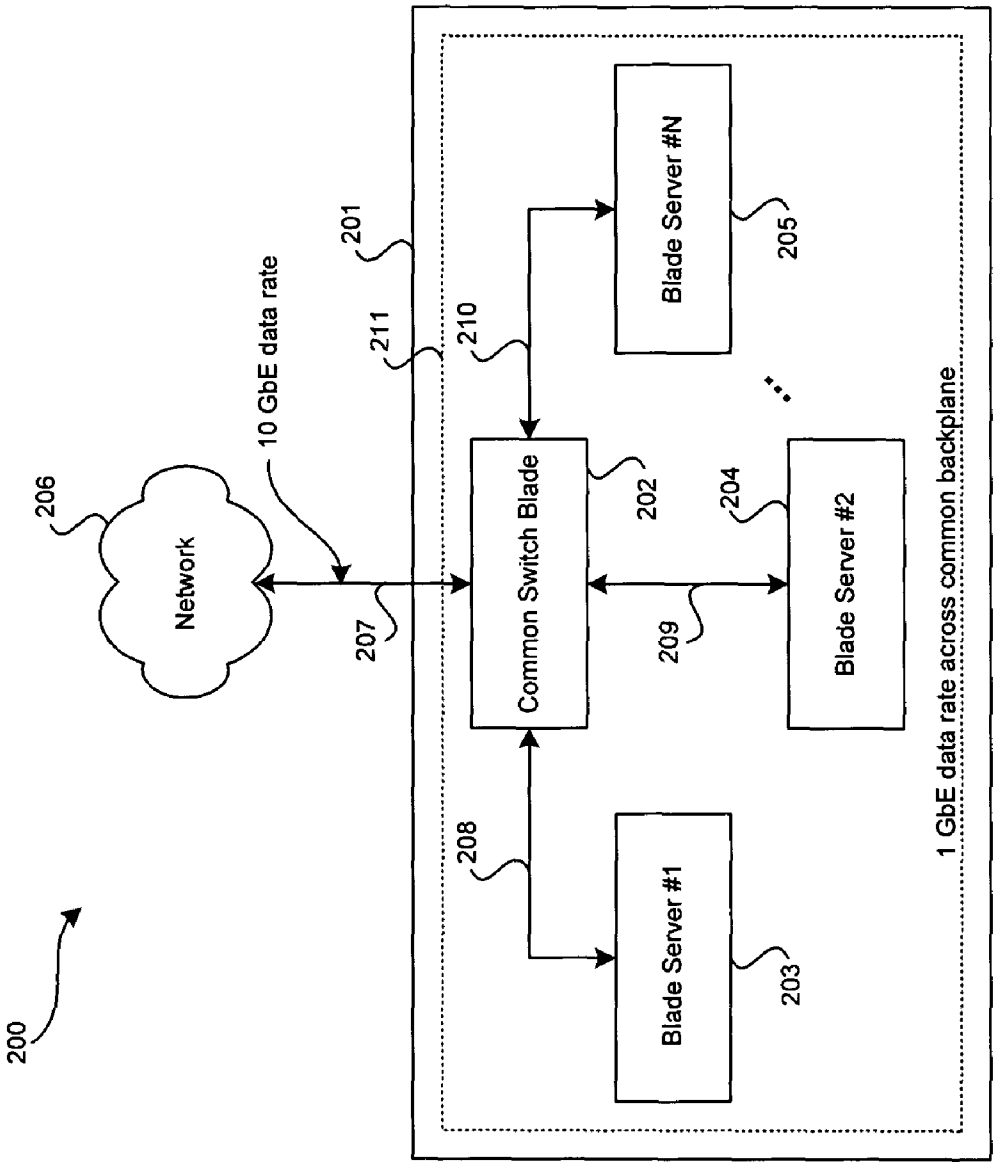
200
206
Network
10 GbE data rate
207
201
211
210
Common Switch Blade
202
Blade Server #N
205
204
Blade Server #2
209
208
Blade Server #1
203
1 GbE data rate across common backplane

