UTILITY PATENT APPLICATION TRANSMITTAL (New Nonprovisional Application Under 37 CFR § 1.53(b))	Attorney Docket No. 60010-0020

13328 U.S. PTO 122204
113014 U.S. PTO 11/022599 122204

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith is the patent application of ( ) application identifier or (X) first named inventor, Vishnu Natchu, entitled MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK, for a(n):

(X) Original Patent Application.

( ) Continuing Application (prior application not abandoned):
- ( ) Continuation ( ) Divisional ( ) Continuation-in-part (CIP) of prior application No: _____ Filed on: _____.
- ( ) A statement claiming priority under 35 USC § 120 has been added to the specification.

Enclosed are:
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- (X) Oath or Declaration: 2 Pages
  - (X) A Newly Executed Combined Declaration and Power of Attorney:
    - **(X) Signed.** ( ) Unsigned. ( ) Partially Signed.
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    - ( ) Incorporation by Reference. The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied, is considered as being part of the disclosure of the accompanying application and is hereby incorporated herein by reference in its entirety for all purposes.
    - ( ) Signed Statement Deleting Inventor(s) Named in the Prior Application. (37 CFR § 163(d)(2)).
- ( ) Power of Attorney.
- ( ) Associate Power of Attorney.
- ( ) Preliminary Amendment.
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Independent Claims	4	1	$200.00	$200.00
Multiple Dependent Claims (if applicable)				$0.00
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Respectfully submitted,

By: _____
Bobby K. Truong, Reg. No. 37, 499

Date: December 22, 2004

Correspondence Address:

29989

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Date of Deposit: December 22, 2004

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TOTAL AMOUNT OF PAYMENT	($) 2,240.00

Complete if Known	
Application Number	NYA
Filing Date	December 22, 2004
First Named Inventor	Vishnu Natchu
Examiner Name	NYA
Group/Art Unit	NYA
Attorney Docket No.	60010-0020

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1011	300	2011	150	Utility filing fee	300.00
1111	500	2111	250	Utility Search fee	500.00
1311	200	2311	100	Utility Examination fee	200.00
1081	250	2081	125	Utility Application Size Fee	
1005	200	2005	100	Provisional Application Fee	
1085	250	20835	125	Provisional Application Size Fee	
				SUBTOTAL (1)	($) 1000.00

2. EXTRA CLAIM FEES

	Highest Paid Claims		Extra Claims		Fee from Below		Fee Paid
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Independent Claims	4	- 3**=	1	X	200.00	=	200.00
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1202	50	2202	25	Claims in excess of 20
1201	200	2201	100	Independent claims in excess of 3
1203	360	2203	180	Multiple dependent claim, if not paid
1204	200	2204	100	**Reissue independent claims over original patent
1205	50	2205	25	**Reissue claims in excess of 20 and over original patent
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FEE CALCULATION (continued)

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1464	130	1464	130	Petitions Director not specifically provided for Group III	
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8021	40	8021	40	Recording each patent assignment per property (times number of properties)	40.00
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				Other fee (specify)	
				Other fee (specify)	

*Reduced by Basic Filing Fee Paid SUBTOTAL (3) ($) 40.00

SUBMITTED BY

Name (Print/Type)	Bobby K. Truong	Registration No. (Attorney/Agent)	37,499	Telephone	(408) 414-1080
Signature				Date	December 22, 2004

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60010-0020 *Patent*

UNITED STATES PATENT APPLICATION

FOR

MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

INVENTOR(S):

VISHNU NATCHU

PREPARED BY:
HICKMAN PALERMO TRUONG & BECKER, LLP
1600 WILLOW STREET
SAN JOSE, CALIFORNIA 95125-5106
(408) 414-1080

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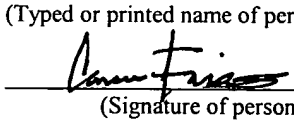
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MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

Inventor(s): Vishnu Natchu

Background

[0001] With the advent of file sharing applications such as KaZaA, Gnutella, BearShare, and Winny, the amount of peer-to-peer (P2P) traffic on the Internet has grown immensely in recent years. In fact, it has been estimated that P2P traffic now represents about 50-70 percent of the total traffic on the Internet. This is so despite the fact that the number of P2P users is quite small compared to the number of non P2P users. Thus, it appears that most of the bandwidth on the Internet is being consumed by just a minority of the users. For this and other reasons, P2P traffic is viewed by ISP's (Internet service providers) and others as being abusive/misbehaving traffic that should be controlled and penalized.

[0002] In order to control P2P traffic, however, it first needs to be identified. Earlier generations of P2P protocols used fixed TCP port numbers for their transmissions. For example, FastTrack used TCP port 1214. This made P2P traffic easy to identify. Current P2P protocols, however, no longer have to use fixed port numbers. Rather, they can be configured to use random dynamic port numbers so that P2P traffic can now be masqueraded as other types of traffic, such as HTTP web browsing and unspecified TCP traffic. As a result, the current P2P protocols have rendered the port-based identification techniques ineffective.

Cloudflare - Exhibit 1002, page 6

[0003] Another technique that has been used to identify P2P traffic involves the use of signatures. Specifically, it was observed that some P2P protocols inserted distinct information into their data packets. Using this distinct information as a signature, it was possible to identify packets that were assembled using those P2P protocols. This technique has several problems. First, it usually is effective for only a relatively short period of time. As the P2P protocols evolve and mutate (which they do on a fairly constant basis), their signatures change. Once that happens, the previous signatures are no longer valid, and the technique will have to be changed to recognize the new signatures. Another and more serious problem is that the P2P protocols are now evolving to the point that they either leave no signature or they obfuscate their signatures (e.g. by encryption). This makes it extremely difficult if not impossible to identify P2P traffic using signatures.

[0004] Overall, P2P protocols have gotten quite sophisticated, and the more sophisticated they become, the more difficult it is to identify P2P traffic. Unless P2P traffic can be identified, it cannot be effectively controlled.

Summary

[0005] In accordance with one embodiment of the present invention, there is provided a mechanism for effectively identifying and penalizing misbehaving information packet flows in a network. This mechanism may be applied to any type of network traffic including, but certainly not limited to, P2P traffic. In one embodiment, misbehaving flows are identified based upon their observed behavior. Unlike the prior approaches, they are not identified based upon ancillary factors, such as port numbers and signatures.

Cloudflare - Exhibit 1002, page 7

Because misbehaving flows are identified based upon their observed behavior, and because their behavior cannot be hidden, misbehaving flows cannot avoid detection. Thus, regardless of which protocols they use, or how those protocols try to hide/obfuscate their nature, misbehaving flows can be identified. Once identified/detected, they can be controlled and/or penalized.

[0006] In one embodiment, a flow is processed as follows. One or more information packets belonging to the flow are received and processed. As the information packets are processed, a set of behavioral statistics are maintained for the flow. These behavioral statistics reflect the empirical behavior of the flow. In one embodiment, the behavioral statistics include a total byte count (sum of all of the bytes in all of the packets of the flow that have been processed up to the current time), a life duration (how long the flow has been in existence since inception), a flow rate (derived by dividing the total byte count by the life duration of the flow), and an average packet size (derived by dividing the total byte count by the total number of packets in the flow that have been processed). These behavioral statistics are updated as information packets belonging to the flow are processed; thus, they provide an up to date reflection of the flow's behavior.

[0007] Based at least partially upon the behavioral statistics, a determination is made as to whether the flow is exhibiting undesirable behavior. In one embodiment, this determination may be made by computing a badness factor for the flow. This badness factor is computed based, at least partially, upon the behavioral statistics, and this badness factor provides an indication as to whether the flow is exhibiting undesirable behavior. In one embodiment, the badness factor also provides an indication of the degree to which the flow is misbehaving.

Cloudflare - Exhibit 1002, page 8

[0008] If the flow is exhibiting undesirable behavior, then a penalty may be enforced on the flow. In one embodiment, the penalty to be enforced is determined based, at least partially, upon the badness factor. This penalty may be an increased drop rate. When enforced on the flow, this increased drop rate causes the information packets belonging to the flow to have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior. Thus, more packets may be dropped from the flow than from other non-misbehaving flows. In one embodiment, this penalty is enforced on the flow only if a congestion condition is encountered. Thus, if there is no congestion, the flow (even if it is exhibiting undesirable behavior) is not penalized.

[0009] In one embodiment, enforcing the penalty on the flow has the effect of correcting the flow's behavior. That is, enforcing the penalty causes the badness factor of the flow to improve (e.g. decrease). As a result, by application of the penalty, a currently misbehaving flow can be turned into a non-misbehaving flow in the future. Once the flow is no longer misbehaving, it is no longer subject to penalty. In this manner, a misbehaving flow can be identified, penalized, and even rehabilitated in accordance with one embodiment of the present invention.

Brief Description of the Drawings

[0010] Fig. 1 shows an overview of a network in which one embodiment of the present invention may be implemented.

[0011] Fig. 2 is a block diagram of a router in which one embodiment of the present invention may be implemented.

Cloudflare - Exhibit 1002, page 9

[0012] Fig. 3 is an operational flow diagram showing the operation of a misbehaving flow manager (MFM) in accordance with one embodiment of the present invention.

[0013] Fig. 4 is a diagram of a sample flow block in accordance with one embodiment of the present invention.

[0014] Fig. 5 shows one possible function for computing a badness factor for a flow in accordance with one embodiment of the present invention.

Detailed Description of Embodiment(s)

Network Overview

[0015] With reference to Fig. 1, there is shown an overview of a network 100 in which one embodiment of the present invention may be implemented. As shown, the network 100 comprises a plurality of routers 102 interconnected to each other by trunks or links in such a way that each router 102 has multiple possible paths to every other router 102. For example, information from router 102a may reach router 102d by going through routers 102b and 102c, or routers 102e and 102f, and information from router 102c may reach router 102a by going through router 102b or router 102e. Interconnecting the routers 102 in this way provides flexibility in determining how information from one router 102 is delivered to another, and makes it possible to route around any failures that might arise. For the sake of simplicity, only a few routers 102 are shown in Fig. 1; however, it should be noted that network 100 may be much more complex if so desired, comprising more routers 102, more connections between the routers 102, and other components.

Cloudflare - Exhibit 1002, page 10

[0016] In addition to being coupled to each other, each router 102 may further be coupled to various machines (not shown), such as clients and servers, from which information originates and to which information is destined. By going through the routers 102, each of these machines may send information to any of the other machines in the network 100.

[0017] Information is conveyed from one router 102 to another via a physical link or trunk. Depending on the type of network, this link or trunk may be an optical medium (e.g. an optical fiber), a coaxial cable, or some other type of medium. For purposes of the present invention, network 100 may use any type of transport medium.

Router Overview

[0018] Fig. 2 shows a block diagram of a sample router 102 that may be used to implement one or more of the routers 102 in network 100. As shown in Fig. 2, the router 102 comprises a plurality of line cards 202 for coupling the router 102 to one or more of the other routers 102 in the network 100. For example, assuming that the router 102 in Fig. 2 is router 102b in network 100, line card 202d may couple router 102b to router 102f, line card 202c may couple router 102b to router 102c, line card 202b may couple router 102b to router 102e, and line card 202a may couple router 102b to router 102a. Overall, the line cards 202 act as the router's 102 interfaces to the rest of the network 100. In one embodiment, the trunks coupled to the line cards 202 are bi-directional; thus, each line card 202 may receive information from another router, or send information to another router. Put another way, each line card 202 is capable of acting as an ingress line card (to receive information from another router) or an egress line card (to send

Cloudflare - Exhibit 1002, page 11

information to another router). Whether a particular line card 202 is acting as an ingress or an egress line card at any particular time depends upon the flow of network traffic.

[0019] To couple the line cards 202 to each other within the router 102, there is provided an internal switching fabric 204. In one embodiment, the switching fabric 204 comprises a plurality of interconnected fabric cards 206. Basically, the switching fabric 204 provides a mechanism for coupling any line card 202 to any other line card 202 within the router 102 so that information can be transported from any ingress line card 202 to any egress line card 202. By transporting information from an ingress line card 202 to an egress line card 202, the switching fabric 204 routes information through the router 102 and sends it on its way to the next hop (i.e. the next router). Information is thus received and routed by the router 102.

[0020] To increase the flexibility of the router 102 and to facilitate the process of failure recovery, each line card 202, in one embodiment, has multiple connections to the switching fabric 204. In addition, the switching fabric 204 provides multiple routes for connecting each line card connection to every other line card connection. With such a setup, each line card 202 has multiple routes to every other line card 202 in the router 102. For example, one possible route from line card 202d to line card 202a may pass through fabric card 206c, while another route may pass through fabric card 206b. By providing multiple routes between the various line cards 202, the switching fabric 204 makes it possible to route around any internal failures that may arise.

[0021] In addition to the line cards 202 and the switching fabric 204, the router 102 further comprises an application processor 208. In one embodiment, the application processor 208 determines the forwarding paths, and hence, the egress line cards, that can

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be used to forward information to any particular destination address. Put another way, given a destination address, the application processor 208 determines which line card 202 or line cards are most suitable to act as the egress line card to forward information to that destination address. For example, suppose that the router 102 in Fig. 2 is router 102b in network 100, and that the destination is a machine coupled to router 102d. Suppose further that line card 202c is coupled to router 102c and line card 202d is coupled to router 102f. In such a case, because the most direct routes to router 102d are through either router 102c or 102f, the most suitable egress line cards for forwarding information to the destination router 102d are probably line cards 202c and 202d. Accordingly, the application processor 208 designates these line cards 202c, 202d as potential egress line cards for destination router 102d, with one being designated as the primary egress line card and the other being the alternate.

[0022] Once the egress line card determinations are made by the application processor 208 for each destination address, they are communicated to each of the line cards 202 in the router 102. In turn, each line card 202 stores the information into a forwarding table residing on the line card 202. Thereafter, when a line card 202 acts as an ingress line card and receives a set of information, it can use the forwarding table to determine the appropriate egress line card 202 to which to forward the information. Because the egress line card information is predetermined and stored in the forwarding table, the ingress line card simply has to perform a table lookup to determine the proper egress line card. No on-the-fly calculation needs to be performed. Since table lookup operations can be carried out very quickly, the process of determining the proper egress line card requires relatively little time.

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Information Routing

[0023] In one embodiment, information is routed from router to router, and from line card 202 to line card 202, in the form of information packets. Each packet represents a set of information that is sent by a source to a destination. To enable it to be properly routed, a packet typically comprises a header portion. The header portion contains information that is used by the line cards 202 to determine the next hop for the packet. Depending upon the routing protocol used, the information contained in the header portion may differ. In one embodiment, the header portion comprises the following sets of information: (1) a source address (i.e. the network address of the entity sending the packet); (2) a source port number; (3) a destination address (i.e. the network address of the entity that is to receive the packet); (4) a destination port number; and (5) an indication of the routing protocol that is to be used. These sets of information may be referred to as the "five tuple". Using this header information, an ingress line card 202 can determine to which egress line card 202 the packet should be routed.

[0024] In addition to the header portion, a packet also comprises a payload. The payload comprises the actual data that the source is trying to send to the destination. In addition to the actual data, the payload may also include other information, such as information inserted by other protocols (e.g. P2P protocols). This additional information may be needed by the destination to properly process the packet.

[0025] In one embodiment, one or more packets may be grouped into a flow. For purposes of the present invention, a flow is a series of packets that are related in some manner. In one embodiment, packets are grouped into a flow if they share a sufficient

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amount of header information. More specifically, in one embodiment, packets belong to the same flow if they have the five tuple in common. Thus, if two or more packets have the same source address, the same source port number, the same destination address, the same destination port number, and the same protocol, they are grouped into the same flow. Usually, barring some failure that requires rerouting, all of the packets belonging to a flow are received by the same ingress line card 202 and forwarded to the same egress line card 202. By grouping packets into flows, it is possible to aggregate individual packets in a meaningful way to enable a higher level understanding of the traffic flowing through the router 102 to be derived.

[0026] The flows that pass through a router 102 may represent many different types of traffic. For example, the flows may contain web browsing traffic, TCP traffic, P2P traffic, etc. As noted previously, some traffic is more abusive/misbehaving than others. P2P traffic, for example, is often considered to be abusive. Other types of traffic may also be considered abusive. To make the best use of available resources, and to best control the traffic that passes through the router 102, it is desirable for the router 102 to be able to identify abusive/misbehaving traffic, and to penalize and even rehabilitate that traffic. In one embodiment, the line cards 202 of router 102 have been enhanced to give the router 102 such capability. More specifically, the line cards 202 have been adapted to include a misbehaving flow manager (MFM) 210 for keeping track of flows, determining whether the flows are exhibiting undesirable behavior, and enforcing a penalty on the flows if they are exhibiting undesirable behavior.

[0027] For purposes of the present invention, the MFM 210 of the line cards 202 may be implemented in any desired manner. For example, the functionality of the MFM 210

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may be realized by having one or more processors on a line card 202 execute one or more sets of instructions. Alternatively, the MFM 210 may be implemented using hardwired logic components (e.g. in the form of one or more ASIC's on a line card 202). These and other implementations are within the scope of the present invention.

Functional Overview of MFM on Line Card

[0028] With reference to Figs. 2 and 3, a functional overview of the operation of an MFM 210 in accordance with one embodiment of the present invention will now be described. In the following discussion, it will be assumed that the MFM 210 is on a line card 202 that is acting as an egress line card (i.e. the line card is receiving packets from an ingress line card and sending packets out to another router). However, it should be noted that the MFM 210 on a line card may process flows in the same manner even when the line card 202 is acting as an ingress line card (i.e. the line card is receiving packets from another router and sending them to an egress line card).

[0029] Initially, an MFM 210 receives and processes one or more packets belonging to a flow. Processing a packet may, but does not necessarily, involve forwarding the packet to another router. As the packets of a flow are processed, a set of behavioral statistics are maintained (block 302 of Fig. 3) for the flow. These behavioral statistics reflect the empirical behavior of the flow. In one embodiment, the behavioral statistics include a total byte count (sum of all of the bytes in all of the packets of the flow that have been processed up to the current time), a life duration (how long the flow has been in existence since inception), a flow rate (derived by dividing the total byte count by the life duration of the flow), and an average packet size (derived by dividing the total byte

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count by the total number of packets in the flow that have been processed). These behavioral statistics are stored by the line card 202 in a flow block associated with the flow, and are updated as information packets belonging to the flow are processed; thus, these behavioral statistics provide an up to date reflection of the flow's behavior.

[0030] Based upon the behavioral statistics, the MFM 210 determines (block 304) whether the flow is exhibiting undesirable behavior. In one embodiment, this determination is made by computing a badness factor for the flow. This badness factor is computed based upon the behavioral statistics of the flow, and provides an indication as to whether the flow is exhibiting undesirable behavior. In one embodiment, the badness factor also provides an indication of the degree to which the flow is misbehaving.

[0031] If the flow is exhibiting undesirable behavior, then the MFM 210 enforces (block 306) a penalty on the flow. In one embodiment, the penalty to be enforced is determined based upon the badness factor. This penalty may be an increased drop rate. When enforced on the flow, this increased drop rate causes the information packets belonging to the flow to have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior. Thus, more packets may be dropped from the flow than from other non-misbehaving flows. In one embodiment, the MFM 210 enforces this penalty on the flow only if a congestion condition is encountered. If there is no congestion, the flow (even if it is exhibiting undesirable behavior) is not penalized.

[0032] In one embodiment, enforcing the penalty on the flow has the effect of correcting the flow's behavior. That is, enforcing the penalty causes the badness factor of the flow to improve (e.g. decrease). As a result, by application of the penalty, a currently

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misbehaving flow can be turned into a non-misbehaving flow in the future. Once the flow is no longer misbehaving, it is no longer subject to penalty. In this manner, an MFM 210 on a line card 202 can identify, penalize, and even rehabilitate a misbehaving flow.

Sample Operation

[0033] The above discussion provides a high level overview of the operation of an MFM 210. To facilitate a complete understanding of the invention, a specific sample operation of an MFM 210 in accordance with one embodiment of the present invention will now be described. In the following discussion, it will be assumed that line card 202d of Fig. 2 is acting as an egress line card, and that line card 202b is acting as an ingress line card, which is sending packets to the egress line card 202d. The following discussion describes the operation of the MFM 210d on the egress line card 202d.