FIG. 2

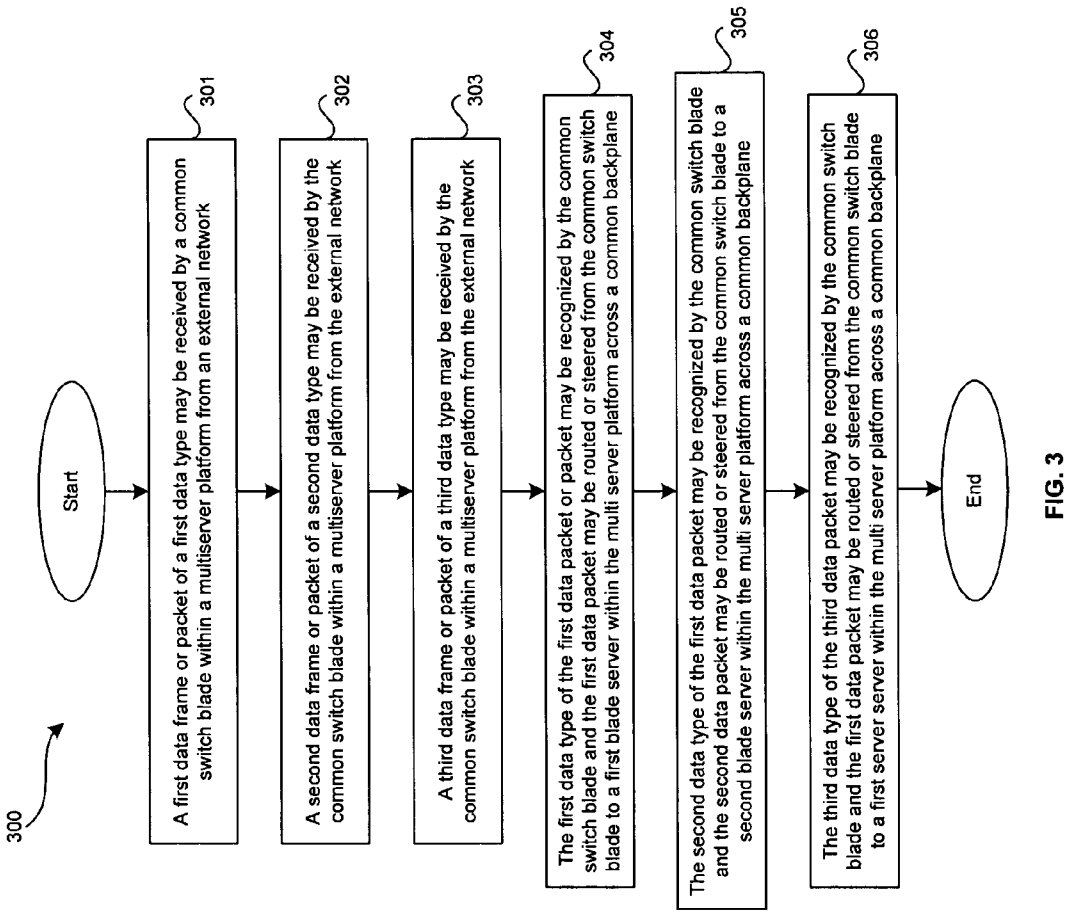
300
Start
A first data frame or packet of a first data type may be received by a common switch blade within a multiserver platform from an external network
301
A second data frame or packet of a second data type may be received by the common switch blade within a multiserver platform from the external network
302
A third data frame or packet of a third data type may be received by the common switch blade within a multiserver platform from the external network
303
The first data type of the first data packet or packet may be recognized by the common switch blade and the first data packet may be routed or steered from the common switch blade to a first blade server within the multi server platform across a common backplane
304
The second data type of the first data packet may be recognized by the common switch blade and the second data packet may be routed or steered from the common switch blade to a second blade server within the multi server platform across a common backplane
305
The third data type of the third data packet may be recognized by the common switch blade and the first data packet may be routed or steered from the common switch blade to a first server server within the multi server platform across a common backplane
306
End