[0034] Initially, MFM 210d receives a packet from the ingress line card 202b. In processing this packet, the MFM 210d determines whether the packet belongs to an existing flow. In one embodiment, the MFM 210d makes this determination by processing the five tuple contained in the header portion of the packet (e.g. using a hashing function) to derive a flow ID. The MFM 210d then determines whether this flow ID is associated with a flow block that is already stored (e.g. in a memory, not shown) on the egress line card 202d. If so, then the packet is part of an existing flow. If not, then the packet is the first packet of a new flow.

[0035] In the present example, it will be assumed that the packet is the first packet of a new flow. In such a case, the MFM 210d creates a new flow block for the new flow. A

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sample flow block 402 in accordance with one embodiment of the present invention is shown in Fig. 4. As shown, the flow block 402 comprises the flow ID (derived by processing the five tuple), and a set of behavioral statistics. The behavioral statistics include a total (T) byte count (sum of all of the bytes in all of the packets of the flow that have been processed up to the current time), a life duration (L) (how long the flow has been in existence since inception), a flow rate (R) (derived by dividing T by L), a number (N) of packets processed up to the current time, an average (A) packet size (derived by dividing T by N), a badness factor (B), and a timestamp of when the flow block 402 was created. The behavioral statistics may include other sets of information as well. In addition to the above information, the flow block 402 may also include any other information pertinent to the flow. In one embodiment, when the flow block 402 is initially created, the timestamp value is updated with the current time, and the badness factor is set to a default value of 1. The other behavioral statistics are set to 0. The flow block 402 is then stored on the egress line card 202d for future reference.

[0036] After creating the flow block 402, the MFM 210d determines whether to forward the packet to the router to which the egress line card 202d is coupled. If the link is currently experiencing congestion, the packet may be dropped. In the current example, it will be assumed that the link is not congested; hence, the MFM 210d forwards the packet to the external router. After doing so, the MFM 210d updates the behavioral statistics to reflect the packet that was just forwarded. More specifically, the MFM 210d updates T to include the forwarded packet's byte count, updates L by computing the difference between the current time and the timestamp, updates R by dividing the updated

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T by the updated L, updates N to include the forwarded packet, and updates A by dividing the updated T by the updated N.

[0037] In addition, the MFM 210d also computes a badness factor for the flow. For purposes of the present invention, the badness factor may be computed using any desired methodology based upon any desired criteria. In one possible specific embodiment, the badness factor is computed in accordance with the function shown in Fig. 5, which takes the minimum of six possible values. One possible value is 16, which represents the maximum possible badness factor for any flow. Another possible value is 1, which is the default badness factor for a flow. Other possible values are the quotient of $T/T_{threshold}$, the quotient of $L/L_{threshold}$, the quotient of $R/R_{threshold}$, and the quotient of $(A-A_{threshold})/(MTU-A_{threshold})$. For purposes of this function, the constants $T_{threshold}$, $L_{threshold}$, $R_{threshold}$, MTU, and $A_{threshold}$ are assigned by an administrator of the router 102. These values can be adjusted to tune the MFM 210d for optimal performance.

[0038] The quotients $T/T_{threshold}$, $L/L_{threshold}$, $R/R_{threshold}$, and $(A-A_{threshold})/(MTU-A_{threshold})$ represent the total byte count component, the duration component, the rate component, and the average packet size component, respectively, of the function. These components are included in the function because it has been found that they provide a measure of whether a flow is misbehaving. For example, it has been found that P2P traffic flows generally have high byte counts, relatively long life, relatively high rates, and relatively large average packet sizes. These characteristics are also found in other types of abusive/misbehaving flows. Thus, these components are manifestations of misbehavior. By taking these components into account in the computation of the badness factor, it is possible to derive a badness factor that provides an indication of whether a

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flow is misbehaving. In one embodiment, a badness factor value larger than 1 indicates a misbehaving flow. In addition to providing an indication of whether a flow is misbehaving, the badness factor also provides an indication of the degree to which the flow is misbehaving. Thus, a flow with a badness factor of 1.8 is misbehaving to a greater degree than a flow with a badness factor of 1.2.

[0039] The function shown in Fig. 5 is just one possible way of computing the badness factor. The function may be changed, augmented, or even replaced. For example, the administrator of the router 102 may configure the MFM 210d to not take one or more of the components into account. For example, the administrator may determine that the duration component is not very indicative of a misbehaving flow, and hence, may configure the MFM 210d to ignore this component. In such a case, the MFM 210d will not use this component in computing the badness factor. Also, a different and even more sophisticated function, one that comprises one or more logical expressions, for example, may be used to compute the badness factor. These and other functions may be implemented. In addition, components other than and/or in addition to those components shown in Fig. 5 may be taken into account in computing the badness factor. Overall, for purposes of the present invention, the badness factor may be computed in any desired way, using any desired methodology and any desired criteria.

[0040] After the MFM 210d computes the badness factor, it stores the badness factor into the flow block 402. The behavioral characteristics of the flow are thus updated to reflect the packet that was just forwarded. The MFM 210d is now ready to process another packet. The next time the MFM 210d receives a packet belonging to the same flow, it will recognize that the packet is part of an existing flow; thus, it will not create a

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new flow block. Instead, it will access the existing flow bock 402 and use and/or update the information contained therein. In the current example, it will be assumed that the MFM 210d receives many more packets belonging to the flow, and forwards and processes them in the manner described above. Thus, the behavioral statistics are repeatedly updated to give rise to a set of relatively mature statistics (which include a relatively mature badness factor) for the flow. In one embodiment, the MFM 210d takes the badness factor of a flow into account only when a congestion condition is encountered (e.g. the outgoing link is experiencing congestion). If there is no such congestion, the MFM 210d will not enforce a penalty on the flow, regardless of the flow's badness value.

[0041] Suppose now that the MFM 210d receives another packet belonging to the flow, but that this time, the egress line card 202d is experiencing a congestion condition on the outgoing link. In such a case, the MFM 210d may wish to enforce a penalty on the flow, and the packet may need to be dropped. To determine whether to enforce a penalty on the flow, the MFM 210d accesses the badness factor stored in the flow block 402 associated with the flow. If the badness factor is less than or equal to a threshold value (which in the current example is 1), then no penalty will be enforced on the flow. Hence, the packet will be subject to the non-misbehaving flow drop rate, which in one embodiment is .1 (which means that the packet has a 10% chance of being dropped). However, if the badness factor is greater than the threshold value, then the MFM 210d will impose a penalty on the flow. In one embodiment, this penalty takes the form of an increased drop rate. This increased drop rate causes the packet to be subjected to a higher

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probability of being dropped than packets belonging to flows that are either not misbehaving or are less misbehaving.

[0042] In one embodiment, the magnitude of the increased drop rate is determined based upon the value of the badness factor. For purposes of the present invention, any formula/function may be used to determine the increased drop rate. In one embodiment, the increase drop rate rises rapidly relative to the badness factor. Thus, by the time the badness factor reaches 2, the increased drop rate is already .5 (which means that the packet has a 50% probability of being dropped). By the time the badness factor is 3, the increased drop rate is .7, and by the time the badness factor is 5, the increased drop rate is over .8. This rapid increase in drop rate serves to penalize misbehaving flows early before they become too serious a problem. Of course, slower rising drop rates may be used if so desired.

[0043] After the drop rate is determined (whether it is the default drop rate or an increased drop rate), it is enforced by the MFM 210d. More specifically, the MFM 210d applies the appropriate probability in determining whether to drop the packet. If, after applying the appropriate drop rate, the packet is not dropped, then the line card 202d forwards the packet to the external router. After that is done, the MFM 210d updates the behavioral statistics of the flow in the manner described above to reflect the forwarded packet.

[0044] On the other hand, if the MFM 210d decides to drop the packet, then the egress line card 202d will not forward the packet to the external router. In such a case, the MFM 210d will update the behavioral statistics, but it will do so in a slightly different manner than that described above. Specifically, since the packet was not forwarded, the

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total byte count T, the number of packets N, and the average packet size A do not change; hence, these values will not be updated. However, the life duration L of the flow (derived by taking the difference between the current time and the timestamp) has changed; thus, it will be updated. Since the rate R depends on L, it will also be updated. In addition, the badness factor will be recomputed. In this manner, the behavioral statistics are updated even when a packet is dropped.

[0045] An interesting point to note in the above drop situation is that while the total byte count T has not changed, the life duration L has increased. Since the rate R is derived by dividing T by L, this means that the rate R has decreased as a result of dropping the packet. Since R has decreased, the quotient $R/R_{threshold}$ has also decreased. Because the quotient $R/R_{threshold}$ is one of the components used to determine the badness factor, this decrease could lead to a decrease in the badness factor. Thus, by dropping a packet, the badness factor may be improved (e.g. decreased). As noted above, the penalty imposed on a misbehaving flow is an increased drop rate. By making it more likely that a packet from the misbehaving flow will be dropped, which in turn will cause more packets from the flow to be dropped, the MFM 210d can cause the badness factor of the flow to improve. Thus, the imposition of a penalty on a misbehaving flow has the effect of improving the behavior of the flow. In this manner, not only does the MFM 210d detect and penalize misbehaving flows, it can also rehabilitate them.

[0046] In the example discussed above, a penalty is enforced on a misbehaving flow only when a congestion condition is encountered. As an alternative, a penalty may be enforced on a misbehaving flow even when there is no congestion. That is, any time a flow has a badness factor that indicates undesirable flow behavior, the MFM 210d can

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impose an increased drop rate on the flow, and can enforce that drop rate on packets of the flow, regardless of whether there is congestion. That way, the MFM 210d can manage and control abusive/misbehaving traffic even in the absence of any traffic congestion. This and other modifications and enhancements are within the scope of the present invention.

[0047] At this point, it should be noted that although the invention has been described with reference to one or more specific embodiments, it should not be construed to be so limited. Various modifications may be made by those of ordinary skill in the art with the benefit of this disclosure without departing from the spirit of the invention. Thus, the invention should not be limited by the specific embodiments used to illustrate it but only by the scope of the issued claims and the equivalents thereof.

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What is claimed is:

1. A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed;

determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow.

2. The method of claim 1, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

3. The method of claim 1, wherein enforcing the penalty comprises:

imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

4. The method of claim 1, wherein the penalty is enforced when a congestion condition is encountered.

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5. A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed; and

computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

6. The method of claim 5, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

7. The method of claim 6, further comprising:

determining, based at least partially upon the badness factor, a penalty to impose on the flow.

8. The method of claim 7, further comprising:

enforcing the penalty on the flow.

9. The method of claim 8, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

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10. The method of claim 8, wherein the penalty is enforced on the flow when a congestion condition is encountered.

11. The method of claim 8, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

12. The method of claim 8, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

13. The method of claim 8, wherein determining the penalty comprises:

determining an increased drop rate to impose on one or more information packets belonging to the flow.

14. The method of claim 13, wherein enforcing the penalty comprises:

imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

15. The method of claim 5, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

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16. The method of claim 5, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

17. The method of claim 16, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

18. The method of claim 5, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

19. The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow;

determining whether to forward the particular information packet to a destination; and

in response to a determination to forward the particular information packet to the destination, updating the set of behavioral statistics to reflect processing of the particular information packet.

20. The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow; and

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updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

21. A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed;

means for determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

means for enforcing, in response to a determination that the flow is exhibiting undesirable behavior, a penalty on the flow.

22. The MFM of claim 21, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

23. The MFM of claim 21, wherein the means for enforcing the penalty comprises:

means for imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

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24. The MFM of claim 21, wherein the penalty is enforced when a congestion condition is encountered.

25. A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed; and

means for computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

26. The MFM of claim 25, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

27. The MFM of claim 26, further comprising:

means for determining, based at least partially upon the badness factor, a penalty to impose on the flow.

28. The MFM of claim 27, further comprising:

means for enforcing the penalty on the flow.

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29. The MFM of claim 28, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

30. The MFM of claim 28, wherein the penalty is enforced on the flow when a congestion condition is encountered.

31. The MFM of claim 28, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

32. The MFM of claim 28, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

33. The MFM of claim 28, wherein the means for determining the penalty comprises:

means for determining an increased drop rate to impose on one or more information packets belonging to the flow.

34. The MFM of claim 33, wherein the means for enforcing the penalty comprises:

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means for imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

35. The MFM of claim 25, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

36. The MFM of claim 25, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

37. The MFM of claim 36, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

38. The MFM of claim 25, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

39. The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow;

means for determining whether to forward the particular information packet to a destination; and

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means for updating, in response to a determination to forward the particular information packet to the destination, the set of behavioral statistics to reflect processing of the particular information packet.

40. The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow; and

means for updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

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ABSTRACT OF THE DISCLOSURE

A mechanism is disclosed for identifying and penalizing misbehaving flows in a network. In one implementation, a set of behavioral statistics are maintained for each flow. These behavioral statistics are updated as information packets belonging to a flow are processed. Based upon these behavioral statistics, a determination is made as to whether a flow is exhibiting undesirable behavior. If so, a penalty is imposed on the flow. In one implementation, this penalty causes packets belonging to the flow to have a higher probability of being dropped than packets belonging to other flows that do not exhibit undesirable behavior. In one implementation, in addition to penalizing the flow, this penalty also has the effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior after the penalty than before. By correcting the flow's behavior, the penalty makes it possible for the flow to become a non-misbehaving flow.

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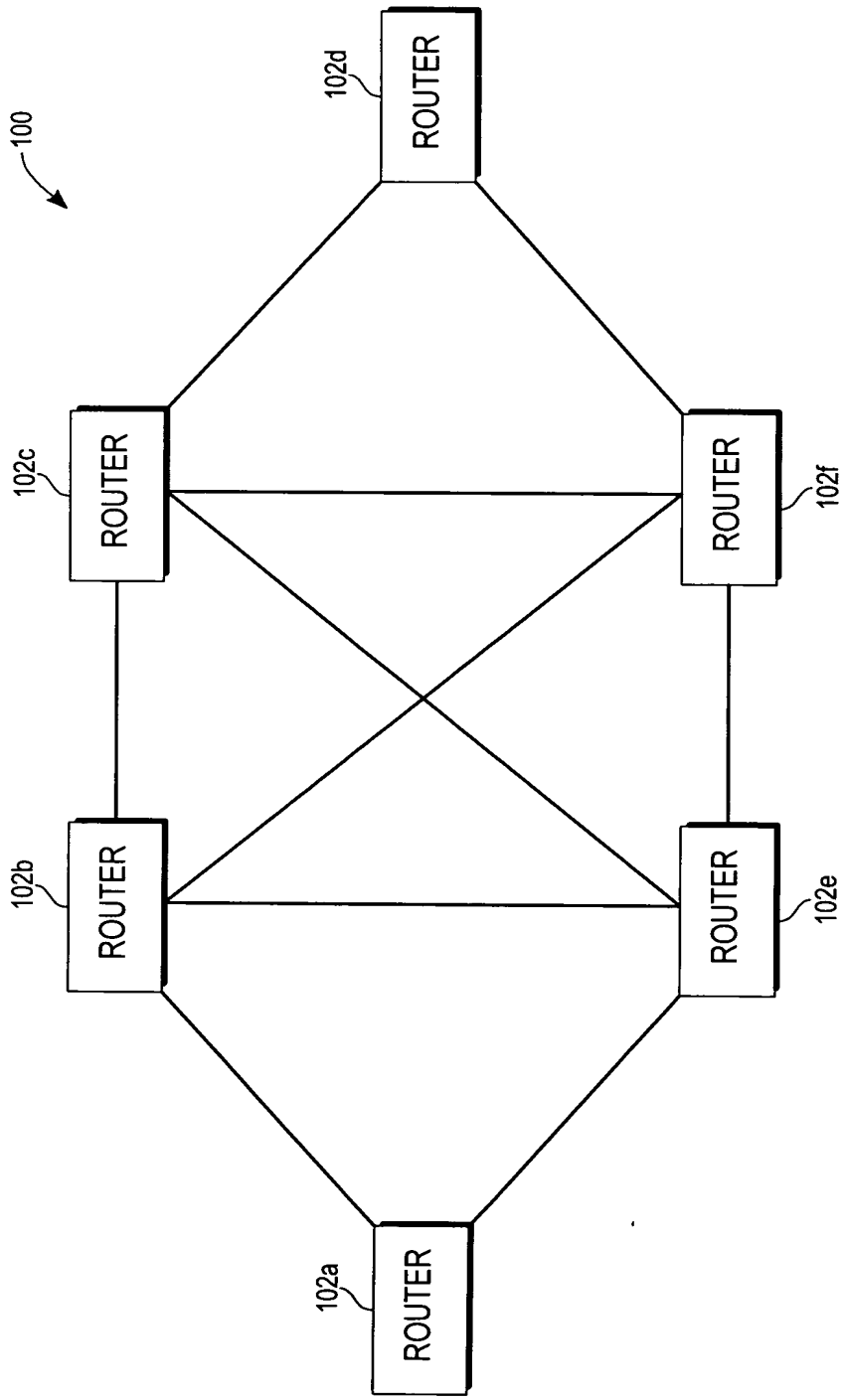
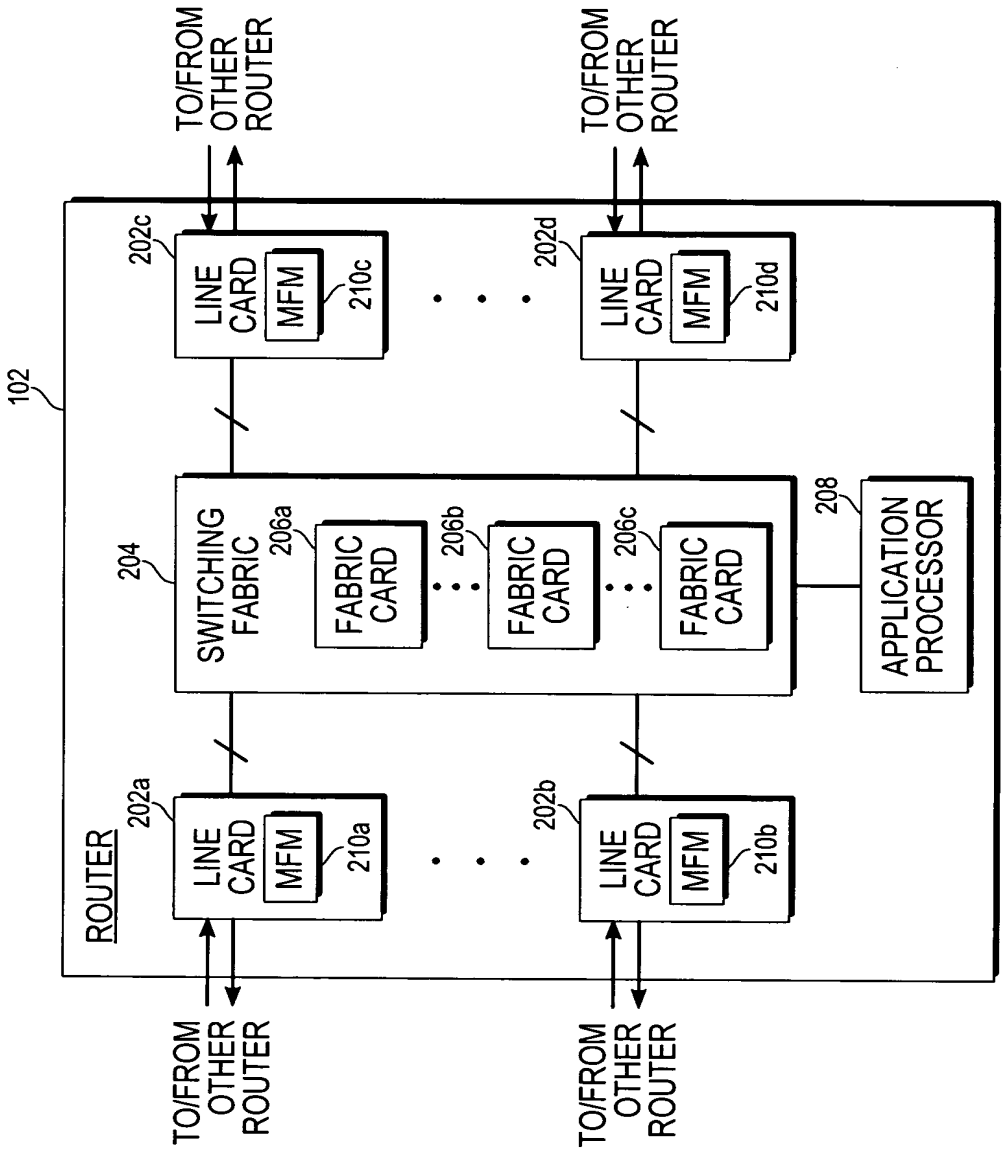