FIG. 3

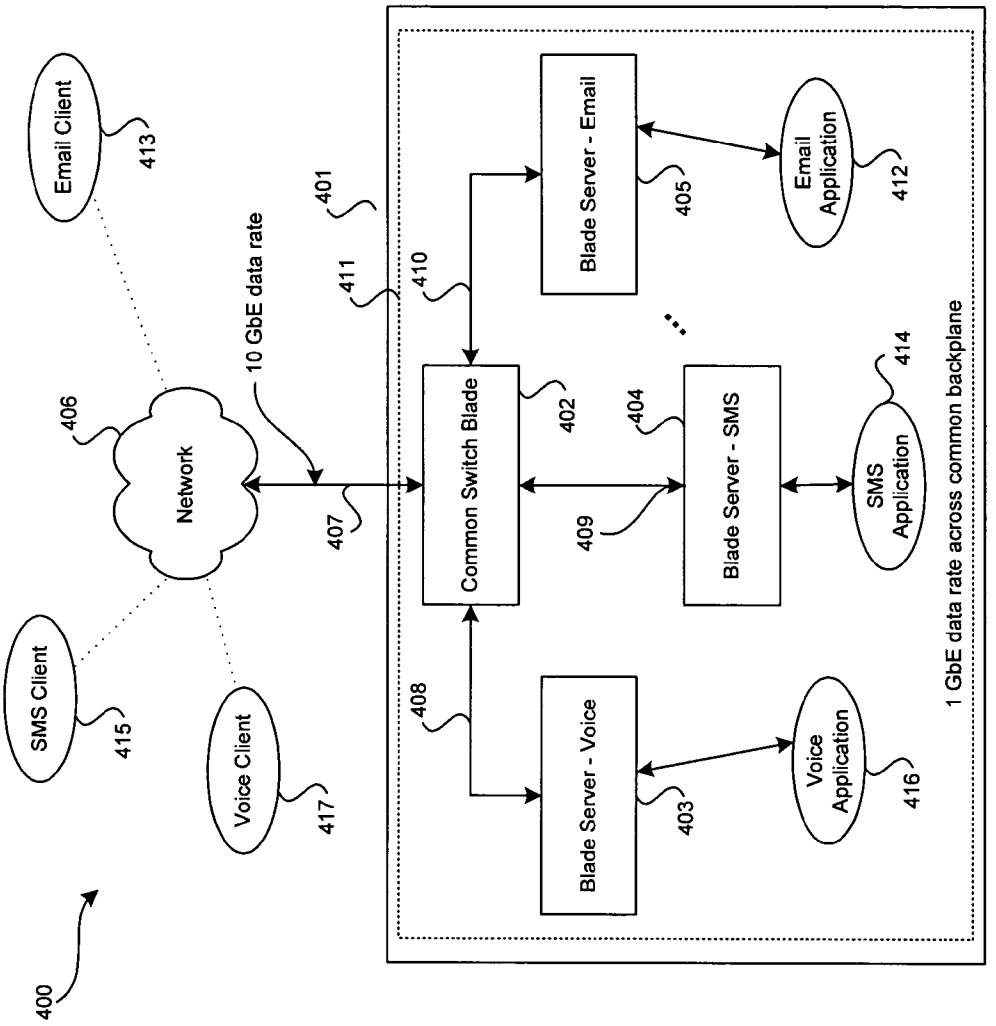
Email Client
413
401
10 GbE data rate
411
410
Blade Server - Email
405
Email Application
412
406
Network
Common Switch Blade
402
404
Blade Server - SMS
414
SMS Application
407
409
SMS Client
415
408
Blade Server - Voice
403
Voice Application
416
Voice Client
417
1 GbE data rate across common backplane
400

FIG. 4

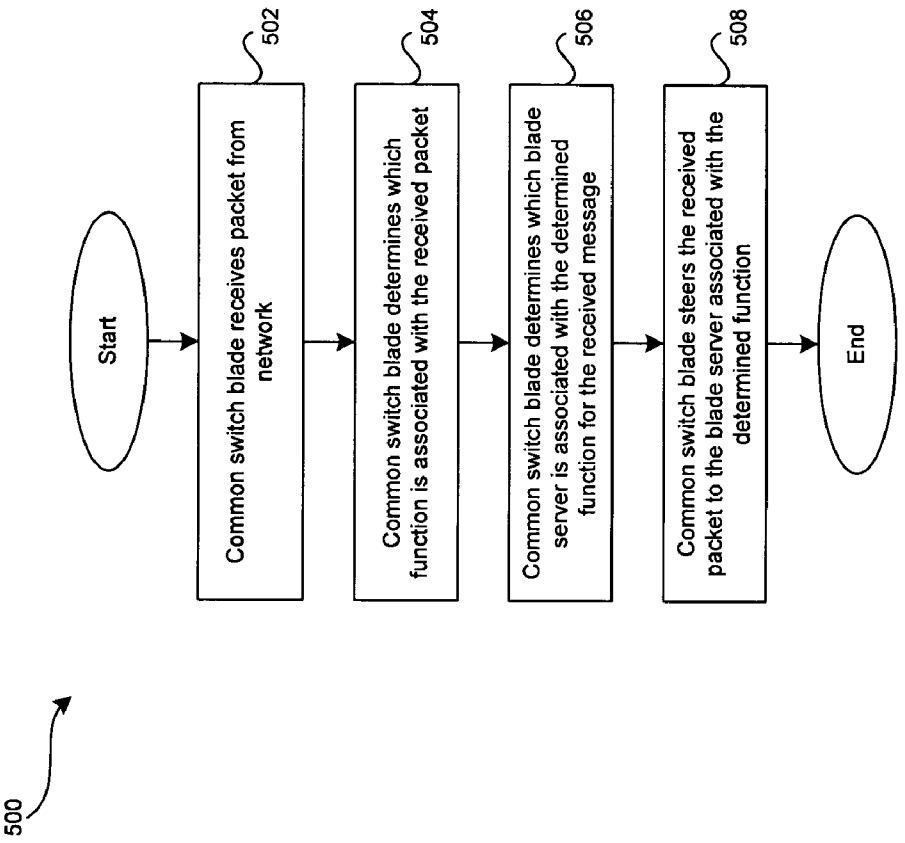
500
Start
Common switch blade receives packet from network
502
Common switch blade determines which function is associated with the received packet
504
Common switch blade determines which blade server is associated with the determined function for the received message
506
Common switch blade steers the received packet to the blade server associated with the determined function
508
End