100
102d
ROUTER
102c
ROUTER
102f
ROUTER
102b
ROUTER
102e
ROUTER
102a
ROUTER

Fig. 1


TO/FROM OTHER ROUTER
TO/FROM OTHER ROUTER
202c
LINE CARD
MFM
210c
202d
LINE CARD
MFM
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102
204
SWITCHING FABRIC
206a
FABRIC CARD
206b
FABRIC CARD
206c
FABRIC CARD
208
APPLICATION PROCESSOR
ROUTER
202a
LINE CARD
MFM
210a
202b
LINE CARD
MFM
210b
TO/FROM OTHER ROUTER
TO/FROM OTHER ROUTER

Fig. 2

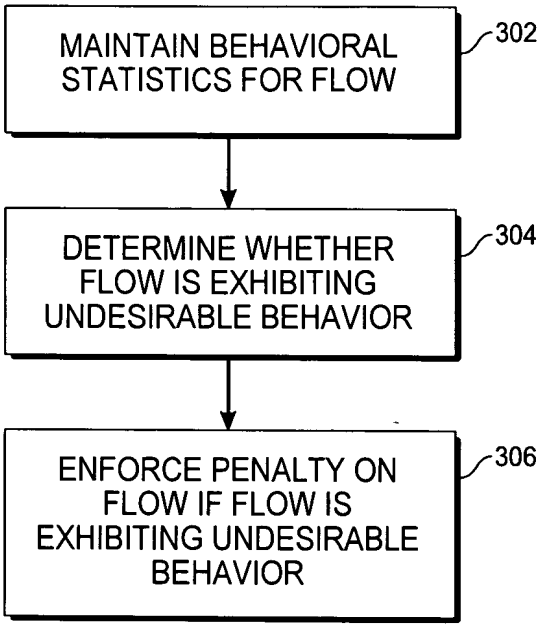
MAINTAIN BEHAVIORAL STATISTICS FOR FLOW
302
DETERMINE WHETHER FLOW IS EXHIBITING UNDESIRABLE BEHAVIOR
304
ENFORCE PENALTY ON FLOW IF FLOW IS EXHIBITING UNDESIRABLE BEHAVIOR
306

Fig. 3

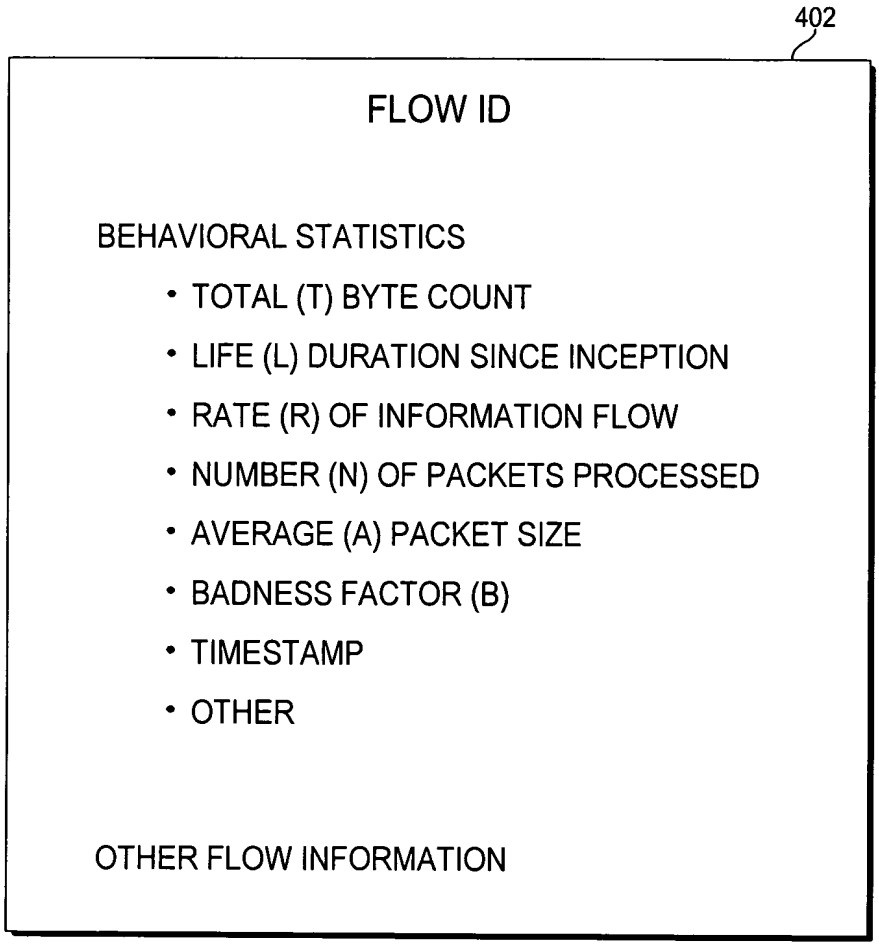
402
FLOW ID
BEHAVIORAL STATISTICS
• TOTAL (T) BYTE COUNT
• LIFE (L) DURATION SINCE INCEPTION
• RATE (R) OF INFORMATION FLOW
• NUMBER (N) OF PACKETS PROCESSED
• AVERAGE (A) PACKET SIZE
• BADNESS FACTOR (B)
• TIMESTAMP
• OTHER
OTHER FLOW INFORMATION

Fig. 4

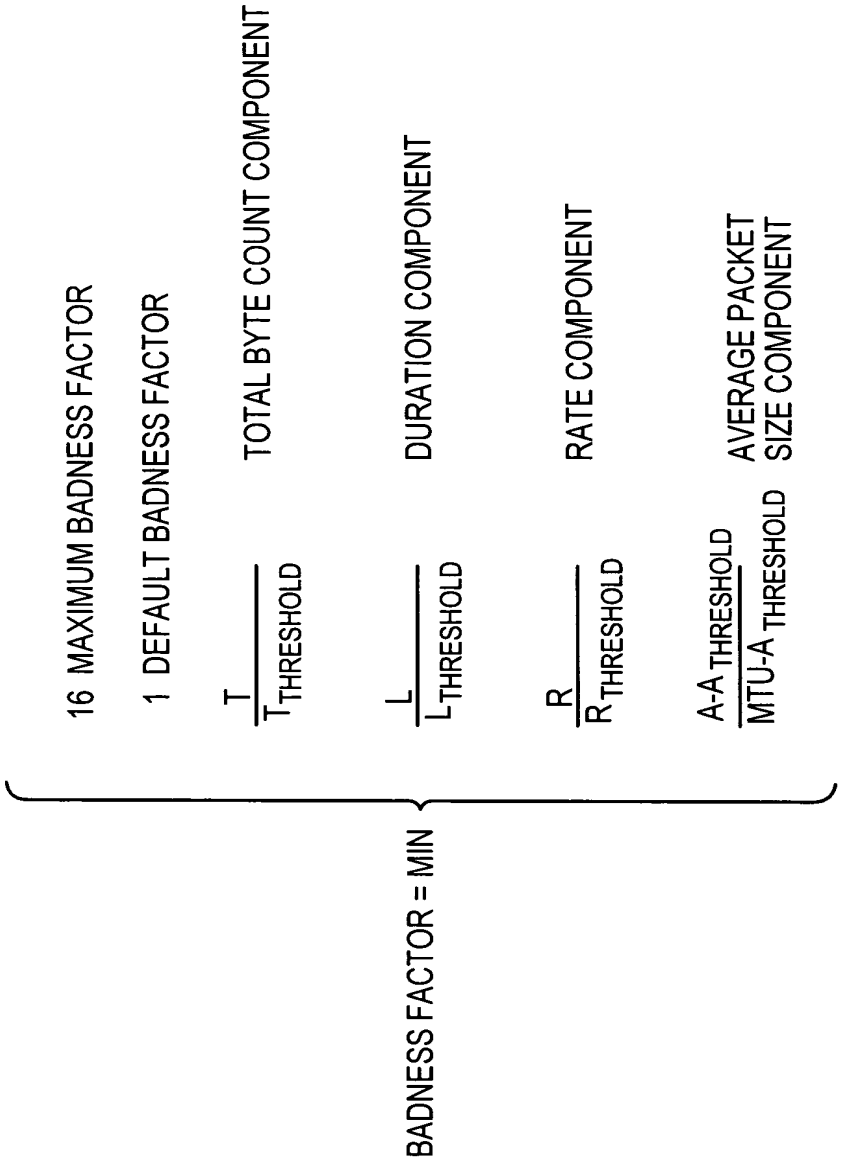
BADNESS FACTOR = MIN
16 MAXIMUM BADNESS FACTOR
1 DEFAULT BADNESS FACTOR
T / T THRESHOLD
TOTAL BYTE COUNT COMPONENT
L / L THRESHOLD
DURATION COMPONENT
R / R THRESHOLD
RATE COMPONENT
A-A THRESHOLD / MTU-A THRESHOLD
AVERAGE PACKET SIZE COMPONENT

Fig. 5

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Docket No.: 60010-0020

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor of the subject matter claimed and for which a patent is sought on the MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK, the specification of which

☒ is attached hereto.
☐ was filed on _____ as Application Serial No. _____and was amended on (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known to me to be material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Applications(s):

Number	Country	Day/Month/Year filed	**Priority Claimed**
			☐
			☐

I hereby claim the benefit under 35 USC §119(e) of any United States provisional application(s) listed below.

Prior Provisional Application(s): Filing Date:

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U.S. Application(s):

Serial No.	Filing Date	Status: Patented, Pending, Abandoned

EV564758070US
Cloudflare - Exhibit 1002, page 41

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the practitioners associated with Customer Number **29989**, practitioners of HICKMAN PALERMO TRUONG & BECKER, LLP, as attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all future correspondence should be addressed to them.

Full name of sole or first inventor: VISHNU NATCHU			
Inventor's signature: V. Natchu		Date: 16 Dec 2004	
Residence: City: Santa Clara		State: CA	Country
Citizenship: India			
Mailing Address: 2831 Malabar Avenue #1			
Mailing Address: City: Santa Clara	State: CA	Zip: 95051	Country

Cloudflare - Exhibit 1002, page 42

PATENT APPLICATION FEE DETERMINATION RECORD

Effective December 8, 2004

11022599

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	40	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	40 minus 20=	* 20
INDEPENDENT CLAIMS	4 minus 3 =	* 1
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	150.00	OR	BASIC FEE	300.00
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL		OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 25=		OR	X$50=	
X100=		OR	X200=	
+180=		OR	+360=	

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

01/03/2005 KBETEMA1 00000020 11022599

02 FC:1011	300.00	OP
03 FC:1111	500.00	OP
04 FC:1311	200.00	OP
05 FC:1201	200.00	OP
06 FC:1202	1000.00	OP

PTO-1556
(5/87)

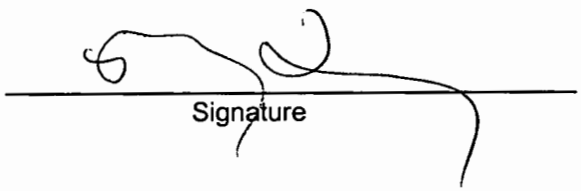
*U.S. Government Printing Office: 2002 — 489-267/69033

PTO/SB/35 (11-00)
Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST AND CERTIFICATION UNDER 35 U.S.C. 122(b)(2)(B)(i)		
	First Named Inventor	Vishnu Natchu
	Title	MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK
	Atty. Docket Number	60010-0020

I hereby certify that the invention disclosed in the attached application **has not and will not be** the subject of an application filed in another country, or under a multilateral agreement, that requires publication at eighteen months after filing. I hereby request that the attached application not be published under 35 U.S.C. 122(b).

December 22, 2004
Date


Signature

Bobby K. Truong (Reg. No. 37,499)
Typed or printed name

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing.**

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

Burden Hour Statement: This collection of information is required by37 CFR 1.213(a). The information is used by the public to request that an application not be published under 35 U.S.C. 122(b) (and the PTO to process that request). Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This form is estimated to take 6 minutes to complete. This time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

OIPE IAP46
JAN 10 2006
PATENT & TRADEMARK OFFICE

RESCISSION OF PREVIOUS NONPUBLICATION REQUEST
(35 U.S.C. 122(b)(2)(B)(ii)) AND, IF APPLICABLE, NOTICE OF FOREIGN FILING
(35 U.S.C. 122(b)(2)(B)(iii))

Send completed form to:
Mail Stop PG Pub
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
FAX: (703) 305-8568

Application Number	11/022,599
Filing Date	December 22, 2004
First Named Inventor	Vishnu Natchu
Title	Mechanism for Identifying and Penalizing Misbehaving Flows in a Network
Attorney Docket Number	60010-0020
Group Art Unit	2661
Examiner	NYA

A request that the above-identified application not be published under 35 U.S.C. 122(b) (nonpublication request) was included with the above-identified application on filing pursuant to 35 U.S.C. 122(b)(2)(B)(i). I hereby **rescind** the previous non-publication request.

If a notice of foreign or international filing is or will be required by 35 U.S.C. 122(b)(2)(B)(iii) and 37 CFR 1.213(c), I hereby provide such notice. This notice is being provided no later than forty-five (**45**) days after the date of such foreign or international filing.

*If a notice of subsequent foreign or international filing required by 35 U.S.C. 122(b)(2)(B)(iii) and 37 CFR 1.213(c) was not filed within forty-five (**45**) days after the date of filing of the foreign or international application, the application is ABANDONED, and a petition to revive under 37 CFR 1.37(b) is required. See 37 CFR 1.137(f).*

January 5 , 2006
Date

Signature

(408) 414-1080 ext. 234
Telephone Number

Bobby K. Truong, (Reg. No. 37,499)
Typed or printed name

This request must be signed in compliance with 37 CFR 1.33(b).

If information or assistance is needed in completing this form, please contact the Pre-Grant Publication Division at (703)605-4283 or by e-mail at PGPub@USPTO.gov.

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop PG Pub, Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile ((703) 305-8568) transmitted to the U.S. Patent and Trademark Office on the date shown below:

Name (Print/Type)	Annette Jacobs		
Signature		*Date*	January 5 , 2006

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
11/022,599	12/22/2004	Vishnu Natchu	60010-0020

CONFIRMATION NO. 8956

29989
HICKMAN PALERMO TRUONG & BECKER, LLP
2055 GATEWAY PLACE
SUITE 550
SAN JOSE, CA 95110

Date Mailed: 01/18/2006

Communication Regarding Rescission Of Nonpublication Request and/or Notice of Foreign Filing

Applicant's rescission of the previously-filed nonpublication request and/or notice of foreign filing is acknowledged. The paper has been reflected in the Patent and Trademark Office's (USPTO's) computer records so that the earliest possible projected publication date can be assigned.

The projected publication date is 06/22/2006.

If applicant rescinded the nonpublication request before or on the date of "foreign filing,"[1] then no notice of foreign filing is required.

If applicant foreign filed the application after filing the above application and before filing the rescission, and the rescission did not also include a notice of foreign filing, then a notice of foreign filing (not merely a rescission) is required to be filed within 45 days of the date of foreign filing. See 35 U.S.C. § 122(b)(2)(B)(iii), and Clarification of the United States Patent and Trademark Office's Interpretation of the Provisions of 35 U.S.C. § 122(b)(2)(B)(ii)-(iv), 1272 Off. Gaz. Pat. Office 22 (July 1, 2003).

If a notice of foreign filing is required and is not filed within 45 days of the date of foreign filing, then the application becomes abandoned pursuant to 35 U.S.C. § 122(b)(2)(B)(iii). In this situation, applicant should either file a petition to revive or notify the Office that the application is abandoned. See 37 CFR 1.137(f). Any such petition to revive will be forwarded to the Office of Petitions for a decision. Note that the filing of the petition will not operate to stay any period of reply that may be running against the application.

Questions regarding petitions to revive should be directed to the Office of Petitions at (571) 272-3282. Questions regarding publications of patent applications should be directed to the patent application publication hotline at (703) 605-4283 or by e-mail pgpub@uspto.gov.

[1] Note, for purpose of this notice, that "foreign filing" means "filing an application directed to the same invention in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing".

OIPE
AUG 29 2006
PATENT & TRADEMARK OFFICE

Attorney Docket No. 60010-0020

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Vishnu Natchu

Serial No.: 11/022,599

Filed on: December 22, 2004

Confirmation No.: 8956

Examiner: NYA

Group Art Unit No.: 2661

For: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DISCLOSURE OF RELATED APPLICATIONS

Sir:

Applicant(s) would like to bring to the Examiner's attention the following related application(s):

DISCLOSURE OF RELATED APPLICATIONS

U.S. Application/ Pat. No.	File Date	Atty. Docket. No.
11/497,002	7/31/2006	60010-0024

The related application(s) may contain subject matter that is related to the subject matter of the present application. The related application(s) may contain one or more claims that are substantially similar to one or more claims in the present application, and those claims may have been rejected in the related application(s). Therefore, the Examiner is encouraged to review the file history(ies) of the related application(s) as some of the information contained therein may be material to the examination of the present application.

Cloudflare - Exhibit 1002, page 48

Throughout the pendency of this application, please charge any additional fees, including any required extension of time fees, and credit all overpayments to deposit account 50-1302.

Respectfully submitted,

HICKMAN PALERMO TRUONG & BECKER LLP

Dated: August 23, 2006

Bobby K. Truong
Reg. No. 37,499

2055 Gateway Place, Suite 550
San Jose, California 95110-1089
Telephone: (408) 414-1080
Facsimile: (408) 414-1076

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on August 24, 2006.
(Date of Deposit)

Annette Jacobs
(Typed or printed name of person mailing correspondence)

(Signature of person mailing correspondence)

Cloudflare - Exhibit 1002, page 49

OIPE IAP28
FEB 20 2007
PATENT & TRADEMARK OFFICE

IFW

PTO/SB/83 (01-06)
Approved for use through 12/31/2008. OMB 0651-0035
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST FOR WITHDRAWAL AS ATTORNEY OR AGENT AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	11/022,599
Filing Date	December 22, 2004
First Named Inventor	Vishnu Natchu
Art Unit	2661
Examiner Name	NYA
Attorney Docket Number	60010-0020

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Please withdraw me as attorney or agent for the above identified patent application, and

☑ all the attorneys/agents of record.

☐ the attorneys/agents (with registration numbers) listed on the attached paper(s), or

☑ the attorneys/agents associated with Customer Number 29989

NOTE: This box can only be checked when the power of attorney of record in the application is to all the practitioners associated with a customer number.

The reasons for this request are:

CORRESPONDENCE ADDRESS

1. ☐ The correspondence address is NOT affected by this withdrawal.
2. ☑ Change the correspondence address and direct all future correspondence to:

☐ The address associated with Customer Number:

OR

☑ Firm *or* Individual Name	Geoff Mattson Sable Networks, Inc.				
Address	3171 Jay Street				
City	Santa Clara	State	California	Zip	95054
Country					
Telephone	408-499-7582	Email	gmattson@sablenetworks.com		
Signature					
Name	Bobby K. Truong	Registration No.	37,499		
Date	February 12, 2007	Telephone No.	408-414-1234		

NOTE: Withdrawal is effective when approved rather than when received. Unless there are at least 30 days between approval of withdrawal and the expiration date of a time period for response or possible extension period, the request to withdraw is normally disapproved.

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

OIPE IAP28
FEB 20 2007
PATENT & TRADEMARK OFFICE

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

on February 13, 2007 By _____
Annette Jacobs

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Hickman Palermo Truong
& Becker, LLP
2055 Gateway Place
Suite 5500
San Jose, CA 95110

COPY MAILED

MAY 09 2007

OFFICE OF PETITIONS

In re Application of :
Vishnu NATCHU :
Application No. 11/022,599 : DECISION ON PETITION
Filed: December 22, 2004 : TO WITHDRAW
Attorney Docket No. 60010-0020 : FROM RECORD
:

This is a decision on the Request to Withdraw as attorney or agent of record under 37 C.F.R. § 1.36(b), filed February 20, 2007.

The request is **NOT APPROVED**.

The request cannot be approved because no reasons for withdrawal have been provided. The Office cannot, at this time, determine whether practitioner's request is one of the mandatory or permissive reasons enumerated in 37 CFR 10.40. Any subsequent requests must include reasons for withdrawal. Please note that there is a space provided for on PTO/SB/83 (Request to Withdraw as Attorney or Agent) to supply practitioner's reasons.