FIG. 5

METHOD AND SYSTEM FOR HANDLING TRAFFIC FOR SERVER SYSTEMS

CROSS-REFERENCE TO RELATED APPLICATIONS/INCORPORATION BY REFERENCE

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

[0002] U.S. Provisional Patent Application Serial No. 60/448,656, entitled "A Method and System to Provide External Communication Using a Multi-Server Platform Having a Single Switch Backplane" and filed on Feb. 18, 2003;

[0003] 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;

[0004] 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; 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 data traffic steering. More specifically, certain embodiments of the invention relate to a method and system for selectively steering data traffic of various data types to functionally dedicated blade servers within a multi-server platform.

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 processing data in a server. Aspects of the method for processing data in a server may include receiving at least one packet and determining at least one function associated with the received packet. A determination regarding which one of the blade server handles the function associated with the received packet may be done. The received packet may be steered to at least one of a plurality of blade servers that handles the determined function associated with the received packet. The method may further include generating at least one association between a particular characteristic of a packet and a particular function associated with that packet. One or more of the blade servers may be assigned to handle the particular function associated with a packet. This may be done so that the packet may be identified when received. Notwithstanding, the particular characteristic may be a packet type, a field within the packet and/or a flag within a portion of the packet.

[0014] The method may also include processing the steered packet by one or more of the blade servers that handles the determined function. In accordance with an aspect of the invention, a default blade server may be assigned to handle one or more of the received packets. In this regard, at least one of the received packets may be steered to the default blade server if the received packet is unrecognized and/or if the received packet contains particular data. One or more of the blade servers may be configured to control steering of the received packet to at least one of the other blade servers. Accordingly, a switch blade may be utilized to control steering of the received packets.

[0015] Another embodiment of the invention may provide a machine-readable storage, having stored thereon, a computer program having at least one code section for process-

ing data in a server. The at least one code section may be executable by a machine, thereby causing the machine to perform the steps as described above for processing data in a server.

[0016] Aspects of the system for processing data in a server may include at least one of a plurality of blade servers that may receive at least one packet and determine at least one function associated with the received packet. The blade server may steer one or more received packets to at least one other blade server that handles the determined function. Any one or more of the blade servers may generate or create at least one association between a particular characteristic of a packet and a particular function associated with that packet. In this regard, the particular characteristic may be a packet type, a packet field and/or a flag within a portion of the packet. At least one of the blade servers may be utilized to assign one of the plurality of blade servers to handle the particular function.

[0017] Notwithstanding, at least one of the blade servers may be utilized to determine which one of the plurality of blade servers may be utilized to handle the function associated with the received packet. Once a determination has been made, the blade server may process the steered packet that it receives. One or more of the blade servers may be utilized to define a default blade server that may be utilized to handle a received packet. At least one of the blade servers may be utilized to steer one or more packets to the default blade server for processing. Steering a packet to a default blade server may occur if a packet is unrecognized or has no association and/or the packet has particular data contained within the packet. A switch blade may be utilized to control controlling steering of a least one packet to a blade server.

[0018] 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

[0019] **FIG. 1** is a block diagram of an embodiment of a multi-server platform in accordance with an embodiment of the present invention.

[0020] **FIG. 2** is a block diagram illustrating an embodiment of a communication system including a multi-server platform and an external network, in accordance with various aspects of the invention.

[0021] **FIG. 3** is a flowchart illustrating an embodiment of a method to selectively steer data traffic to service blades in the multi-server platform of **FIG. 2**, in accordance with various aspects of the invention.

[0022] **FIG. 4** is a block diagram illustrating an embodiment of a communication system including a multi-server platform and an external network, which may be utilized for data steering in accordance with various aspects of the invention

[0023] **FIG. 5** is a flowchart illustrating exemplary generic steps for steering traffic in accordance with and embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0024] Certain embodiments of the invention may include selective steering of data traffic of various data types to functionally dedicated blade servers. Certain embodiments of the invention provide a method and system for processing data in a server. Aspects of the method for processing data in a server may involve receiving a packet and determining a function associated with the received packet. The blade server handling the function associated with the received packet may be determined. Accordingly, the received packet may be steered to one or more of a plurality of blade servers that may handle the determined function associated with the received packet. At least one association may be generated or created between a particular characteristic of a packet and a particular function associated with that packet. At least one blade server may be assigned to handle the particular function associated with a packet. The particular characteristic of the packet may include, but is not limited to, a packet type, a field within the packet and/or a flag within a portion of the packet.