All future communications from the Office will continue to be directed to the above-listed address until otherwise notified by applicant.

There are no pending Office actions at the present time.

Telephone inquiries concerning this decision should be directed to Diane Goodwyn at 571-272-6735.

April Wise
Petitions Examiner
Office of Petitions

cc: Vishnu Natchu
2831 Malabar Avenue 1
Santa Clara, CA 95051

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	(Natchu near Vishnu).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:08
L2	2644	370/229,232,234.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:08
L3	3271	370/233,235,236.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:09
L4	27325885	@rlad < "20041222" @ad < "20041222"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:09
L5	4692	(L2 L3) and L4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:11
L6	2255	L2 and L4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:11
L7	2885	L3 and L4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:11
L8	448	(L2 and L3) and L4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:13
L9	6	L5 and (penal$6 near5 flow) same (threshold limit average mean factor)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 20:43

Cloudflare - Exhibit 1002, page 53

EAST Search History

L10	4	L5 and penal$6 same (probability chance) same (drop$5 discard$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 20:06
L11	11	L5 and penal$6 same (behavior$3 statistic)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 20:27
L12	34	L5 and (penal$8 with flow)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 20:29
L13	1	L4 and (penal$6 near5 flow) same (threshold limit average mean factor) same (probability chance) same (drop$5 discard$3) and "370"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 20:46
L14	1	L4 and (penal$6 near5 flow) same (threshold limit average mean factor) same (probability chance) same (drop$5 discard$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 21:19
L15	1	L4 and (penal$6 near5 flow) same (probability chance) same (drop$5 discard$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 20:53
L16	90	L4 and penal$8 same (probability chance) same (drop$5 discard$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 20:56
L17	4	L4 and (penal$6 with flow) same (threshold limit average mean factor) same (drop$5 discard$3) and "709"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 21:26
L18	6	L4 and (penal$6 with flow) same (threshold limit average mean factor) same (drop$5 discard$3) and "370"/$.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 21:28

Cloudflare - Exhibit 1002, page 54

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	60010-0020	8956

29989 7590 12/20/2007
HICKMAN PALERMO TRUONG & BECKER, LLP
2055 GATEWAY PLACE
SUITE 550
SAN JOSE, CA 95110

EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2616	

MAIL DATE	DELIVERY MODE
12/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/022,599	NATCHU, VISHNU	
	Examiner	Art Unit	
	Xavier Szewai Wong	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22nd December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22nd December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1, 2, 4 – 10, 21, 22** and **24 – 30** are rejected under 35 U.S.C. 102(b) as being anticipated by **Zikan** et al (**US 6,310,881 B1**).

3. Consider claims **1** and **21**, **Zikan** et al disclose a dynamic load balancer (e.g. MFM) for processing a flow which comprises of a series of information packets (col. *2* ln. *45-49*), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow (col. *2* ln. *47-51*; col. *5* ln. *26-29*); determining, based upon the behavioral statistics, whether the flow is exhibiting undesirable behavior (col. *2* ln. *47-51*; col. *5* ln. *30-37*); enforcing, in response to the determination of undesirable behavior, a penalty on the flow (col. *3* ln. *2-6*; col. *5* ln. *37-41*).

4. Consider claims **5** and **25**, **Zikan** et al disclose a dynamic load balancer (e.g. MFM) for processing a flow which comprises of a series of information packets (col. *2* ln. *45-49*), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow (col. *2* ln. *47-51*; col. *5* ln. *26-29*); computing, based upon the behavioral statistics, an

expression $E_{\alpha,\beta}(f)$ (e.g. badness factor) to provide indication of whether the flow is exhibiting undesirable behavior (col. *9* ln. *40-65*).

5. Consider claims **2** and **22**, as applied to claims **1** and **21**, **Zikan** et al teach means for the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior (*merit* function & flow *optimization*: col. *3* ln. *2-5*; col. *4* ln. *19-20*; col. *10* ln. *20-28*).

6. Consider claims **4**, **10**, **24** and **30**, as applied to claims **1**, **8**, **21** and **28**, **Zikan** et al teach that the invention is to solve, among other misbehaviors/faults, congestion in a network (col. *2* ln. *1-6*; *abstract*); the penalty function is enforced when a misbehavior/fault, such as a congestion, is encountered (col. *5* ln. *30-41*; col. *9* ln. *62-65*).

7. Consider claims **6** and **26**, as applied to claims **5** and **25**, **Zikan** et al teach means for the $E_{\alpha,\beta}(f)$ (e.g. badness factor) providing an indication of a degree to which the flow is behaving undesirably (col. *9* ln. *40-67*).

8. Consider claims **7**, **8**, **27** and **28** as applied to claims **6**, **7**, **26** and **27**, **Zikan** et al teach means for determining, based on the $E_{\alpha,\beta}(f)$ (e.g. badness factor), a penalty to impose and enforce on the flow (col. *3* ln. *2-6*; col. *5* ln. *37-41*; col. *9* ln. *40-65*).

9. Consider claims **9** and **29**, as applied to claims **8** and **28**, **Zikan** et al teach means for the penalty has an effect (enforcing) of correcting the flow's behavior such that the flow exhibits less undesirable behavior (*merit* function & flow *optimization*: col. *3* ln. *2-5*; col. *4* ln. *19-20*); therefore, causing $E_{\alpha,\beta}(f)$ (e.g. badness factor) to improve (*maximization* of

merit functions: col. *10* ln. *20-28*).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims **3**, **12**, **13**, **14**, **18**, **23**, **32**, **33**, **34** and **38** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Skirmont** (**US 6,252,848 B1**).

13. Consider claims **3**, **13**, **14**, **23**, **33** and **34**, as applied to claims **1**, **8**, **13**, **21**, **28** and **33**, **Zikan** et al teach the penalty imposed involve lost packets (drop rate; col. *4* ln. *16-20*). However, **Zikan** et al may not have *explicitly* mentioned an increased drop rate such that a misbehaving flow has a higher probability of being dropped than flows that do not exhibit undesirable misbehavior. **Skirmont** teaches means for assigning not well-behaved flows to higher drop probabilities and therefore, creating an increased drop rate, than a flow that is well-behaved (col. *4* ln. *64-67*). It would have been obvious to

one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Zikan** et al for penalty enforcement on misbehaving flows.

14. Consider claims **12** and **32**, as applied to claims **8** and **28**, **Zikan** et al teach the claimed invention except may not have *explicitly* mentioned the penalty is determined and enforced on the flow even when no congestion condition is encountered. **Skirmont** mentions a Random Early Detection (RED) algorithm comprising means for allowing the dropping of packets *without regard* to the characteristics (e.g. congestion) of a flow (col. *5* ln. *21-24*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to incorporate the RED algorithm as mentioned by **Skirmont** to the load balancer of **Zikan** et al for improving network flow performance.

15. Consider claims **18** and **38**, as applied to claims **5** and **25**, **Zikan** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising an average size for the information packets of a flow. **Skirmont** teaches in figure *2* an average queue (flow) size is taken into account when deciding a drop probability (col. *4* ln. *26-34*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Zikan** et al for enforcing flow traffic.

Claims **11** and **31** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Afanador** (**US 6,167,041**).

Consider claims **11** and **31**, as applied to claims **8** and **28**, **Zikan** et al disclose the claimed invention except may not have *explicitly* mentioned no penalty is enforced on a flow unless a congestion is encountered, regardless of how undesirably the flow is behaving. **Afanador** teaches that only offending queues (flows) are penalized in time of congestion (col. *8* ln. *25-33*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Afanador** to the penalty function of **Zikan** et al for fair penalization of flows.

Claims **15**, **16**, **17**, **35**, **36** and **37** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Scifres** et al (**US 7,113,990 B2**).

Consider claims **15**, **16**, **17**, **35**, **36** and **37**, as applied to claims **1**, **5**, **16**, **25** and **36**, **Zikan** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising: T for an amount of total information contained in all of the information packets belonging to a flow, an L for how long the flow has been existing, and using T/L to obtain R, which is a rate for information transfer of the flow. **Scifres** et al teach a flow volume *32* (e.g. T) is divided by a time period *46* (e.g. L) to obtain an average flow rate (e.g. R) (col. *5* ln. *9-13*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the calculation method as taught by **Scifres** et al to the penalty function of **Zikan** et al for flow restriction and allocation.

Claims **19**, **20**, **39** and **40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Kejriwal** et al (**US 6,934,250 B1**).

Consider claims **19**, **20**, **39** and **40**, as applied to claims **5** and **25**, **Zikan** et al disclose the claimed invention except may not have *explicitly* mentioned means for receiving and determining whether to forward a particular information packet to a destination; updating, in response to a determination to forward the particular packet, a set of behavioral statistics to reflect processing of the particular packet; and updating regardless of. **Kejriwal** et al teach means for a policing embodiment determines whether a received packet is to be rejected (discarded) or enqueued (forwarded out of a processor pipeline) to a destination based on a length indicator (packet conforming or non-conforming information); as a statistics table *921* is being written based on the information of the packet, *either* rejected or forwarded. (col. *24* ln. *30-43* & *47-65*; fig. *9* @ *917,922,924,950* → fig. *5A*).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A. **Jacobson** et al (**US 2005/0226149 A1**) teach Random Early Detection (RED) algorithm

B. **Hou** (**US 2005/0141426 A1**) teach a packet handling engine that forwards or drops a received information packet based on updated information from a bucket threshold value

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is 571-270-1780. The examiner can normally be reached on Monday through Friday 8:30 am - 6:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Xavier Szewai Wong
X.S.W / x.s.w
16th December 2007

Seema S. Rao
SEEMA S. RAO 12/18/07
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Notice of References Cited	Application/Control No. 11/022,599	Applicant(s)/Patent Under Reexamination NATCHU, VISHNU	
	Examiner Xavier Szewai Wong	Art Unit 2616	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,310,881 B1	10-2001	Zikan et al.	370/401
*	B	US-6,252,848 B1	06-2001	Skirmont, David A.	370/229
*	C	US-6,167,041	12-2000	Afanador, J. Abraham	370/353
*	D	US-7,113,990 B2	09-2006	Scifres et al.	709/224
*	E	US-6,934,250 B1	08-2005	Kejriwal et al.	370/229
*	F	US-2005/0226149 A1	10-2005	Jacobson et al.	370/229
*	G	US-2005/0141426 A1	06-2005	Hou, Cheng-Liang	370/235
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
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BIB DATA SHEET

CONFIRMATION NO. 8956

SERIAL NUMBER	FILING or 371(c) DATE / RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/022,599	12/22/2004	370	2616	60010-0020

APPLICANTS
Vishnu Natchu, Santa Clara, CA;

** CONTINUING DATA ********** N/A; 16.December.2007; /X.S.W/

** FOREIGN APPLICATIONS ********** N/A; 16.December.2007; /X.S.W/

** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **
02/11/2005

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/Xavier Szewai Wong/ Examiner's Signature	☐ Initials	CA	5	40	4

ADDRESS

HICKMAN PALERMO TRUONG & BECKER, LLP
2055 GATEWAY PLACE
SUITE 550
SAN JOSE, CA 95110
UNITED STATES

TITLE

Mechanism for identifying and penalizing misbehaving flows in a network

FILING FEE RECEIVED	
2200	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:

- ☐ All Fees
- ☐ 1.16 Fees (Filing)
- ☐ 1.17 Fees (Processing Ext. of time)
- ☐ 1.18 Fees (Issue)
- ☐ Other _____
- ☐ Credit

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11022599	NATCHU, VISHNU
	Examiner	Art Unit
	Wong, Xavier Szewai	2616

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	12/17/2007								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
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	32	✓								
	33	✓								
	34	✓								
	35	✓								
	36	✓								

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11022599	NATCHU, VISHNU
	Examiner	Art Unit
	Wong, Xavier Szewai	2616

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	12/17/2007								
	37	✓								
	38	✓								
	39	✓								
	40	✓								

Search Notes

Application/Control No.	Applicant(s)/Patent under Reexamination	
11/022,599	NATCHU, VISHNU	
Examiner	**Art Unit**	
Xavier Szewai Wong	2616	

SEARCHED			
Class	Subclass	Date	Examiner
370	229	12/16/2007	XSW
	232	12/16/2007	XSW
	234	12/16/2007	XSW

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
EAST image and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	12/16/2007	XSW
Inventor Name and Assignee search in PALM ExPO and EAST	12/16/2007	XSW

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	60010-0020	8956

29989 7590 08/20/2008

HICKMAN PALERMO TRUONG & BECKER, LLP
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EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2616	

MAIL DATE	DELIVERY MODE
08/20/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of Abandonment	Application No.	Applicant(s)	
	11/022,599	NATCHU, VISHNU	
	Examiner	Art Unit	
	Xavier Wong	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

This application is abandoned in view of:

1. ☒ Applicant's failure to timely file a proper reply to the Office letter mailed on *20th December 2007*.
   (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
   (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection.
   (A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
   (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
   (d) ☒ No reply has been received.

2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
   (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
   (b) ☐ The submitted fee of $_____ is insufficient. A balance of $_____ is due.
   The issue fee required by 37 CFR 1.18 is $_____. The publication fee, if required by 37 CFR 1.18(d), is $_____.
   (c) ☐ The issue fee and publication fee, if applicable, has not been received.

3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
   (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
   (b) ☐ No corrected drawings have been received.

4. ☐ The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.

5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.

6. ☐ The decision by the Board of Patent Appeals and Interference rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. ☒ The reason(s) below:

over 7 months after office action mailed 12-20-07 without response filed

/Brenda Pham/
Primary Examiner, Art Unit 2616

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application
Inventor(s): Vishnu, Natchu
Appln. No.: 11/022,599 Art Unit: 2616
Confirm. No.: 8956 Examiner: Wong, Xavier S.
Filed: 12/22/2004
Title: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

Customer No. 43490

RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. § 1.111

Mail Stop Amendments
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This RESPONSE is in reply to the Office Action mailed December 20, 2007. The time set for response was three months and ended on March 20, 2008. No reply was filed prior to the end of the six month maximum statutory period. Thus, the above-referenced application was unintentionally abandoned and a Petition for Revival under 37 C.F.R. § 1.137 accompanies this response. All required fees are enclosed.

Cloudflare - Exhibit 1002, page 71

Remarks

These remarks are in response to the Office Action mailed December 20, 2007. The total number of claims submitted for consideration is forty (40).

Cloudflare - Exhibit 1002, page 72

Office Action Not in Accordance with 37 C.F.R. 1.104(c)(2)

Applicant respectfully asserts that the rejections are not in accordance with 37 CFR 1.104(c)(2), which states, in relevant part, "[t]he pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified." In the present Office Action, there rejected claims have been lumped together into one collective rejection, and the language of the claims has been paraphrased. For example, in paragraph 6 of the Office Action, claims 4, 10, 24, and 30 were rejected "as applied to claims 1, 8, 21, and 28" without explanation as to the pertinence of the reference as applied to each element of each rejected claim. Applicant has set forth several arguments below, however without further clarity in the rejections, Applicant cannot properly and fully respond. Therefore, Applicant respectfully requests that these rejections be withdrawn.

Cloudflare - Exhibit 1002, page 73

Response to Rejections Under 35 U.S.C. § 102(b)

The Office Action rejected claims 1, 2, 4-10, 21, 22 and 24-30 under 35 U.S.C. § 102(b) as being anticipated by Zikan et al (U.S. 6,310,881 B1).

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v.Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Zikan does not anticipate each and every element of each rejected claim.

Rejections to Claims 1 & 21 Under § 102(b)

The Office Action mistakenly asserts that the dynamic load balancer in Zikan et al. is equivalent to the misbehaving flow manager (MFM) of the present application. Conversely, these two components have different functions and utilize different types of information, as described below. And while the result of the method taught in Zikan is improved routing capabilities (col. 1, ln 17-20; col. 2, ln 52-59), in the present invention "processing a packet my, but does not necessarily, involve forwarding the packet to another router." [detailed description of present application, hereinafter "Natchu", para 29]

Claim 1 teaches "a machine implemented method for processing a flow…" This is a method for processing a *single* flow, whereby only the statistics and behavior of that one flow are used to determine its outcome. [Natchu, para 30-31] By contrast, the Zikan method teaches a network traffic direction system comprising several router modules that, by communicating with each other, determine changes in the overall communication system and adapt accordingly. [See FIGs. 1, 2A, 2B] Thus, the Zikan reference teaches multiple nodes that acquire information from

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multiple sources and make changes to groups of flows, whereas the present invention is directed to a method for processing one flow at a time based on information from only that one flow.

Claim 1 of the present application also teaches "maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated as information packets belonging to the flow are processed." Again, this claim is directed to processing a *single* flow. Information pertaining to each packet belonging to a single flow is collected by the misbehaving flow manager (MFM), and each set of behavioral statistics contains information from only one flow. [Natchu, para 35; FIGs. 3-4] By contrast, the dynamic load balancer of Zikan is "configured to determine flows based on the home and neighbor potentials," and "uses information collected by the neighborhood supervisor unit 214 of the home router module 130 from the neighboring router modules 130." [col. 2, ln 45-47; col. 5, ln 34-37; *see also* col. 17, ln 18-29]

In claim 1 of the present application, "the set of behavioral statistics is updated as information packets belonging to [a single] flow are processed." Additionally, statistics for each flow processed by a router are separate and distinct, and the statistics for one flow are not used to determine the outcome of another flow. [Natchu, para 29-30; FIGs. 3-4] By contrast, the dynamic load balancer of Zikan "adjusts the routing tables of the router table unit 218 based upon the information collected [from neighboring router modules] in order to optimize overall utilization of the data communication system served by the network traffic director system 110." [col. 5, ln 34-41] "The dynamic load balancer unit 216 uses information from the neighborhood supervisor unit 214 to determine parameters that the routing table unit 218 then uses to prepare routing table data." [col. 7, ln 63-66] The method for determining these parameters and optimizing traffic flow is discussed in columns 8-11 of Zikan.

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Mathematically, the method is expressed in column 9, lines 45-50 of Zikan, and "the expression $E_{\alpha,\beta}(f)$ incorporates factors associated with individual OD/QoS combinations for each arc "ab" over all the arcs in a data communication system." [col. 10, ln 29-31] An "arc" is defined as a direction that a packet can travel along a link, and "for typical flow conditions in a data communication system, an overall flow in a particular arc typically is a conglomeration of one or more separate flows." [col. 8, ln 12-14, 48-50] Thus, in the Zikan reference, the method used to optimize traffic flow in a communication system incorporates information from several flows, whereas the method in the present application utilizes information from a single flow. [*See also* col. 17, ln 39-46]

Claim 1 of the present application includes "determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior." Therefore, once all statistics for a single flow are collected, the MFM decides how to treat that particular flow (e.g., whether to drop all or part of it, etc.) [Natchu, para 30] By contrast, the dynamic load balancer 216 in Zikan collects information from "router modules scattered throughout a data communication system" via the neighborhood supervisor unit 214. [col. 15, ln 43-44, 61-63] The information collected within a predetermined period of time is then analyzed and compared to the information collected from the previous time period. If certain parameters have changed or been reached, the dynamic load balancer subsequently updates its associated routing table. [col. 19, ln 12-25] Therefore, while the system in Zikan collects information during a predetermined time period and compares it with information from another time period, the method of the present invention collects information for a single flow, without time limits, and does not compare it to statistics for another flow.

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The method of claim 1 in the present application also comprises, "in response to determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow." In the present invention, any given penalty imposed is applied to only a single flow; the decision to enforce a penalty is not carried out on multiple flows at a time. [Natchu, para 31-32; FIGs. 3, 5] Moreover, in the present invention a penalty can include dropping a packet or enforcing an increased drop rate on the flow [Natchu, para 31-32, 41-44].

By contrast, the penalty function involved in the Zikan system is actually a measure of undesirable influences affecting the flow of communication in the entire data communication system. [col. 9, ln 62-65] This penalty function requires consideration of a multitude of factors relating to a plurality of flows within the data system. "The solution to the optimization of the uniquely formulated [penalty function] over all the component flows…results in solutions of flow $f_{j,ab}$ for each OD/QoS combination "j" for each arc "ab" in the data communication system." [col. 10, ln 52-58] Moreover, Zikan does not teach a penalty function that includes dropping a flow or increasing the drop rate for a flow. Instead, the penalty function of Zikan determines the presence of undesirable influences in the data communication system that may be remedied by changing parameters stored in routing tables. Thus, the penalty function does not impose an action on a single flow as the result of that single flow's behavior.