[0025] In accordance with an aspect of the invention, steered packets may be processed by at least one of the blade servers that may be adapted to handle the function associated with the packets. A default blade server may be assigned to handle one or more of the received packets and one or more received packets may be steered to the default blade server if the received packet is unrecognized and/or contains particular data. One or more of the blade servers may be configured to control steering of the received packet to at least one of the other blade servers. In this regard, a switch blade may be utilized to control steering of the received packets.

[0026] **FIG. 1** is a block diagram of an embodiment of a multi-server platform **100** in accordance with an embodiment of the present invention. The multi-server 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 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 multi-server platform **201** and an external network **206**, in accordance with various aspects of the invention. The multi-server 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 #1 **203**, a blade server #2 **204**, . . . , 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 #1 **203** and the common switch blade **202**. Common backplane **211** may also provide a common backplane interface **209** between blade server #2 **204** 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 bidirectional 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 #1 **203** may communicate in a bidirectional manner with the common switch-blade **202** via the common backplane interface **208**. The blade server #2 **204** may also communicate in a bidirectional 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] **FIG. 3** is a flowchart illustrating an embodiment of a method **300** to selectively steer data traffic to service blades in the multi-server platform **100** of **FIG. 2**, in accordance with various aspects of the invention. Referring to **FIG. 3**, in step **301**, a first data frame or packet of a first data type may be received by a common switch blade within a multi-server platform from an external network. In step **302**, a second data frame or packet of a second data type may be received by the common switch blade within a multi-server platform from an external network. In step **303**, a third data frame or packet of a third data type may be received by the common switch blade within a multi-server platform from an external network. In step **304**, the first data type of the first data frame may be recognized by the common switch-blade, and the first data frame may be steered from the common switch-blade to a first blade server within the multi-server platform across a common backplane. In step **305**, the second data type of the second data frame may be recognized by the common switch-blade, and the second data frame may be steered from the common switch-blade to a second blade server within the multi-server platform across the common backplane. In step **306**, the third data type of the third data frame may be recognized by the common switch-blade, and the third data frame may be steered from the common switch-blade to a third blade server within the multi-server platform across the common backplane.

[0039] In accordance with an embodiment of the present invention, each of the plurality of blade servers #1, #2, . . . , #N may be dedicated to providing a different, specific function within the multi-server platform **101**. For example, referring to **FIG. 2**, the common switch blade **202** may receive a data frame corresponding to an encrypted data type from the external network **206**. The common switch blade **202** may recognize the encrypted data type of the data frame and steer the data frame across the common backplane **211** to the blade server **203**, which is dedicated to decrypting data frames.

[0040] The common switch blade **202** may receive a data frame of a particular data type from a particular source on the external network **206**. The source of the data frame may be unfamiliar or unrecognizable by the common switch blade **202**. In this regard, the particular source associated with the received data frame may not be an authorized source for communication data on the external network. Accordingly, the common switch blade **202** may steer the data frame to the blade server **204**, which may be configured as a dedicated server for performing authentication and/or intrusion detection. The blade server **204** may process the received data frame and recognize that a hacker may be attempting an unauthorized access into the multi-server platform **101** via the external network **106**. In this regard, the intrusion may be thwarted and any appropriate sub-system and/or authority notified.

[0041] In another example, the common switch blade **202** may receive a data frame corresponding to a database application hosted on the multi-server platform **201**. The common switch blade may recognize that the data frame corresponds to the database application and may accordingly steer the data frame to the blade server **205**. The blade server **205** may have been configured to function as a database acceleration engine that may be utilized to decrease the load on other database servers within the multi-server platform **201**. In this regard, the blade server **205** may be configured to offload excess traffic from other database servers that may be coupled to the network.

[0042] Other blade servers in the multi-server platform may be dedicated to performing functions such as virus scanning, firewall applications, email applications, short message service (SMS), voice processing and printing, for example. In this regard, the method and system may provide selective steering of data traffic of various data types to functionally dedicated blade servers within a multi-server platform. A common switch-blade within a multi-server platform steers data frames to the appropriate blade servers within the multi-server platform across a common backplane. In one aspect of the invention, in order to provide redundancy, various functions may be duplicated on the blade servers throughout the multiserver platform.

[0043] **FIG. 4** is a block diagram illustrating an embodiment of a communication system **400** including a multi-server platform **401** and an external network **406**, which may be utilized for data steering in accordance with various aspects of the invention. The multi-server platform **401** may include a chassis having a common backplane **411**, a common switch blade **402** and a plurality of server blades **403**, **404**, **405**. The multiserver platform **401** may also include a voice application **416**, a voice client **417**, a short message server (SMS) application **414**, a short message server client **415**, an email application **412** and an email client **413**. The multiserver platform **401** is similar to the multiserver platform **201** of **FIG. 2**, except the former illustrates the voice application **416**, the voice client **417**, the short message service application **414**, the short message service client **415**, the email application **412** and the email client **413**.

[0044] The multi-server platform **401** may also include a chassis with a common backplane **411** that may also provide a common backplane interface between each blade server **403**, **404**, **405** and the common switch blade **402**. In this regard, the common backplane **411** may provide a common backplane interface **408** between blade server **403** and the common switch blade **402**. The common backplane **411** may also provide a common backplane interface **409** between blade server **404** and the common switch blade **402**. Finally, common backplane **411** may provide a common backplane interface **410** between blade server **405** and the common switch blade **402**. The common backplane interfaces **408**, **409**, **410** may be integrated into the backplane **411** or otherwise coupled to the common backplane **411**.

[0045] The voice application **416**, the short message service application **414** and the email application **412** may be software applications that may run on the multiserver platform **401**. Notwithstanding, the voice application **416** may have one or more components that may run in the blade server **403** and the short message service application **414** may have one or more components that may run on the blade server **404**. Finally, the email application **412**, may also have one or more components that may run on the blade server **405**. The voice client **417** may be an Internet protocol (IP) telephone, the SMS client **415** may be a hybrid telephone/PDA and the email client **413** may be a handheld computer, for example.

[0046] The blade server **403** may be adapted to handle voice processing, which may be processed by the voice application **416**. The blade server **404** may be adapted to handle short message service, which may be processed by the short message service application **414**. Finally, the blade server **405** may be adapted to handle email, which may be processed by the email application **412**.

[0047] In one aspect of the invention, the common switch blade **402** may include suitable software and/or hardware that may be utilized to determine what functions should service a particular type or kind of received message. Based on the function that may be associated with the received messages, the common switch blade may steer the message to an appropriate blade server offering a corresponding processing function. In one embodiment of the invention, one or more association tables may be created that contain entries that associate various types of messages to various types of functions and their corresponding processing entities. For example, the blade server **403** may be associated with the processing of voice messages. As an illustration, text-to-speech (TTS) processing and speech encoding and transcoding functions may be associated with blade server **403** and its associated voice application **416**. In another example, the blade server **404** and/or short message service application **414** may be associated with the processing of short message service messages. In this regard, any messages received by the common switch blade **402** relating to short message server functions may be steered to the blade server **404** and/or its corresponding short message service application **414**. Finally, the blade server **405** and/or email application **412** may be associated with the processing of email messages. As a result, received messages that may be associated with the email function may be steered to the blade server **405** for processing. The associations may be stored in a memory of the blade server as a lookup table. The lookup table may be updated anytime there are new associations or when associations have changed.

[0048] In an illustrative embodiment of the invention, an email message originating from the email client **413** may be steered to the common switch blade **402** via the network **406**

and an external interface **407**. The external interface **407** may be located between the common switch blade **402** and the external network **406**. Upon receipt of the email message by the common switch blade **402**, the common switch blade **402** may examine the received message and determine that it may be related to an email function based on, for example, a lookup table entry. Accordingly, the common switch blade **402** may steer the email message to the blade server **405** via the interface **410** where it made be processed by the blade server **405** and/or the email application **412**. On the other hand, an email message originating from the email application **412** and/or the blade server **405** may be communicated to the common switch blade **402** via the interface **410**. Upon receiving the email message from the blade server **405**, the common switch blade **402** may determine that the email is destined for the email client **413**. Accordingly, the common switch blade **402** may steer the email message to the email client **413** via the network **406**.

[**0049**] In a similar manner, a short message service message originating from the short message service client **415** may be steered to the common switch blade **402** via the network **406** and an external interface **407**. Upon receipt of the short message service message by the common switch blade **402**, the common switch blade **402** may examine the message and determine that it is associated with an email function. Accordingly, the common switch blade **402** may steer the short message service message to the blade server **404** via the interface **409** where it may be processed by the blade server **404** and/or the short message service application **414**. A voice message originating from the voice client **417** may be steered to the common switch blade **402** via the network **406** and an external interface **407**. Upon receipt of the voice message by the common switch blade **402**, the common switch blade **402** may examine the message and determine that it is associated with a voice function. Accordingly, the common switch blade **402** may steer the voice message to the blade server **403** via the interface **408** where it may be processed by the blade server **403** and/or the voice application **416**.