For the foregoing reasons, claim 1 is not anticipated by Zikan and Applicant respectfully requests that the rejection to claim 1 be withdrawn.

Claim 21 was also rejected as being anticipated by Zikan. The elements of claim 21 parallel those of claim 1. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejection of claim 21 under §102(b), and Applicant respectfully requests that the rejection to claim 21 be withdrawn.

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Rejections to Claims 5 & 25 Under §102(b)

Claim 5 teaches a method that comprises "maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated as information packets belonging to the flow are processed." These same elements are also present in claim 1. Therefore, the aforementioned arguments with respect to the rejection of claim 1 under §102(b) are likewise applicable to these elements of claim 5, and Applicant asserts that Zikan does not anticipate these elements.

Claim 5 also teaches "computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior." The badness factor taught by the present application employs a set of behavioral statistics for a *single* flow, and its resulting calculation is utilized by the MFM to determine whether a penalty should be enforced on the flow. [Natchu, para 30, 41]

By contrast, the expression $E_{\alpha,\beta}(f)$ in Zikan necessarily requires computation of data from all flows in a communication system in order to assess the state of the system as a whole. "The solution for data flows also optimizes the following uniquely formulated expression $E_{\alpha,\beta}(f)$ involving a substantially quadratic function of data flows in a data communication system." [col. 9, ln 40-44] "The expression $E_{\alpha,\beta}(f)$ incorporates factors associated with individual OD/QoS combinations for each arc "ab" over all the arcs in a data communication system." [col. 10, ln 29-31] Moreover, once $E_{\alpha,\beta}(f)$ is computed, any changes made are applied to a group of flows in the system; there is no drop-rate penalty enforced on an individual flow.

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For the foregoing reasons, claim 5 is not anticipated by Zikan and Applicant respectfully requests that the rejection to claim 5 be withdrawn.

Claim 25 was also rejected as being anticipated by Zikan. The elements of claim 25 parallel those of claim 5. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejection of claim 25 under §102(b), and Applicant respectfully requests that the rejection to claim 25 be withdrawn.

Rejections to Claims 2, 4, 6-10, 22, 24, 26-30 Under §102(b)

Claims 2, 4, 6-10, 22, 24, and 26-30 were also rejected under §102(b) as being anticipated by Zikan. Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim. 37 CFR 1.75. As shown above, claims 1, 5, 21, and 25 are not anticipated by Zikan. Claims 2 & 4 depend from claim 1; claims 6-10 depend from claim 5; claims 22 & 24 depend from claim 21; and claims 26-30 depend from claim 25. Therefore, Applicant respectfully requests that these rejections be withdrawn as well.

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Response to Rejections Under 35 U.S.C. §103(a)

Claims 3, 12-14, 18, 23, 32-34, and 38 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zikan et al in view of Skirmont. Claims 11 and 31 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zikan et al in view of Afanador. Claims 15-17, 35-37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zikan et al in view of Scifres et al. Claims 19-20, 39-40 were rejected under §103(a) as being unpatentable over Zikan in view of Kejriwal et al. As explained above, these rejections are lumped together in groups without specific explanation of how each element is obvious over each reference. Moreover, the claims are paraphrased and citations to the references are sparse. Thus, these rejections are improper and Applicant cannot properly respond. It is respectfully requested that these rejections be withdrawn.

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Conclusion

Applicant respectfully asserts that the Office Action does not meet the standards of 37 CFR 104(c)(2) and requests that the action be withdrawn and a new Office Action issued. Additionally, to the best of Applicant's ability in light of the improper Office Action, arguments have been set forth which illustrate that the cited references do not render the claims unpatentable.

The Examiner is respectfully requested to telephone the undersigned if she can assist in any way in expediting the issuance of a patent.

Respectfully submitted,

By: /Sara Dirvianskis/
Sara Dirvianskis
Reg. No. 62,613

Dated: May 21, 2009

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Electronic Patent Application Fee Transmittal

Application Number:	11022599
Filing Date:	22-Dec-2004
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Filer:	Stuart James West/Marisella Cornett
Attorney Docket Number:	60010-0020

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Petition-revive unintent. abandoned appl	2453	1	810	810
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**810**

Electronic Acknowledgement Receipt

EFS ID:	5379175
Application Number:	11022599
International Application Number:	
Confirmation Number:	8956
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Customer Number:	29989
Filer:	Stuart James West/Marisella Cornett
Filer Authorized By:	Stuart James West
Attorney Docket Number:	60010-0020
Receipt Date:	21-MAY-2009
Filing Date:	22-DEC-2004
Time Stamp:	16:58:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$810
RAM confirmation Number	3134
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / .zip	Pages (if appl.)

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1	Miscellaneous Incoming Letter	20090521-Transmittal-Revival-SABLE-01008.pdf	2127342 9273262a6d96ac04909387cf952e6a8f5792088f	no	2
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	20090521-SABLE-01008_RevivalPetition_FinalSDP.pdf	82566 5c1c43fa221d0854051ed95344ec188ad9ec09e1	no	2
Warnings:					
Information:					
3	Oath or Declaration filed	20090520-declarationforrevival-SABLE-01008_FinalSDP.pdf	278415 aaedc3b2a7c494eebda35f3466cfdbd9492f94ca	no	1
Warnings:					
Information:					
4	Applicant Arguments/Remarks Made in an Amendment	20090521-SABLE-01008_ROA_FinalSDP.pdf	126381 4cde5042cb40d09b1dbb096b49fa7f5c0ff16e38	no	11
Warnings:					
Information:					
5	Fee Worksheet (PTO-875)	fee-info.pdf	30327 3ec3f070ba43223ae77adb341131a489c3d2fa5b	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2645031		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PET.OP

Document Description: Petition for Review by the Office of Petitions

PTO/SB/64 (04-09)
Approved for use through 05/31/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PETITION FOR REVIVAL OF AN APPLICATION FOR PATENT ABANDONED UNINTENTIONALLY UNDER 37 CFR 1.137(b)	Docket Number (Optional) SABLE-01008

First named inventor: Vishnu, Natchu

Application No.: 11/022,599 Art Unit: 2616

Filed: December 22, 2004 Examiner: Wong, Xavier S.

Title: Mechanism For Identifying And Penalizing Misbehaving Flows In a Network

Attention: Office of Petitions
Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
FAX (571) 273-8300

NOTE: If information or assistance is needed in completing this form, please contact Petitions Information at (571) 272-3282.

The above-identified application became abandoned for failure to file a timely and proper reply to a notice or action by the United States Patent and Trademark Office. The date of abandonment is the day after the expiration date of the period set for reply in the office notice or action plus any extensions of time actually obtained.

APPLICANT HEREBY PETITIONS FOR REVIVAL OF THIS APPLICATION

NOTE: A grantable petition requires the following items:
(1) Petition fee;
(2) Reply and/or issue fee;
(3) Terminal disclaimer with disclaimer fee - required for all utility and plant applications filed before June 8, 1995; and for all design applications; and
(4) Statement that the entire delay was unintentional

1. Petition Fee

☑ Small entity-fee $ 810.00 (37 CFR 1.17(m)). Application claims small entity status. See 37 CFR 1.27.

☐ Other than small entity-fee $ _____ (37 CFR 1.17(m))

2. Reply and/or fee

A. The reply and/or fee to the above-noted Office action in the form of Response To Office Action (identify type of reply):

☐ has been filed previously on _____.

☑ is enclosed herewith.

B. The issue fee and publication fee (if applicable) of $_____.

☐ has been paid previously on _____.

☐ is enclosed herewith.

This collection of information is required by 37 CFR 1.137(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

3. Terminal disclaimer with disclaimer fee

☐ Since this utility/plant application was filed on or after June 8, 1995, no terminal disclaimer is required.

☐ A terminal disclaimer (and disclaimer fee (37 CFR 1.20(d)) of $_____ for a small entity or $_____ for other than a small entity) disclaiming the required period of time is enclosed herewith (see PTO/SB/63).

4. STATEMENT: The entire delay in filing the required reply from the due date for the required reply until the filing of a grantable petition under 37 CFR 1.137(b) was unintentional. [NOTE: The United States Patent and Trademark Office may require additional information if there is a question as to whether either the abandonment or the delay in filing a petition under 37 CFR 1.137(b) was unintentional (MPEP 711.03(c), subsections (III)(C) and (D)).]

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

/Sara Dirvianskis/	May 21, 2009
Signature	Date
Sara Dirvianskis	62,613
Type or Printed name	Registration Number, If applicable
2815 Mitchell Drive, Suite 209	925-465-4603
Address	Telephone Number
Walnut Creek, CA 94598	
Address	

Enclosures:

☑ Fee Payment

☐ Reply

☐ Terminal Disclaimer Form

☐ Additional sheets containing statements establishing unintentional delay

☑ Other: Response to Office Action

CERTIFICATE OF MAILING OR TRANSMISSION [37 CFR 1.8(a)]

I hereby certify that this correspondence is being:

☐ Deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Petition, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450.

☐ Transmitted by facsimile on the date shown below to the United States Patent and Trademark Office at (571) 273-8300.

Date	Signature
	Typed or printed name of person signing certificate

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application
Inventor(s): Vishnu, Natchu
Appln. No.: 11/022,599 Art Unit: 2616
Confirm. No.: 8956 Examiner: Wong, Xavier S.
Filed: 12/22/2004
Title: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

Customer No. 43490

PETITION FOR REVIVAL OF PATENT APPLICATION UNDER 37 C.F.R. § 1.137(b)

Mail Stop Amendments
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant respectfully petitions for the revival of the above-references patent application under 37 C.F.R. § 1.137(b). The entire delay in filing a reply to the Office Action mailed December 20, 2007 was UNINTENTIONAL for the following reasons: miscommunication between Applicant and his attorney prevented a timely response. Applicant sent a document to his attorney that led the attorney to believe that Applicant wanted to handle the Office Action on his own. However, it was not Applicant's intention to handle the Office Action response on his own. This miscommunication resulted in failure to respond in a timely manner and subsequent abandonment of this application.

Thus, this petition filed concurrently with a reply to the outstanding Office Action and required fees under 37 C.F.R. § 1.17(m), was filed at the first possible opportunity after resolving

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the miscommunication. Therefore, Applicant respectfully requests that revival of the current application be granted and prosecution be allowed to continue.

Respectfully submitted,

Date: May 21, 2009

By: /Sara Dirvianskis/
Sara Dirvianskis
Reg. No. 62,613

West & Associates, A PC
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Cloudflare - Exhibit 1002, page 89

Declaration of Stuart J. West

First named inventor:	Vishnu Natchu	Docket Number:	SABLE-01008
Application No.:	11/022,599	Art Unit:	2616
Filed:	12/22/2004	Examiner:	Xavier Szewai Wong

Title: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

DECLARATION

1. The above-referenced application was considered abandoned by the Patent and Trademark Office as of 08/20/2008 because of failure to response to office action mailed 12/20/2007.
2. A response to the office action mailed 12/20/2007 was not sent because of a miscommunication between client and attorney.
3. The client sent a document to the attorney that led the attorney to believe that the client wanted to handle the office action response on his own.
4. However, it was not the client's intention to handle the office action response on his own.
5. Therefore, this delay in replying to the office action and the abandonment of the application was unintentional.

Date: 5/20/09

Stuart J. West
West & Associates, A PC
2815 Mitchell Drive, Suite 209
Walnut Creek, CA 94598

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/022,599	12/22/2004	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 05/21/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 40	Minus	** 40	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/JACQULYN L. WILLIAMS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
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MAILED

JUL 17 2009

OFFICE OF PETITIONS

In re Application of :
Vishnu NATCHU :
Application No. 11/022,599 : DECISION ON PETITION
Filed: December 22, 2004 :
Attorney Docket No. 60010-0020 :

This is a decision on the petition under the unintentional provisions of 37 CFR 1.137(b), filed May 21, 2009, to revive the above-identified application.

The petition is **GRANTED**.

The application became abandoned for failure to reply in a timely manner to the non-final Office action mailed, December 20, 2007, which set a shortened statutory period for reply of three (3) months. No extensions of time under the provisions of 37 CFR 1.136(a) were obtained. Accordingly, the application became abandoned on March 21, 2008.

The petition satisfies the requirements of 37 CFR 1.137(b) in that petitioner has supplied (1) the reply in the form of an amendment, (2) the petition fee of $810; and (3) the proper statement of unintentional delay.

It is not apparent whether the person signing the statement of unintentional delay was in a position to have firsthand or direct knowledge of the facts and circumstances of the delay at issue. Nevertheless, such statement is being treated as having been made as the result of a reasonable inquiry into the facts and circumstances of such delay. See 37 CFR 10.18(b) and Changes to Patent Practice and Procedure; Final Rule Notice, 62 Fed. Reg. 53131, 53178 (October 10, 1997), 1203 Off. Gaz. Pat. Office 63, 103 (October 21, 1997). In the event that such an inquiry has not been made, petitioner must make such an inquiry. If such inquiry results in the discovery that it is not correct that the entire delay in filing the required reply from the due

date for the reply until the filing of a grantable petition pursuant to 37 CFR 1.137(b) was unintentional, petitioner must notify the Office.

There is no indication that the person signing the petition was ever given a power of attorney to prosecute the application. If the person signing the petition desires to receive future correspondence regarding this application, the appropriate power of attorney document must be submitted. While a courtesy copy of this decision is being mailed to the person signing the petition, all future correspondence will be directed to the address currently of record until appropriate instructions are received.

Telephone inquiries concerning this decision should be directed to Diane Goodwyn at (571) 272-6735.

This application is being referred to Technology Center AU 2616 for appropriate action by the Examiner in the normal course of business on the reply received May 21, 2009.

Thurman K. Page
Petitions Examiner
Office of Petitions

cc: SARA DIRVIANSKIS
2815 MITCHELL DRIVE, SUITE 209
WALNUT CREEK, CA 94598

Electronic Acknowledgement Receipt

EFS ID:	5765004
Application Number:	11022599
International Application Number:	
Confirmation Number:	8956
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Customer Number:	29989
Filer:	Stuart James West/Dawn Callender
Filer Authorized By:	Stuart James West
Attorney Docket Number:	60010-0020
Receipt Date:	24-JUL-2009
Filing Date:	22-DEC-2004
Time Stamp:	14:35:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		20090724-POAdocuments-SABLE-01008.pdf	1848847 d464b4f5e9979e48a3097d1aa6f0bbfd7e868394	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Power of Attorney	2	2
	Assignee showing of ownership per 37 CFR 3.73(b).	3	4
Warnings:			
Information:			
	Total Files Size (in bytes):	1848847	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/82 (01-08)
Approved for use through 12/31/2008. OMB 0651-0035
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REVOCATION OF POWER OF ATTORNEY WITH NEW POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Application Number	11022599
Filing Date	12/22/2004
First Named Inventor	Vishnu Natchu
Art Unit	2616
Examiner Name	Xavier S. Wong
Attorney Docket Number	SABLE-01008

I hereby revoke all previous powers of attorney given in the above-identified application.

☐ A Power of Attorney is submitted herewith.

OR

☒ I hereby appoint the practitioners associated with the Customer Number: 43490

☒ Please change the correspondence address for the above-identified application to:

☒ The address associated with Customer Number: 43490

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

I am the:

☐ Applicant/Inventor.

☒ Assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

SIGNATURE of Applicant or Assignee of Record

Signature			
Name	Sable Networks, Inc by Gregory Perry		
Date	28 AUG 08	Telephone	

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.36. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/96 (06-09)
Approved for use through 06/30/2009. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Sable Networks, Inc.

Application No./Patent No.: 11022599 Filed/Issue Date: 12/22/2004

Titled: Mechanism for Identifying and Penalizing Misbehaving Flows in a Network

Sable Networks, Inc., a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. [x] the assignee of the entire right, title, and interest in;
2. [ ] an assignee of less than the entire right, title and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

OR

B. [x] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Vishnu Natchu To: Caspian Networks, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 016138, Frame 0366, or for which a copy thereof is attached.

2. From: Caspian Networks, Inc. To: Venture Lending & Leasing IV, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 018243, Frame 0363, or for which a copy thereof is attached.

3. From: Venture Lending & Leasing IV, Inc. To: Caspian Networks, Inc.
The document was recorded in the United States Patent and Trademark Office at
Reel 022991, Frame 0484, or for which a copy thereof is attached.

[x] Additional documents in the chain of title are listed on a supplemental sheet(s).

[x] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature	July 22, 2009 Date
Gregory Perry Printed or Typed Name	CEO of Sable Networks, Inc. Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

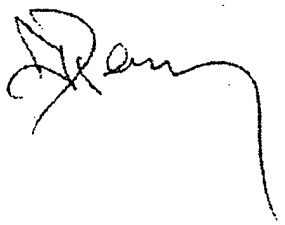
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

From: Caspian Networks, Inc. To: Mobile Convergence, Ltd.

The document was recorded in the United States Patent and Trademark Office at
Reel 022992, Frame 0829, or for which a copy thereof is attached.

From: Mobile Convergence, Ltd. To: Sable Networks, Inc.

The document was recorded in the United States Patent and Trademark Office at
Reel 022992, Frame 0914, or for which a copy thereof is attached.



Doc Code: TRAN.LET

Document Description: Transmittal Letter

PTO/SB/21 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	4

Application Number	11022599
Filing Date	12/22/2004
First Named Inventor	Vishnu Natchu
Art Unit	2618
Examiner Name	Xavier S. Wong
Attorney Docket Number	SABLE-01008

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☑ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):
  PTO/SB/96

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	West & Associates, A PC		
Signature	/Stuart J. West/		
Printed name	Stuart J. West		
Date	07/24/2009	Reg. No.	43258

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name		Date	

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008

CONFIRMATION NO. 8956

POA ACCEPTANCE LETTER

43490
WEST & ASSOCIATES, A PC
2815 MITCHELL DRIVE
SUITE 209
WALNUT CREEK, CA 94598

OC00000037255974

Date Mailed: 08/11/2009

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/24/2009.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/squreshi/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Cloudflare - Exhibit 1002, page 100

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/022,599	12/22/2004	Vishnu Natchu	60010-0020

CONFIRMATION NO. 8956

POWER OF ATTORNEY NOTICE

29989
HICKMAN PALERMO TRUONG & BECKER, LLP
2055 GATEWAY PLACE
SUITE 550
SAN JOSE, CA 95110

OC000000037255962

Date Mailed: 08/11/2009

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/24/2009.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/squreshi/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Cloudflare - Exhibit 1002, page 101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8956

43490 7590 11/13/2009

WEST & ASSOCIATES, A PC
1255 Treat Blvd.
3rd Floor
WALNUT CREEK, CA 94597

EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2462	

NOTIFICATION DATE	DELIVERY MODE
11/13/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATENT@WEST-ASSOCIATES.NET
SJWEST@ASTOUND.NET
PATENT@WESTPATENTLAW.COM

Office Action Summary	Application No.	Applicant(s)	
	11/022,599	NATCHU, VISHNU	
	Examiner	Art Unit	
	Xavier Szewai Wong	2462	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21st May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Arguments filed on 21st May 2009 are not persuasive.

Applicant argues that **Zikan**, in general, does not suggest "processing a single flow, whereby only the statistics and behavior of that one flow are used to determine its outcome (pg. 4)." Nonetheless, the limitations of independent claims **1** and **21**, in *no where* in the claims do the arguments presented above reflect such "narrowed down" limitations. Even, *en arguendo*, that said "narrowed down" limitations are present, col. 8 lines 48-50 of **Zikan** *clearly* states "an overall flow in a particular arc typically is a conglomeration of one or more separate flows," in other words, the arc flow can be one single flow (emphasis added). Such (each one / single) arc flow is governed by a penalty and merit function $E_{\alpha,\beta}(f)$ as explained in col. 10 lines 29-30.

Applicant also argues that the penalty function of **Zikan** does not suggest "dropping a packet or enforcing an increased drop rate on the flow" as the applicant's invention performs (pg. 7). Again, *no where* in the limitations of claim 1 (or claim 21) mentions such "narrowed down" limitations of "dropping packets" or "increasing drop rates." Claim 1 (and claim 21) *merely* states "a determination that the flow is exhibiting undesirable behaviour, forcing a penalty on the flow." Clearly, the **Zikan** penalty and merit function teaches the limitations above.