[**0050**] The integration of multiple blade servers into a multi-server platform **100** may provide an increased server density and easier management of the multiple servers since all the servers are situated in a single installation enclosure. Additionally, the integration of multiple blade servers may provide a more scalable system with greater reliability. With regard to scalability, more servers may be readily added, provisioned or commissioned to facilitate increased traffic and more servers may be readily removed to facilitate decreased traffic. The integration of multiple blade servers within a single enclosure may more readily facilitate the implantation of fault tolerance and redundancy. Accordingly, the redundancy may ultimately result in substantial reliability and significantly reduced downtime.

[**0051**] In accordance with another aspect of the invention, at least a portion of the blade servers **120** may include one or more of the characteristics as set forth below. The blade server **120** may be modular and self-contained, and may include, for example, a server on a card or a single-board computer (SBC). The blade server **120** may include for example, a computer disposed in an ultra-dense card or board. The ultra-dense card may include, but is not limited to, a central processing unit (CPU), a memory, a hard disk and networking components. The blade server **120** may be hot swappable, hot pluggable and/or adapted for plug-and-play capability. The chassis **110** may provide sharing among the blade servers **120** for one or more of the following: power supplies, cooling fans and access to the network **170** or storage.

[**0052**] **FIG. 5** is a flowchart illustrating exemplary generic steps for steering traffic in accordance with and embodiment of the present invention. In step **502**, the common switch blade of the multi-server platform receives a packet such as a data packet via the network **170**. In step **504**, common switch blade may determine which function is associated with the received message. In step **506**, the common switch blade may determine which blade server is associated with the determine function for the received message. In step **508**, the common switch blade steers the received packet to the blade server associated with the determined function.

[**0053**] With reference to step **504**, the switch blade may analyze the packet to determine one or more characteristics that may assist in determining to which of the blade server or blades **120** the packet may be transmitted. In one embodiment, the characteristic may be, for example, a particular field value in a frame of the packet. In another embodiment, the characteristic may be, for example, an enabled or disabled flag in a frame of the packet. In yet another embodiment, the characteristic may be, for example, a particular packet type. Notwithstanding, a particular data type may be processed by a particular blade server **120** and the message may be steered to one or more blade servers for processing.

[**0054**] In accordance with an aspect of the invention, at least a portion of the blade servers **120** may be dedicated to providing different, specific functions within the multi-server platform **100**. In one embodiment according to the present invention, if the switch blade **140** receives an encrypted data type from the network **170** and if the switch blade **140** recognizes that the data frame is an encrypted data type, then the switch blade **140** may steer the data frame to the particular blade server **120** that is dedicated to decrypting encrypted data frames. In another embodiment of the invention, if the switch blade **140** receives a packet associated with a database application hosted on the multi-server platform **100** and if the switch blade **140** recognizes the packet type, then the switch blade **140** may steer the packet to a blade server **120** that may be configured, for example, as a database acceleration engine, thereby decreasing the load on other database servers within the multi-server platform **100**. Other blade servers in the multi-server platform **100** may be dedicated to perform, for example, virus detection, firewall applications, mission-critical applications, e-mail applications, and printing, as well as other applications, operations and tasks.

[**0055**] Some embodiments of the invention may include alerting the switch blade **140** when a particular packet type is received or when a particular packet is received from a particular source. In this regard, the switch blade **140** may reject or refuse to steer packets from unknown, unfamiliar or unauthorized sources. Accordingly, some received packets may be processed by a default handler if no blade server has been specified to handle a function associated with the message. As a result, the switch blade **140** may steer the packets from unknown, unfamiliar or unauthorized sources to a particular blade server that is dedicated to performing intrusion detection or other types of threat assessment. For

example, the particular dedicated blade server may determine that an attack is in progress from an attacker or a hacker linked via the network **170**.

[**0056**] In light of the foregoing, aspects of the system for processing data in a server may include at least one of a plurality of blade servers that may receive at least one packet and determine at least one function associated with the received packet. The blade server may steer one or more of the packets that are received one or more other blade servers that may be adapted to handle the determined function. Any of the blade servers may be utilized to generate or create at least one association between a particular characteristic of a packet and a particular function associated with that packet. The particular characteristic may be a packet type, a packet field and/or a flag within a portion of the packet. Similarly, one or more blade servers may be utilized to assign a particular blade server to handle the particular function.

[**0057**] In another aspect of the invention, at least one of the blade servers may be utilized to determine which one of the plurality of blade servers may be utilized to handle the function associated with the received packet. Once a determination has been made, the blade server may process the steered packet that it receives. One or more of the blade servers may be utilized to define a default blade server that may be utilized to handle a received packet. At least one of the blade servers may be utilized to steer one or more packets to the default blade server for processing. Steering a packet to a default blade server may occur if a packet is unrecognized or has no association and/or the packet has particular data contained within the packet. A switch blade may be utilized to control controlling steering of a least one packet to a blade server.

[**0058**] 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.

[**0059**] 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.

[**0060**] 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 processing data in a server, the method comprising:

receiving at least one packet;

determining at least one function associated with said at least one received packet; and

steering said at least one received packet to at least one of a plurality of blade servers that handles said determined function.

2. The method according to claim 1, further comprising generating at least one association between a particular characteristic of said packet and a particular function associated with said at least one packet

3. The method according to claim 2, wherein said particular characteristic is at least one of a packet type, a packet field and a flag.

4. The method according to claim 2, further comprising assigning at least one of said plurality of blade servers for handling said particular function.

5. The method according to claim 1, further comprising determining which of said plurality of blade servers handles said determined at least one function associated with said at least one received packet.

6. The method according to claim 1, further comprising processing said steered at least one received packet by said at least one of a plurality of blade servers that handles said determined function.

7. The method according to claim 1, further comprising assigning a default blade server for handling said at least one received packet.

8. The method according to claim 7, further comprising steering said at least one packet to said default blade server if at least one of:

said at least one received packet is unrecognized; and

said at least one received packet contains a particular data.

9. The method according to claim 1, further comprising controlling steering of said at least one packet by at least one of said plurality of blade servers.

10. The method according to claim 9, wherein said at least one of said plurality of blade servers controlling said steering is a switch blade.

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

receiving at least one packet;

determining at least one function associated with said at least one received packet; and

steering said at least one received packet to at least one of a plurality of blade servers that handles said determined function.

12. The machine-readable storage according to claim 11, further comprising code for generating at least one associa-

tion between a particular characteristic of said packet and a particular function associated with said at least one packet

13. The machine-readable storage according to claim 12, wherein said particular characteristic is at least one of a packet type, packet field and a flag.

14. The machine-readable storage according to claim 12, further comprising code for assigning at least one of said plurality of blade servers for handling said particular function.

15. The machine-readable storage according to claim 11, further comprising code for determining which of said plurality of blade servers handles said determined at least one function associated with said at least one received packet.

16. The machine-readable storage according to claim 11, further comprising code for processing said steered at least one received packet by said at least one of a plurality of blade servers that handles said determined function.

17. The machine-readable storage according to claim 11, further comprising code for assigning a default blade server for handling said at least one received packet.

18. The machine-readable storage according to claim 17, further comprising code for steering said at least one packet to said default blade server if at least one of:

said at least one received packet is unrecognized; and

said at least one received packet contains a particular data.

19. The machine-readable storage according to claim 11, further comprising code for controlling steering of said at least one packet by at least one of said plurality of blade servers.

20. The machine-readable storage according to claim 19, wherein said at least one of said plurality of blade servers controlling said steering is a switch blade.

21. A system for processing data in a server, the system comprising:

at least one blade server that receives at least one packet;

said at least one blade server determines at least one function associated with said at least one received packet; and

said at least one blade server steers said at least one received packet to at least one of a plurality of other blade servers that handles said determined function.

22. The system according to claim 21, wherein said at least one blade server and at least one of said plurality of other blade servers generates at least one association between a particular characteristic of said packet and a particular function associated with said at least one packet

23. The system according to claim 22, wherein said particular characteristic is at least one of a packet type, a packet field, and a flag.

24. The method according to claim 22, wherein said at least one blade server and said at least one of said plurality of other blade servers assigns at least one of said plurality of blade servers to handle said particular function.

25. The system according to claim 21, wherein said at least one blade server determines which of said plurality of other blade servers handles said determined at least one function associated with said at least one received packet.

26. The system according to claim 21, wherein said at least one of said plurality of other blade servers that handles said determined function processes said steered at least one received packet.

27. The system according to claim 21, wherein said at least one blade server and at least one of said plurality of other blade servers assigns a default blade server for handling said at least one received packet.

28. The system according to claim 27, wherein said at least one blade server and at least one of said plurality of other blade servers steers said at least one packet to said default blade server if at least one of:

said at least one received packet is unrecognized; and

said at least one received packet contains a particular data.

29. The system according to claim 21, further comprising controlling steering of said at least one packet by said at least blade server.

30. The system according to claim 29, wherein said at least blade server that controls said steering is a switch blade.

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