In response to applicant's argument above that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., dropping a packet or enforcing an increased drop rate on the flow) are not recited in the rejected claim(s). Although the claims are

interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants also argue that claims **4**, **10**, **24** and **30** are not clearly taught by **Zikan** (pg. 3).

Claims **4**, **10**, **24** and **30** contains the **same** limitations, thus, the examiner combined the rejections and *asserts* that the best reference, **Zikan**, at the time of the previous action dated 20th December 2007 has been applied and fully explained, and therefore, in full compliance with 37 CFR 1.104(c)(2). Even so, the examiner hereby re-states the rejection as shown below:

Claims **4**, **10**, **24** and **30**: **Zikan** clearly teaches the penalty is enforced when a congestion condition is encountered (abstract, lines 3-6: penalty and merit function to reduce costs of congestion).

Regarding claims 1-20, the Examiner notes the claims are directed to statutory subject matter, per paragraphs 0025-0027 of the Applicant's specification, because it is implied that a misbehaving flow manager, comprising processors, determines the behavior characteristics of a packet flow.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1**, **2, 4 – 10**, **21**, **22** and **24 – 30** are rejected under 35 U.S.C. 102(b) as being anticipated by **Zikan** et al (**US 6,310,881 B1**).

Consider claims **1** and **21**, **Zikan** et al disclose a dynamic load balancer (e.g. MFM) for processing a flow which comprises of a series of information packets (col. *2* ln. *45-49*), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow (col. *2* ln. *47-51*; col. *5* ln. *26-29*); determining, based upon the behavioral statistics, whether the flow is exhibiting undesirable behavior (col. *2* ln. *47-51*; col. *5* ln. *30-37*); enforcing, in response to the determination of undesirable behavior, a penalty on the flow (col. *3* ln. *2-6*; col. *5* ln. *37-41*).

Consider claims **5** and **25**, **Zikan** et al disclose a dynamic load balancer (e.g. MFM) for processing a flow which comprises of a series of information packets (col. *2* ln. *45-49*), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow (col. *2* ln. *47-51*; col. *5* ln. *26-29*); computing, based upon the behavioral statistics, an expression $E_{\alpha,\beta}(f)$ (e.g. badness factor) to provide indication of whether the flow is exhibiting undesirable behavior (col. *9* ln. *40-65*).

Consider claims **2** and **22**, as applied to claims **1** and **21**, **Zikan** et al teach means for the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior (*merit* function & flow *optimization*: col. *3* ln. *2-5*; col. *4* ln. *19-20*; col. *10* ln. *20-28*).

Consider claims **4**, **10**, **24** and **30**, as applied to claims **1**, **8**, **21** and **28**, **Zikan** et al teach that the invention is to solve, among other misbehaviors/faults, congestion in a network (col. *2* ln. *1-6*; *abstract*); the penalty function is enforced when a misbehavior/fault, such as a congestion, is encountered (col. *5* ln. *30-41*; col. *9* ln. *62-65*).

Consider claims **6** and **26**, as applied to claims **5** and **25**, **Zikan** et al teach means for the $E_{\alpha,\beta}(f)$ (e.g. badness factor) providing an indication of a degree to which the flow is behaving undesirably (col. *9* ln. *40-67*).

Consider claims **7**, **8**, **27** and **28** as applied to claims **6**, **7**, **26** and **27**, **Zikan** et al teach means for determining, based on the $E_{\alpha,\beta}(f)$ (e.g. badness factor), a penalty to impose and enforce on the flow (col. *3* ln. *2-6*; col. *5* ln. *37-41*; col. *9* ln. *40-65*).

Consider claims **9** and **29**, as applied to claims **8** and **28**, **Zikan** et al teach means for the penalty has an effect (enforcing) of correcting the flow's behavior such that the flow exhibits less undesirable behavior (*merit* function & flow *optimization*: col. *3* ln. *2-5*; col. *4* ln. *19-20*); therefore, causing $E_{\alpha,\beta}(f)$ (e.g. badness factor) to improve (*maximization* of merit functions: col. *10* ln. *20-28*).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims **3**, **12**, **13**, **14**, **18**, **23**, **32**, **33**, **34** and **38** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Skirmont** (**US 6,252,848 B1**).

Consider claims **3**, **13**, **14**, **23**, **33** and **34**, as applied to claims **1**, **8**, **13**, **21**, **28** and **33**, **Zikan** et al teach the penalty imposed involve lost packets (drop rate; col. *4* ln. *16-20*). However, **Zikan** et al may not have *explicitly* mentioned an increased drop rate such that a misbehaving flow has a higher probability of being dropped than flows that do not exhibit undesirable misbehavior. **Skirmont** teaches means for assigning not well-behaved flows to higher drop probabilities and therefore, creating an increased drop rate, than a flow that is well-behaved (col. *4* ln. *64-67*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Zikan** et al for penalty enforcement on misbehaving flows.

Consider claims **12** and **32**, as applied to claims **8** and **28**, **Zikan** et al teach the claimed invention except may not have *explicitly* mentioned the penalty is determined and enforced on the flow even when no congestion condition is encountered. **Skirmont** mentions a Random Early Detection (RED) algorithm comprising means for allowing the dropping of packets *without regard* to the characteristics (e.g. congestion) of a flow (col. *5* ln. *21-24*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to incorporate the RED algorithm as mentioned by **Skirmont** to the load balancer of **Zikan** et al for improving network flow performance.

Consider claims **18** and **38**, as applied to claims **5** and **25**, **Zikan** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising an average size for the information packets of a flow. **Skirmont** teaches in figure *2* an average

queue (flow) size is taken into account when deciding a drop probability (col. *4* ln. *26-34*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Zikan** et al for enforcing flow traffic.

Claims **11** and **31** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Afanador (US 6,167,041)**.

Consider claims **11** and **31**, as applied to claims **8** and **28**, **Zikan** et al disclose the claimed invention except may not have *explicitly* mentioned no penalty is enforced on a flow unless a congestion is encountered, regardless of how undesirably the flow is behaving. **Afanador** teaches that only offending queues (flows) are penalized in time of congestion (col. *8* ln. *25-33*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Afanador** to the penalty function of **Zikan** et al for fair penalization of flows.

Claims **15**, **16**, **17**, **35**, **36** and **37** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Scifres** et al (**US 7,113,990 B2**).

Consider claims **15**, **16**, **17**, **35**, **36** and **37**, as applied to claims **1**, **5**, **16**, **25** and **36**, **Zikan** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising: T for an amount of total information contained in all of the information packets belonging to a flow, an L for how long the flow has been existing, and using T/L to obtain R, which is a rate for information transfer of the flow. **Scifres** et al teach a flow volume

32 (e.g. T) is divided by a time period *46* (e.g. L) to obtain an average flow rate (e.g. R) (col. *5* ln. *9-13*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the calculation method as taught by **Scifres** et al to the penalty function of **Zikan** et al for flow restriction and allocation.

Claims **19**, **20**, **39** and **40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Zikan** et al (**US 6,310,881 B1**) in view of **Kejriwal** et al (**US 6,934,250 B1**).

Consider claims **19**, **20**, **39** and **40**, as applied to claims **5** and **25**, **Zikan** et al disclose the claimed invention except may not have *explicitly* mentioned means for receiving and determining whether to forward a particular information packet to a destination; updating, in response to a determination to forward the particular packet, a set of behavioral statistics to reflect processing of the particular packet; and updating regardless of. **Kejriwal** et al teach means for a policing embodiment determines whether a received packet is to be rejected (discarded) or enqueued (forwarded out of a processor pipeline) to a destination based on a length indicator (packet conforming or non-conforming information); as a statistics table *921* is being written based on the information of the packet, *either* rejected or forwarded. (col. *24* ln. *30-43* & *47-65*; fig. *9* @ *917,922,924,950* → fig. *5A*).

Conclusion

This action is made **FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is 571-270-1780. The examiner can normally be reached on Monday through Friday 8:30 am - 6:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Xavier Szewai Wong/
x.s.w
30th October 2009

/Donald L Mills/
Primary Examiner, Art Unit 2462

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11022599	NATCHU, VISHNU
	Examiner	**Art Unit**
	Xavier Szewai Wong	2462

SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
370	229-236	10.30.09	XSW

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	10.30.09	XSW
Inventor Name and Assignee search in PALM and EAST	10.30.09	XSW

INTERFERENCE SEARCH			
Class	**Subclass**	**Date**	**Examiner**

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	(Natchu near Vishnu).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L2	10012	370/229-236.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L3	29960275	@rlad < "20041222" @ad < "20041222"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L4	7769	L3 and L2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L5	0	(Caspian Sable).as. and (penal$6 with (flow traffic)).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:07
S1	3	(Natchu near Vishnu).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:08
S2	2644	370/229,232,234.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:08
S3	3271	370/233,235,236.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:09
S4	27325885	@rlad < "20041222" @ad < "20041222"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:09

S5	4692	(S2 S3) and S4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:11
S6	2255	S2 and S4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:11
S7	2885	S3 and S4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:11
S8	448	(S2 and S3) and S4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/12/16 19:11

EAST Search History (Interference)

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10/30/2009 7:08:00 PM
C:\Documents and Settings\xwong\Desktop\Natchu\Natchu_Base.wsp

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	(Natchu near Vishnu).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L2	10012	370/229-236.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L3	29960275	@rlad < "20041222" @ad < "20041222"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L4	7769	L3 and L2	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:05
L5	18	L4 and (penal$5 with (flow packet frame traffic stream)) same (statistic$5 behavi $6 histor$5)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:11
L6	1	L4 and (penal$5 with (single one) adj (flow packet frame traffic stream))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:30
L7	9	L4 and (penal$5 same (single one) adj (flow packet frame traffic stream))	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/10/30 19:38

EAST Search History (Interference)

< This search history is empty>

10/ 30/ 2009 8:46:06 PM
C:\ Documents and Settings\ xwong\ My Documents\ EAST\ Workspaces\ Natchu_10.30.09.

w sp

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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8956

43490 7590 03/12/2010

WEST & ASSOCIATES, A PC
1255 Treat Blvd.
3rd Floor
WALNUT CREEK, CA 94597

EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2462	

NOTIFICATION DATE	DELIVERY MODE
03/12/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATENT@WEST-ASSOCIATES.NET
SJWEST@ASTOUND.NET
PATENT@WESTPATENTLAW.COM

Interview Summary	Application No.	Applicant(s)	
	11/022,599	NATCHU, VISHNU	
	Examiner	Art Unit	
	Xavier Szewai Wong	2462	

All participants (applicant, applicant's representative, PTO personnel):

(1) *Xavier Wong*.

(2) *Sara Pfeffer*.

(3)*Vishnu Natchu*.

(4)_____.

Date of Interview: *5th March 2010*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☐ No.
If Yes, brief description: _____.

Claim(s) discussed: *new proposed claim*.

Identification of prior art discussed: *Zikan et al, US 6310881 B2*.

Agreement with respect to the claims f)☐ was reached. g)☐ was not reached. h)☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *discussed invention in general; the examiner recommended further clarification on "behavioral statistics", "heuristically determining said flow" and "penalty" phrases; the applicant will file amendment for further consideration by the examiner*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/Xavier Szewai Wong/
AU 2462 Patent Examiner

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

PTO/SB/30 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	11022599
Filing Date	12/22/2004
First Named Inventor	Natchu
Art Unit	2462
Examiner Name	Xavier Wong
Attorney Docket Number	SABLE-01008US

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).
   - a. [ ] Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.
     - i. [ ] Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
     - ii. [ ] Other _____
   - b. [X] Enclosed
     - i. [X] Amendment/Reply
     - ii. [ ] Affidavit(s)/Declaration(s)
     - iii. [ ] Information Disclosure Statement (IDS)
     - iv. [ ] Other _____
2. Miscellaneous
   - a. [ ] Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)
   - b. [ ] Other _____
3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.
   - a. [ ] The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. _____.
     - i. [ ] RCE fee required under 37 CFR 1.17(e)
     - ii. [ ] Extension of time fee (37 CFR 1.136 and 1.17)
     - iii. [ ] Other _____
   - b. [ ] Check in the amount of $ _____ enclosed
   - c. [X] Payment by credit card (Form PTO-2038 enclosed)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/Sara Dirvianskis/	Date	April 13, 2010
Name (Print/Type)	Sara Dirvianskis	Registration No.	62613

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature			
Name (Print/Type)		Date	

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Patent Application Fee Transmittal

Application Number:	11022599
Filing Date:	22-Dec-2004
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Filer:	Sara Elizabeth Dirvianskis
Attorney Docket Number:	SABLE-01008

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	3	26	78
Independent claims in excess of 3	2201	3	110	330
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Cloudflare - Exhibit 1002, page 121

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 2 months with $0 paid	2252	1	245	245
Miscellaneous:				
Request for continued examination	2801	1	405	405
		Total in USD ($)		**1058**

Electronic Acknowledgement Receipt

EFS ID:	7408876
Application Number:	11022599
International Application Number:	
Confirmation Number:	8956
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Customer Number:	43490
Filer:	Sara Elizabeth Dirvianskis
Filer Authorized By:	
Attorney Docket Number:	SABLE-01008
Receipt Date:	13-APR-2010
Filing Date:	22-DEC-2004
Time Stamp:	20:18:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1058
RAM confirmation Number	6238
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

Cloudflare - Exhibit 1002, page 123

1	Amendment After Final	20100413-SABLE-01008_ROA_finalSDP.pdf	166785 0d65940c6ffd626d8f3f20eb979bd4a412f6e3c5	no	27
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	20100413-SABLE-01008_RCE_transmittal.pdf	127398 11511b0280f8678b62a10fda98dda235434b09ec	no	1
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	35266 36012a891b14ba5497520a636196d7c21dc70b5b	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	329449		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application
Inventor(s): Natchu, Vishnu
Appln. No.: 11/022,599
Confirm. No.: 8956

PATENT APPLICATION

Art Unit: 2462
Examiner: Wong, Xavier S.

Filed: December 22, 2004
Title: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

Customer No. 43490

RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. §1.111

Mail Stop Amendment
Commissioner for Patents
P.O. 1450
Alexandria, VA 22313-1450

Sir:

This RESPONSE is in reply to the Office Action mailed November 13, 2009. The time for response was set for three months and ended on February 13, 2010. A two-month extension of time is hereby requested and the required fee submitted. A Request for Continued Examination is also hereby requested and the required fee submitted herewith. Additionally, the application has been amended to include three additional independent claims, and the required fee for these claims is submitted herewith. This response, filed April 13, 2010, is therefore timely.

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Summary of Examiner Interview

On March 5, 2010, a telephonic interview with Examiner Wong was conducted specifically regarding the Office Action mailed on November 13, 2009. The cited prior art was discussed and compared to the present application. Amendments were proposed that were seen to possibly overcome the Zikan reference. This RESPONSE therefore sets forth new claims based on the aforementioned discussion.

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Remarks

These remarks are in response to the Office Action mailed November 13, 2009. The total number of claims submitted for consideration is forty three (43).

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Amendments to the Claims

Applicant respectfully amends the claims as follows. A clean copy of the amended claims is included in Appendix A.

What is claimed is:

1. (Original) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed;

determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow.

2. (Original) The method of claim 1, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

3. (Original) The method of claim 1, wherein enforcing the penalty comprises:

imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

4. (Original) The method of claim 1, wherein the penalty is enforced when a congestion condition is encountered.

5. (Original) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

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maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed; and

computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

6. (Original) The method of claim 5, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

7. (Original) The method of claim 6, further comprising:

determining, based at least partially upon the badness factor, a penalty to impose on the flow.

8. (Original) The method of claim 7, further comprising: enforcing the penalty on the flow.

9. (Original) The method of claim 8, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

10. (Original) The method of claim 8, wherein the penalty is enforced on the flow when a congestion condition is encountered.

11. (Original) The method of claim 8, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

12. (Original) The method of claim 8, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

13. (Original) The method of claim 8, wherein determining the penalty comprises:

determining an increased drop rate to impose on one or more information packets belonging to the flow.

14. (Original) The method of claim 13, wherein enforcing the penalty comprises:

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imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

15. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

16. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

17. (Original) The method of claim 16, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

18. (Original) The method of claim 5, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

19. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow;

determining whether to forward the particular information packet to a destination; and

in response to a determination to forward the particular information packet to the destination, updating the set of behavioral statistics to reflect processing of the particular information packet.

20. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow; and

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updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

21. (Original) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed;

means for determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

means for enforcing, in response to a determination that the flow is exhibiting undesirable behavior, a penalty on the flow.

22. (Original) The MFM of claim 21, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

23. (Original) The MFM of claim 21, wherein the means for enforcing the penalty comprises:

means for imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

24. (Original) The MFM of claim 21, wherein the penalty is enforced when a congestion condition is encountered.

25. (Original) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

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means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed; and

means for computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

26. (Original) The MFM of claim 25, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

27. (Original) The MFM of claim 26, further comprising:

means for determining, based at least partially upon the badness factor, a penalty to impose on the flow.

28. (Original) The MFM of claim 27, further comprising: means for enforcing the penalty on the flow.

29. (Original) The MFM of claim 28, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

30. (Original) The MFM of claim 28, wherein the penalty is enforced on the flow when a congestion condition is encountered.

31. (Original) The MFM of claim 28, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

32. (Original) The MFM of claim 28, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

33. (Original) The MFM of claim 28, wherein the means for determining the penalty comprises:

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means for determining an increased drop rate to impose on one or more information packets belonging to the flow.

34. (Original) The MFM of claim 33, wherein the means for enforcing the penalty comprises:

means for imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

35. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

36. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

37. (Original) The MFM of claim 36, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

38. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

39. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow;

means for determining whether to forward the particular information packet to a destination; and

means for updating, in response to a determination to forward the particular information packet to the destination, the set of behavioral statistics to reflect processing of the particular information packet.

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40. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow; and

means for updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

41. (New) A machine-implemented method for processing a single flow, the flow comprising a plurality of packets, and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content-agnostic behavioral statistics pertaining to said flow;

said router updating said flow block with the payload-content-agnostic behavioral statistics as packets belonging to said flow are processed by said router;

said router heuristically determining whether said flow exhibits undesirable behavior by comparing at least one of said payload-content-agnostic behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow exhibits undesirable behavior, enforcing, relative to at least one packet, a penalty;

wherein said payload-content-agnostic behavioral statistics for said flow are calculated by said router without requiring use of inter-router data.

42. (New) A computer-readable medium having computer-executable instructions for performing a method to process a single flow, the flow comprising a plurality of packets, and the method comprising:

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creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content agnostic behavioral statistics about said flow;

said router updating said flow block with the flow's behavioral statistics as packets belonging to said flow are processed by said router;

said router heuristically determining whether said flow is exhibiting undesirable behavior by comparing at least one of said behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow is exhibiting undesirable behavior, enforcing, relative to at least one packet belonging to said flow, a penalty;

wherein said behavioral statistics for said flow are calculated by said router and independent of inter-router data.

43. (New) An article of manufacture comprising:

a computer-readable medium having stored thereon a data structure;

a first field containing data representing a flow block;

a second field containing data representing payload-content-agnostic behavioral statistics about a flow;

a third field containing data representing pre-determined behavior threshold values;

a fourth field containing data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values;

a fifth field containing data representing at least one penalty to be enforced against at least one packet upon determination that said flow exhibits undesirable behavior.

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Response to Rejections under 35 USC §102

As previously stated in an earlier response: the Office Action mistakenly asserts that the dynamic load balancer in Zikan et al. is equivalent to the misbehaving flow manager (MFM) of the present application. Conversely, these two components have different functions and utilize different types of information, as described below. And while the result of the method taught in Zikan is improved routing capabilities (col. 1, ln 17-20; col. 2, ln 52-59), in the present invention "processing a packet my, but does not necessarily, involve forwarding the packet to another router." [detailed description of present application, hereinafter "Natchu", para 29]

Claim 1 teaches "a machine implemented method for processing a flow…" This is a method for processing a single flow, whereby only the statistics and behavior of that one flow are used to determine its outcome. [Natchu, para 30-31] By contrast, the Zikan method teaches a network traffic direction system comprising several router modules that, by communicating with each other, determine changes in the overall communication system and adapt accordingly. [See FIGs. 1, 2A, 2B] Thus, the Zikan reference teaches multiple nodes that acquire information from multiple sources and make changes to groups of flows, whereas the present invention is directed to a method for processing one flow at a time based on information from only that one flow.

Claim 1 of the present application also teaches "maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated as information packets belonging to the flow are processed." This claim is directed to processing a single flow. Information pertaining to each packet belonging to a single flow is collected by the misbehaving flow manager (MFM), and each set of behavioral statistics contains information from only one flow. [Natchu, para 35; FIGs. 3-4] By contrast, the dynamic load balancer of Zikan is "configured to determine flows based on the home and neighbor potentials," and "uses information collected by

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the neighborhood supervisor unit 214 of the home router module 130 from the neighboring router modules 130." [col. 2, ln 45-47; col. 5, ln 34-37; see also col. 17, ln 18-29]

In claim 1 of the present application, "the set of behavioral statistics is updated as information packets belonging to [a single] flow are processed." Additionally, statistics for each flow processed by a router are separate and distinct, and the statistics for one flow are not used to determine the outcome of another flow. [Natchu, para 29-30; FIGs. 3-4] By contrast, the dynamic load balancer of Zikan "adjusts the routing tables of the router table unit 218 based upon the information collected [from neighboring router modules] in order to optimize overall utilization of the data communication system served by the network traffic director system 110." [col. 5, ln 34-41] "The dynamic load balancer unit 216 uses information from the neighborhood supervisor unit 214 to determine parameters that the routing table unit 218 then uses to prepare routing table data." [col. 7, ln 63-66] The method for determining these parameters and optimizing traffic flow is discussed in columns 8-11 of Zikan.

Mathematically, the method is expressed in column 9, lines 45-50 of Zikan, and "the expression $E_{\alpha,\beta}(f)$ incorporates factors associated with individual OD/QoS combinations for each arc "ab" over all the arcs in a data communication system." [col. 10, ln 29-31] An "arc" is defined as a direction that a packet can travel along a link, and "for typical flow conditions in a data communication system, an overall flow in a particular arc typically is a conglomeration of one or more separate flows." [col. 8, ln 12-14, 48-50] Thus, in the Zikan reference, the method used to optimize traffic flow in a communication system incorporates information from several flows, whereas the method in the present application utilizes information from a single flow. [See also col. 17, ln 39-46]

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Claim 1 of the present application includes "determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior." Therefore, once all statistics for a single flow are collected, the MFM decides how to treat that particular flow (e.g., whether to drop all or part of it, etc.) [Natchu, para 30] By contrast, the dynamic load balancer 216 in Zikan collects information from "router modules scattered throughout a data communication system" via the neighborhood supervisor unit 214. [col. 15, ln 43-44, 61-63] The information collected within a predetermined period of time is then analyzed and compared to the information collected from the previous time period. If certain parameters have changed or been reached, the dynamic load balancer subsequently updates its associated routing table. [col. 19, ln 12-25] Therefore, while the system in Zikan collects information during a predetermined time period and compares it with information from another time period, the method of the present invention collects information for a single flow, without time limits, and does not compare it to statistics for another flow.

The method of claim 1 in the present application also comprises, "in response to determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow." In the present invention, any given penalty imposed is applied to only a single flow; the decision to enforce a penalty is not carried out on multiple flows at a time. [Natchu, para 31-32; FIGs. 3, 5] Moreover, in the present invention a penalty can include dropping a packet or enforcing an increased drop rate on the flow [Natchu, para 31-32, 41-44].

By contrast, the penalty function involved in the Zikan system is actually a measure of undesirable influences affecting the flow of communication in the entire data communication system. [col. 9, ln 62-65] This penalty function requires consideration of a multitude of factors relating to a plurality of flows within the data system. "The solution to the optimization of the

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uniquely formulated [penalty function] over all the component flows…results in solutions of flow $f_{j,ab}$ for each OD/QoS combination "j" for each arc "ab" in the data communication system." [col. 10, ln 52-58] Moreover, Zikan does not teach a penalty function that includes dropping a flow or increasing the drop rate for a flow. Instead, the penalty function of Zikan determines the presence of undesirable influences in the data communication system that may be remedied by changing parameters stored in routing tables. Thus, the penalty function does not impose an action on a single flow as the result of that single flow's behavior.

For the foregoing reasons, claim 1 is not anticipated by Zikan and Applicant respectfully requests that the rejection to claim 1 be withdrawn.

Claim 21 was also rejected as being anticipated by Zikan. The elements of claim 21 parallel those of claim 1. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejection of claim 21 under §102(b), and Applicant respectfully requests that the rejection to claim 21 be withdrawn.

Rejections to Claims 5 & 25 Under §102(b)

Claim 5 teaches a method that comprises "maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated as information packets belonging to the flow are processed." These same elements are also present in claim 1. Therefore, the aforementioned arguments with respect to the rejection of claim 1 under §102(b) are likewise applicable to these elements of claim 5, and Applicant asserts that Zikan does not anticipate these elements.

Claim 5 also teaches "computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of

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whether the flow is exhibiting undesirable behavior." The badness factor taught by the present application employs a set of behavioral statistics for a single flow, and its resulting calculation is utilized by the MFM to determine whether a penalty should be enforced on the flow. [Natchu, para 30, 41]

By contrast, the expression $E_{\alpha,\beta}(f)$ in Zikan necessarily requires computation of data from all flows in a communication system in order to assess the state of the system as a whole. "The solution for data flows also optimizes the following uniquely formulated expression $E_{\alpha,\beta}(f)$ involving a substantially quadratic function of data flows in a data communication system." [col. 9, ln 40-44] "The expression $E_{\alpha,\beta}(f)$ incorporates factors associated with individual OD/QoS combinations for each arc "ab" over all the arcs in a data communication system." [col. 10, ln 29-31] Moreover, once $E_{\alpha,\beta}(f)$ is computed, any changes made are applied to a group of flows in the system; there is no drop-rate penalty enforced on an individual flow.

For the foregoing reasons, claim 5 is not anticipated by Zikan and Applicant respectfully requests that the rejection to claim 5 be withdrawn.

Claim 25 was also rejected as being anticipated by Zikan. The elements of claim 25 parallel those of claim 5. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejection of claim 25 under §102(b), and Applicant respectfully requests that the rejection to claim 25 be withdrawn.

Rejections to Claims 2, 4, 6-10, 22, 24, 26-30 Under §102(b)

Claims 2, 4, 6-10, 22, 24, and 26-30 were also rejected under §102(b) as being anticipated by Zikan. Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim. 37 CFR 1.75. As shown above, claims 1, 5,

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21, and 25 are not anticipated by Zikan. Claims 2 & 4 depend from claim 1; claims 6-10 depend from claim 5; claims 22 & 24 depend from claim 21; and claims 26-30 depend from claim 25. Therefore, Applicant respectfully requests that these rejections be withdrawn as well.

Response to Rejections under 35 USC §103

Claims 3, 12-14, 18, 23, 32-34, and 38 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zikan et al in view of Skirmont. Claims 11 and 31 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zikan et al in view of Afanador. Claims 15-17, 35-37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Zikan et al in view of Scifres et al. Claims 19-20, 39-40 were rejected under §103(a) as being unpatentable over Zikan in view of Kejriwal et al.

Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim. 37 CFR 1.75. Claim 3 is dependent on independent claim 1 and therefore includes all the limitations of claim 1. Claims 12-14, 18 are dependent on independent claim 5 and therefore include all the limitations of claim 5. Claim 23 is dependent on independent claim 21 and therefore includes all the limitations of claim 21. Claims 32-34, 38 are dependent on independent claim 25 and therefore include all the limitations of claim 25. As explained above with respect to the §102 rejections, independent claims 1, 5, 21, and 25 are not anticipated by Zikan. It follows that claims 3, 12-14, 18, 23, 32-34, and 38 are not anticipated by Zikan in view of any combination of references. Therefore, Applicant respectfully requests that the rejections to these claims be withdrawn.

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Conclusion

Applicant respectfully asserts that the cited references do not render the claims unpatentable, either singularly or in combination. In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowed and a Notice of Allowance is earnestly solicited. The Examiner is respectfully requested to telephone the undersigned if she can assist in any way in expediting the issuance of a patent.

Respectfully submitted,

By: /Sara Dirvianskis/
Sara Dirvianskis
Reg. No. 62,613

Dated: April 13, 2010

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Appendix A: Clean Copy of Amended Claims

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What is claimed is:

1. (Original) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed;

determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow.

2. (Original) The method of claim 1, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

3. (Original) The method of claim 1, wherein enforcing the penalty comprises:

imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

4. (Original) The method of claim 1, wherein the penalty is enforced when a congestion condition is encountered.

5. (Original) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed; and

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computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

6. (Original) The method of claim 5, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

7. (Original) The method of claim 6, further comprising:

determining, based at least partially upon the badness factor, a penalty to impose on the flow.

8. (Original) The method of claim 7, further comprising: enforcing the penalty on the flow.

9. (Original) The method of claim 8, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

10. (Original) The method of claim 8, wherein the penalty is enforced on the flow when a congestion condition is encountered.

11. (Original) The method of claim 8, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

12. (Original) The method of claim 8, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

13. (Original) The method of claim 8, wherein determining the penalty comprises:

determining an increased drop rate to impose on one or more information packets belonging to the flow.

14. (Original) The method of claim 13, wherein enforcing the penalty comprises:

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imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

15. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

16. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

17. (Original) The method of claim 16, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

18. (Original) The method of claim 5, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

19. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow;

determining whether to forward the particular information packet to a destination; and

in response to a determination to forward the particular information packet to the destination, updating the set of behavioral statistics to reflect processing of the particular information packet.

20. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow; and

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updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

21. (Original) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed;

means for determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

means for enforcing, in response to a determination that the flow is exhibiting undesirable behavior, a penalty on the flow.

22. (Original) The MFM of claim 21, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

23. (Original) The MFM of claim 21, wherein the means for enforcing the penalty comprises:

means for imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

24. (Original) The MFM of claim 21, wherein the penalty is enforced when a congestion condition is encountered.

25. (Original) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

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means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics are updated as information packets belonging to the flow are processed; and

means for computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

26. (Original) The MFM of claim 25, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

27. (Original) The MFM of claim 26, further comprising:

means for determining, based at least partially upon the badness factor, a penalty to impose on the flow.

28. (Original) The MFM of claim 27, further comprising: means for enforcing the penalty on the flow.

29. (Original) The MFM of claim 28, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

30. (Original) The MFM of claim 28, wherein the penalty is enforced on the flow when a congestion condition is encountered.

31. (Original) The MFM of claim 28, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

32. (Original) The MFM of claim 28, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

33. (Original) The MFM of claim 28, wherein the means for determining the penalty comprises:

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means for determining an increased drop rate to impose on one or more information packets belonging to the flow.

34. (Original) The MFM of claim 33, wherein the means for enforcing the penalty comprises:

means for imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

35. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

36. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

37. (Original) The MFM of claim 36, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

38. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

39. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow;

means for determining whether to forward the particular information packet to a destination; and

means for updating, in response to a determination to forward the particular information packet to the destination, the set of behavioral statistics to reflect processing of the particular information packet.

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40. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow; and

means for updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

41. (New) A machine-implemented method for processing a single flow, the flow comprising a plurality of packets, and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content-agnostic behavioral statistics pertaining to said flow;

said router updating said flow block with the payload-content-agnostic behavioral statistics as packets belonging to said flow are processed by said router;

said router heuristically determining whether said flow exhibits undesirable behavior by comparing at least one of said payload-content-agnostic behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow exhibits undesirable behavior, enforcing, relative to at least one packet, a penalty;

wherein said payload-content-agnostic behavioral statistics for said flow are calculated by said router without requiring use of inter-router data.

42. (New) A computer-readable medium having computer-executable instructions for performing a method to process a single flow, the flow comprising a plurality of packets, and the method comprising:

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creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content agnostic behavioral statistics about said flow;

said router updating said flow block with the flow's behavioral statistics as packets belonging to said flow are processed by said router;

said router heuristically determining whether said flow is exhibiting undesirable behavior by comparing at least one of said behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow is exhibiting undesirable behavior, enforcing, relative to at least one packet belonging to said flow, a penalty;

wherein said behavioral statistics for said flow are calculated by said router and independent of inter-router data.

43. (New) An article of manufacture comprising:

a computer-readable medium having stored thereon a data structure;

a first field containing data representing a flow block;

a second field containing data representing payload-content-agnostic behavioral statistics about a flow;

a third field containing data representing pre-determined behavior threshold values;

a fourth field containing data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values;

a fifth field containing data representing at least one penalty to be enforced against at least one packet upon determination that said flow exhibits undesirable behavior.

Cloudflare - Exhibit 1002, page 151

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/022,599	12/22/2004	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 04/13/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 43	Minus	** 40	= 3	X $ =		OR	X $52=	156
Independent (37 CFR 1.16(h))	* 7	Minus	***4	= 3	X $ =		OR	X $220=	660
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	**816**

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/BRENDA WEBB/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8956

43490 7590 08/19/2010

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EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2462	

NOTIFICATION DATE	DELIVERY MODE
08/19/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATENT@WEST-ASSOCIATES.NET
SJWEST@ASTOUND.NET
PATENT@WESTPATENTLAW.COM

Office Action Summary	Application No.	Applicant(s)	
	11/022,599	NATCHU, VISHNU	
	Examiner	Art Unit	
	Xavier Szewai Wong	2462	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13th April 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13th April 2010 has been entered.

Response to Arguments

Arguments filed on 13th April 2010 have been considered but are moot in view of *new grounds* of rejections. **Jacobson** et al teaches a method for processing one flow at a time based on information from only that one flow (remarks pg. 12); see rejection below.

Nonetheless, the examiner maintains disagreement that **Zikan** et al cannot be modified to teach "one flow" processing since **Zikan** et al *clearly* states "an overall flow in a particular arc typically is a [conglomeration] of **one** [*or* more separate] **flow**(s)," in other words, the arc flow ***can be*** one single flow (emphasis added). Such (each one / single) arc flow is governed by a penalty and merit function $E_{\alpha,\beta}(f)$ as explained in col. 10 lines 29-30.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims **42** and **43** are directed to non-statutory subject matter. The "computer-readable medium" may be "an optical medium (e.g. an optical fiber), a coaxial cable, or some other type of medium. For purposes of the present invention, network 100 may use any type of transport medium," which may comprise of both *transitory* and *non-transitory* medium as indicated on page 6 paragraph 0017 of the applicant's specification. It **must** be made clear that the invention is claiming a -- Non-Transitory -- computer-readable medium in order for the claims to be statutory.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims **1**, **2, 4 – 8**, **10**, **21**, **22**, **24**, **25**, **27 – 30**, **41** and **42** are rejected under 35 U.S.C. 102(e) as being anticipated by **Jacobson** et al (**US 2005/0226149 A1**).

Consider claims **1** and **21**, **Jacobson** et al teach a dynamic load balancer (e.g. MFM) for processing a flow which comprises of a series of information packets (fig. 1: gateway 106; *abstract*: to identify a non-adaptive flow; [0009] lines 13-15: per-flow basis), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow

([0098]: changing parameters… statistical method for a flow); determining, based upon the behavioral statistics, whether the flow is exhibiting undesirable behavior ([0086]: detect non-adaptive flow); enforcing, in response to the determination of undesirable behavior, a penalty on the flow ([0101-0102]: penalty for a flow).

Consider claims **5** and **25**, **Jacobson** et al disclose a dynamic load balancer (e.g. MFM) for processing a flow which comprises of a series of information packets (fig. 1: gateway 106; *abstract*: to identify a non-adaptive flow; [0009] lines 13-15: per-flow basis; [0056]: a series of packets), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow ([0098]: changing parameters… statistical method for a flow); computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow ([0097]: DEM for a flow), to provide indication of whether the flow is exhibiting undesirable behavior ([0101-0103]: penalty for a flow).

Consider claims **2** and **22**, as applied to claims **1** and **21**, **Jacobson** et al teach means for the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior ([0101]: reduce sending rate for non-adaptive flow).

Consider claims **4**, **10**, **24** and **30**, as applied to claims **1**, **8**, **21** and **28**, **Jacobson** et al teach that the invention is to solve, among other misbehaviors/faults, congestion in a network ([0098]: congestion); the penalty function is enforced when a misbehavior/fault, such as a congestion, is encountered ([0100-0103]: penalty).

Consider claims **6** and **26**, as applied to claims **5** and **25**, **Jacobson** et al teach the badness factor providing an indication of a degree to which the flow is behaving undesirably ([0097]: DEM for a flow).

Consider claims **7**, **8**, **27** and **28** as applied to claims **6**, **7**, **26** and **27**, **Jacobson** et al teach means for determining, based on the badness factor, a penalty to impose and enforce on the flow ([0098] lines 15-24).

Consider claims **41** and **42**, **Jacobson** et al teach a machine-implemented method for processing a single flow by a computer readable medium having computer-executable instructions (fig. 1: gateway 106; *abstract*: to identify a non-adaptive flow; [0009] lines 13-15: per-flow basis), the flow comprising a plurality of packets ([0056]: a series of packets) and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router (fig. 9: flow block 904 in gateway 106);

said flow block being configured to store payload-content-agnostic behavioral statistics pertaining to said flow ([0095-0097]);

said router updating said flow block with the payload-content-agnostic behavioral statistics as packets belonging to said flow are processed by the router ([0098]: changing parameters… statistical method for a flow);

said router heuristically determining whether said flow exhibits undesirable behavior by comparing at least one of said payload-content-agnostic behavioral statistics to at least one pre-determined threshold value (fig. 2: lower and upper thresholds; [0098] + claims 4 and 5: comparing DEM of a flow to a range); and

upon determination by said router that said flow exhibits undesirable behavior, enforcing, relative to at least one packet, a penalty ([0101-0103]: penalty);

wherein said payload-content-agnostic behavioral statistics for said flow are calculated by said router without (independent of) use of inter-router data (fig. 1: only gateway 106 is used, so there is not other "inter-router" data for gateway 106 to depend on).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims **3**, **12**, **13**, **14**, **18**, **23**, **32**, **33**, **34** and **38** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Skirmont** (**US 6,252,848 B1**).

Consider claims **3**, **13**, **14**, **23**, **33** and **34**, as applied to claims **1**, **8**, **13**, **21**, **28** and **33**, **Jacobson** et al teach the penalty imposed involve lost packets (Zikan, col. *4* ln. *16*-20: drop rate). However, **Jacobson** et al may not have *explicitly* mentioned an increased drop rate such that a misbehaving flow has a higher probability of being dropped than flows that do not exhibit undesirable misbehavior. **Skirmont** teaches means for assigning not well-behaved flows to higher drop probabilities and therefore, creating an increased drop rate, than a flow that is well-behaved (col. *4* ln. *64-67*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Jacobson** et al for penalty enforcement on misbehaving flows.

Consider claims **12** and **32**, as applied to claims **8** and **28**, **Jacobson** et al teach the claimed invention except may not have *explicitly* mentioned the penalty is determined and enforced on the flow even when no congestion condition is encountered. **Skirmont** mentions a Random Early Detection (RED) algorithm comprising means for allowing the dropping of packets *without regard* to the characteristics (e.g. congestion) of a flow (col. *5* ln. *21-24*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to incorporate the RED algorithm as mentioned by **Skirmont** to the load balancer of **Jacobson** et al for improving network flow performance.

Consider claims **18** and **38**, as applied to claims **5** and **25**, **Jacobson** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising an average size for the information packets of a flow. **Skirmont** teaches in

figure *2* an average queue (flow) size is taken into account when deciding a drop probability (col. *4* ln. *26-34*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Jacobson** et al for enforcing flow traffic.

Claims **9** and **29** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Zikan** et al (**US 6,310,881 B1**).

Consider claims **9** and **29**, as applied to claims **8** and **28**, **Jacobson** et al teach means for the penalty has an effect (enforcing) of correcting the flow's behavior such that the flow exhibits less undesirable behavior ([0097-0098]: DEM for a flow). **Jacobson** et al do not very explicitly teach "causing the badness factor to improve." **Zikan** et al teach concept of causing $E_{\alpha,\beta}(f)$ (e.g. badness factor) to improve (*maximization* of merit functions: col. *10* ln. *20-28*). It would have been obvious to one skilled in the art to apply a function of causing improvement in some badness factor as taught by **Zikan** et al to the single flow processing means of **Jacobson** et al to dynamically regulate each flow individually.

Claims **11** and **31** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Afanador** (**US 6,167,041**).

Consider claims **11** and **31**, as applied to claims **8** and **28**, **Jacobson** et al disclose the claimed invention except may not have *explicitly* mentioned no penalty is enforced on a flow unless a congestion is encountered, regardless of how undesirably the flow is behaving. **Afanador** teaches that only offending queues (flows) are penalized

in time of congestion (col. *8* ln. *25-33*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Afanador** to the penalty function of **Jacobson** et al for fair penalization of flows.

Claims **15**, **16**, **17**, **35**, **36** and **37** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Scifres** et al (**US 7,113,990 B2**).

Consider claims **15**, **16**, **17**, **35**, **36** and **37**, as applied to claims **1**, **5**, **16**, **25** and **36**, **Jacobson** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising: T for an amount of total information contained in all of the information packets belonging to a flow, an L for how long the flow has been existing, and using T/L to obtain R, which is a rate for information transfer of the flow. **Scifres** et al teach a flow volume *32* (e.g. T) is divided by a time period *46* (e.g. L) to obtain an average flow rate (e.g. R) (col. *5* ln. *9-13*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the calculation method as taught by **Scifres** et al to the penalty function of **Jacobson** et al for flow restriction and allocation.

Claims **19**, **20**, **39** and **40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Kejriwal** et al (**US 6,934,250 B1**).

Consider claims **19**, **20**, **39** and **40**, as applied to claims **5** and **25**, **Jacobson** et al disclose the claimed invention except may not have *explicitly* mentioned means for

receiving and determining whether to forward a particular information packet to a destination; updating, in response to a determination to forward the particular packet, a set of behavioral statistics to reflect processing of the particular packet; and updating regardless of whether the particular information packet is discarded or forwarded to a destination. **Kejriwal** et al teach means for a policing embodiment determines whether a received packet is to be rejected (discarded) or enqueued (forwarded out of a processor pipeline) to a destination based on a length indicator (packet conforming or non-conforming information); as a statistics table *921* is being written based on the information of the packet, *either* rejected or forwarded. (col. *24* lines *30-43* & *47-65*; fig. *9* @ *917*,*922*,*924*,*950* → fig. 5*A*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the functions as taught by **Kejriwal** et al to the penalty function of **Jacobson** et al for distinguishing good and bad flows individually.

Claim **43** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Yazaki** et al (**US 2010/0110889 A1**).

Consider claim **43**, **Jacobson** et al teach an article of manufacture (fig. 1: gateway 106) comprising:

a computer-readable medium having stored thereon a data structure (figs. 9 and 10 tables);

a first field containing data representing a flow block (fig. 9: column 904 contains indicia of flow of packet; [0082] lines 10-18); and

a second field containing data representing payload-content-agnostic behavioral statistics about a flow (fig. 9: column 906 drop times; [0083] – drop times involve behavior of the packet as shown in [0101]).

While **Jacobson** et al mention:

i.) data representing pre-determined behavior threshold values (fig. 2: lower and upper thresholds; [0098] + claims 4 and 5: comparing DEM of a flow to a range);

ii.) data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values ([0098]: changing parameters… statistical method for a flow; [0098] + claims 4 and 5: comparing DEM of a flow to a range); and

iii.) data representing at least one penalty to be enforced against *at least one* packet upon determination that said flow exhibits undesirable behavior ([0101-0103]: penalty);

Jacobson et al may not have very explicitly mentioned "a third field," "a fourth field," and "a fifth field" to indicate on the table of processes i., ii. and iii. respectively.

Yazaki shows fields ([0061]) that indicate i ([0097] lines 1-4: THR – threshold); ii ([0097] lines 1-4: CNT – count of bytes); and iii ([0097] lines 1-4: W – weight; [0061] lines 13-23: PRIC/PRIN – priority conformance or non-conformance) (see claim 1 also). It would have been obvious to one skilled in the art to modify the data structure (table) of **Jacobson** et al to include fields for i., ii. and iii. as taught by **Yazaki** et al for the purpose of providing more information to judge whether a flow or packet is conformant or not.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier Szewai Wong whose telephone number is 571.270.1780. The examiner can normally be reached on Monday through Friday 10:30 am - 8:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571.272.3174. The fax phone number for the organization where this application or proceeding is assigned is 571.273.8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866.217.9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800.786.9199 (IN USA OR CANADA) or 571.272.1000.

/Xavier Szewai Wong/
Patent Examiner AU 2462
15th August 2010

Notice of References Cited	Application/Control No. 11/022,599	Applicant(s)/Patent Under Reexamination NATCHU, VISHNU	
	Examiner Xavier Szewai Wong	Art Unit 2462	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2005/0226149 A1	10-2005	Jacobson et al.	370/229
*	B	US-2010/0110889 A1	05-2010	Yazaki et al.	370/230
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11022599	NATCHU, VISHNU
	Examiner	Art Unit
	Xavier Szewai Wong	2462

SEARCHED

Class	Subclass	Date	Examiner
370	229-236	10.30.09	XSW
updated	above	08.14.2010	/XSW/

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	10.30.09	XSW
Inventor Name and Assignee search in PALM and EAST	10.30.09	XSW
updated above	08.14.2010	/XSW/

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2549	(block packet) with (behavi$6 statistic$5 histor $5) with updat$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:32
L2	29999827	@rlad < "20041222" @ad < "20041222"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:32
L3	18261	L2 and 370/229-254.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:32
L4	169	L1 and L3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:33
L5	95	(block packet) with (behavi$6 statistic$5 histor $5) with updat$5 with (travers$5 pass$5by pass$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:34
L6	7	L5 and L3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:34
L7	111998	L2 and "370".clas.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:41
L8	113	(block packet) with (behavi$6 statistic$5 histor $5) with (captur $3 updat$5) with (travers$5 pass $5by pass$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:42

L9	20	L8 and L7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:42
L10	4946	(block packet) with (travers$5 pass$5by pass$3) with (captur$5 updat$5)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:56
L11	678	L10 and L7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:57
L12	233	L10 and L3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 15:57
L13	1099	(block packet) with (travers$5 pass$5by pass$3) with (behavio$5 statistic$5)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 16:45
L14	112	L13 and L3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/03/05 16:51

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	122	(Natchu near Vishnu).in. SABLE. as.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 21:53
L2	1	L1 and (penalty and behavio$1r$5). clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 21:53
L3	8357	370/229-236.ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 21:54
L4	7	L3 and (single individual one) adj (flow stream block train) same penal $5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 22:06
L5	27	L3 and (single individual one) adj (flow stream block train) same behavio $1r$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 22:13
L6	4	L3 and (single individual one) adj (flow stream block train) and behavio $1r$5 same penal $5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 22:45
L7	114544	("370"/$ "455"/ $.709/$).ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 22:56
L8	38	L7 and (single individual one) adj (flow stream block train) and behavio $1r$5 same penal $5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 22:57

L9	2	L7 and (single individual one) adj (flow stream block train) same penal $5 same (discard $4 drop$4) same (time period)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/14 23:16

EAST Search History (Interference)

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8/15/2010 1:40:18 AM
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	114544	("370"/$ "455"/$.709/$).ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 20:28
L2	7	L1 and (table list database) same (behavio$1r$4 penalty) same threshold same (flow stream block)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 20:29
L3	1	L1 and (table list database) same behavio$1r$4 same penal$5 same (flow stream block)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 20:31
L4	32	L1 and (table list database) same penal$5 same (flow stream block)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 20:37
L5	159	L1 and (table list database) with threshold with (flow stream)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 21:24
L6	22	L1 and (table list database) with (flow stream) with behavior$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 21:25
L7	45	L1 and (table list database) with (flow stream) with (conform$5 penal $5)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 21:29

L8	3	L1 and (table list database) with (flow stream) with (conform$5 penal $5) same (threshold limit)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 21:31
L9	45	L1 and (table list database) with (flow stream) with (conform$5 penal $5) and (bit field)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/15 21:40

EAST Search History (Interference)

<This search history is empty>

8/15/2010 9:46:55 PM
C:\Documents and Settings\xwong\My Documents\EAST\Workspaces\Natchu_08.15.10.wsp

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application
Inventor(s): Natchu, Vishnu
Appln. No.: 11/022,599
Confirm. No.: 8956

PATENT APPLICATION

Art Unit: 2462
Examiner: Wong, Xavier S.

Filed: December 22, 2004
Title: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

Customer No. 43490

RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. §1.111

Mail Stop Amendment
Commissioner for Patents
P.O. 1450
Alexandria, VA 22313-1450

Sir:

This RESPONSE is in reply to the Office Action mailed August 19, 2010. The time for response was set for three months and ended on November 19, 2010. A three-month extension of time is hereby requested and the required fee submitted. The fee for the addition of one new independent claim is hereby submitted. February 19, 2011 fell on a Saturday, and the following Monday was a federal holiday. This response filed on Tuesday February 22, 2011, is therefore timely.

Cloudflare - Exhibit 1002, page 174

Remarks

These remarks are in response to the Office Action mailed August 19, 2010. The total number of claims submitted for consideration is forty-four (44).

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Amendments to the Claims

Applicant respectfully amends the claims as follows. A clean copy of the amended claims is included in Appendix A.

What is claimed is:

1. (Currently Amended) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics [[are]] is updated based on each information packet belonging to the flow, as each information packet[[s]] belonging to the flow is [[are]] processed, regardless of the presence or absence of congestion;

determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow.

2. (Original) The method of claim 1, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

3. (Original) The method of claim 1, wherein enforcing the penalty comprises:

imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

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4. (Original) The method of claim 1, wherein the penalty is enforced when a congestion condition is encountered.

5. (Currently Amended) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics [[are]] is updated based on each information packet belonging to the flow, as each information packet[[s]] belonging to the flow [[are]] is processed, regardless of the presence or absence of congestion; and

computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

6. (Original) The method of claim 5, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

7. (Original) The method of claim 6, further comprising:

determining, based at least partially upon the badness factor, a penalty to impose on the flow.

8. (Original) The method of claim 7, further comprising: enforcing the penalty on the flow.

9. (Original) The method of claim 8, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

10. (Original) The method of claim 8, wherein the penalty is enforced on the flow when a congestion condition is encountered.

11. (Original) The method of claim 8, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

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12. (Original) The method of claim 8, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

13. (Original) The method of claim 8, wherein determining the penalty comprises:

determining an increased drop rate to impose on one or more information packets belonging to the flow.

14. (Original) The method of claim 13, wherein enforcing the penalty comprises:

imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

15. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

16. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

17. (Original) The method of claim 16, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

18. (Original) The method of claim 5, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

19. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow;

determining whether to forward the particular information packet to a destination; and

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in response to a determination to forward the particular information packet to the destination, updating the set of behavioral statistics to reflect processing of the particular information packet.

20. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow; and

updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

21. (Currently Amended) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics [[are]] is updated based on each information packet belonging to the flow, as each information packet[[s]] belonging to the flow [[are]] is processed, regardless of the presence or absence of congestion;

means for determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

means for enforcing, in response to a determination that the flow is exhibiting undesirable behavior, a penalty on the flow.

22. (Original) The MFM of claim 21, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

23. (Original) The MFM of claim 21, wherein the means for enforcing the penalty comprises:

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means for imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

24. (Original) The MFM of claim 21, wherein the penalty is enforced when a congestion condition is encountered.

25. (Currently Amended) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics [[are]] is updated based on each information packet belonging to the flow, as each information packet[[s]] belonging to the flow [[are]] is processed, regardless of the presence or absence of congestion; and

means for computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

26. (Original) The MFM of claim 25, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

27. (Original) The MFM of claim 26, further comprising:

means for determining, based at least partially upon the badness factor, a penalty to impose on the flow.

28. (Original) The MFM of claim 27, further comprising: means for enforcing the penalty on the flow.

29. (Original) The MFM of claim 28, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

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30. (Original) The MFM of claim 28, wherein the penalty is enforced on the flow when a congestion condition is encountered.

31. (Original) The MFM of claim 28, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

32. (Original) The MFM of claim 28, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

33. (Original) The MFM of claim 28, wherein the means for determining the penalty comprises:

means for determining an increased drop rate to impose on one or more information packets belonging to the flow.

34. (Original) The MFM of claim 33, wherein the means for enforcing the penalty comprises:

means for imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

35. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

36. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

37. (Original) The MFM of claim 36, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

38. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

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39. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow;

means for determining whether to forward the particular information packet to a destination; and

means for updating, in response to a determination to forward the particular information packet to the destination, the set of behavioral statistics to reflect processing of the particular information packet.

40. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow; and

means for updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

41. (Currently Amended) A machine-implemented method for processing a single flow, the flow comprising a plurality of packets, and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content-agnostic behavioral statistics pertaining to said flow, regardless of the presence or absence of congestion;

said router updating said flow block with the payload-content-agnostic behavioral statistics of each packet belonging to said flow, as each packet[[s]] belonging to said flow [[are]] is processed by said router, regardless of the presence or absence of congestion;

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said router heuristically determining whether said flow exhibits undesirable behavior by comparing at least one of said payload-content-agnostic behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow exhibits undesirable behavior, enforcing, relative to at least one packet, a penalty;

wherein ~~said payload-content-agnostic behavioral statistics for said flow are calculated by~~ the preceding steps are performed on said router without requiring use of inter-router data.

42. (Currently Amended) A non-transitory computer-readable medium having computer-executable instructions for performing a method to process a single flow, the flow comprising a plurality of packets, and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content agnostic behavioral statistics about said flow, regardless of the presence or absence of congestion;

said router updating said flow block with the flow's behavioral statistics of each packet belonging to said flow, as each packet[[s]] belonging to said flow [[are]] is processed by said router, regardless of the presence or absence of congestion;

said router heuristically determining whether said flow is exhibiting undesirable behavior by comparing at least one of said behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow is exhibiting undesirable behavior, enforcing, relative to at least one packet belonging to said flow, a penalty;

wherein ~~said behavioral statistics for said flow are calculated by~~ the preceding steps are performed on said router ~~and independent~~ without requiring use of inter-router data.

43. (Currently Amended) An article of manufacture comprising:

a non-transitory computer-readable medium having stored thereon a data structure;

a first field containing data representing a flow block;

a second field containing data representing payload-content-agnostic behavioral statistics about dropped and non-dropped packets of a flow;

a third field containing data representing pre-determined behavior threshold values;

a fourth field containing data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values;

a fifth field containing data representing at least one penalty to be enforced against at least one packet upon determination that said flow exhibits undesirable behavior.

44. (New) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed;

determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior, regardless of the presence or absence of congestion; and

in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow.

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Response to Rejections under 35 USC §101

Claims 42 and 43 were rejected for being directed to non-statutory subject matter. Claims 42 and 43 are currently amended to specify a "non-transitory computer-readable medium." Therefore, Applicant respectfully requests that these rejections be withdrawn.

Response to Rejections under 35 USC §102(e)

Independent claims 1, 5, 21, 25, 41, and 42 were rejected as being anticipated by Jacobson et al (US 2005/0226149 A1). "A claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2USPQ2d 1051, 1053 (Fed.Cir. 1987). Jacobson does not teach every element of each rejected claim.

Jacobson teaches a method:

1) that is implemented only when triggered by a certain quantity of dropped packets;
    a. Jacobson, para [0092] lines 2-3: "A flow becomes a candidate for detection when its representation in the drop record is large;"
    b. Jacobson, para [0009] lines 11-12: "A flow is only tested if it has a significant share of the recorded total drops."
    c. *See also*: Jacobson, para [0096]; claims 1, 10, 19;para [0011], lines 11-15; para [0012].
2) is based on congestion levels;
    a. Jacobson, para [0009] lines 1-4: "A network device identifies a non-adaptive flow as follows. In the presence of congestion, the network device drops packets on a random basis using a Random Early Detection (RED) algorithm;"

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b. Jacobson, para [0009] lines 4-7: "The RED algorithm is used by the network device to calculate a drop interval for the arriving packet stream based on the current congestion level of the target queue."

c. Jacobson, para [0034] lines 1-4: "A Random Early Detection (RED) gateway algorithm is executed within gateway 106 for congestion avoidance in network 100. The RED gateway algorithm detects incipient congestion…"

3) whereby statistics are maintained only for packets that are dropped;

a. Jacobson, para [0009], lines 7-9: "In this invention, when a packet is dropped, one or more header fields of the packertare stored, along with a timestamp of the drop time;"

b. Jacobson, para [0082]: "Table 900 has entries for the state data for dropped packets that is retained in an exemplary embodiment of the invention…;"

c. Jacobson, para [0084] & FIG. 10: showing that statistics are maintained and analysis performed for dropped packets only;

d. Jacobson, para [0085]: explaining that the adaptiveness of a flow is based on drop intervals;

e. Jacobson, FIG. 9 entitled "State Maintained for Dropped Packets."

4) resulting in a determination of whether a flow is non-adaptive, based on drop intervals of the dropped packets.

a. Jacobson, para [0012];

b. Jacobson, FIG. 10 entitled "Flow Analysis for Dropped Packets;"

c. Jacobson, para [0084] and [0085], discussing how state information for dropped packets is used to determine drop intervals and whether a flow is non-adaptive;

d. Jacobson, para [0010] lines 4-6: "The network device then applies a statistical test to drop intervals of a plurality of flows in order to identify the non-adaptive flow."

In contrast to the Jacobson invention, Claim 1 of the present application teaches "maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed." Thus, the flow state is maintained for all packets in a flow, regardless of the end result of their processing. *See* Natchu, para [0006] and [0029].

In other words, claim 1 is directed to a process whereby every packet in a flow is processed, accounted for, and subsequently dropped, forwarded, or otherwise treated; but, the Jacobson invention requires first dropping packets, then analyzing the dropped packets, and subsequently labeling the overall flow as adaptive or non-adaptive.

Thus, since Jacobson does not teach "maintaining a set of behavioral statistics for the flow…based on each information packet," claim 1 is not anticipated by Jacobson.

Additionally, as referenced above, Jacobson is a congestion-based mechanism. It relies on the RED algorithm to drop packets prior to identifying a non-adaptive flow, and the very fact that the RED algorithm begins to drop packets indicates that there is an onset of congestion. It is at that point only that the remaining steps of the Jacobson method can be utilized or implemented. The RED algorithm is an algorithm to detect the onset of congestion, and it reacts to the queue size by dropping packets with certain drop probability, depending on the severity of congestion as indicated by the queue size levels (Jacobson, para [0034] lines 1-8). Furthermore, the paper referenced in paragraph 0034 of Jacobson, entitled "*Random Early Detection*

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Gateways for Congestion Avoidance," explicitly says "the RED gateway detects incipient congestion by computing the average queue size. The gateway could notify connections of congestion either by dropping packets arriving at the gateway or by setting a bit in packet headers" (see Abstract of the referenced paper). The very fact that Jacobson's non-adaptive flow detection mechanism relies on a RED packet drop as a trigger necessarily implies that the mechanism is valid only under congestion.

In contrast, amended claim 1 of the present application teaches: "maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed, *regardless of the presence or absence of congestion*" (emphasis added). Jacobson does not anticipate the congestion-independent aspect of claim 1 (since, as explained above, the Jacobson mechanism is used exclusively in congestion-based situations), and therefore Applicant requests that the rejection to claim 1 be withdrawn.

Moreover, the invention in Jacobson is a nonanalogous reference to the present invention. A congestion-based, dropped packet-triggered, packet-selective, RED algorithm-based method is not a matter or invention which "logically would have commended itself to an inventor's attention in considering the invention" of a non-discriminatory, non-selective, all-packet processing mechanism for identifying and penalizing misbehaving flows, regardless of flow adaptiveness. (MPEP 2141.01(a)(I)). The matters with which the respective inventions deal are significantly different.

In light of the above discussion, Application respectfully requests that the rejections to claim 1 be withdrawn.

Claim 5 was also rejected as being anticipated by Jacobson. The elements of claim 5

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parallel those of claim 1. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejection of claim 5 under §102(e), and Applicant respectfully requests that the rejection to claim 5 be withdrawn.

Claim 21 was also rejected as being anticipated by Jacobson. The elements of claim 21 parallel those of claim 1. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejection of claim 21 under §102(e), and Applicant respectfully requests that the rejection to claim 21 be withdrawn.

Claim 25 was also rejected as being anticipated by Jacobson. The elements of claim 25 parallel those of claim 1. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejection of claim 25 under §102(e), and Applicant respectfully requests that the rejection to claim 25 be withdrawn.

Claims 41 and 42 were also rejected as being anticipated by Jacobson. The elements of claims 41 and 42 parallel those of claim 1. Thus, the arguments made above with respect to claim 1 rejections also apply to the rejections of claims 41 and 42 under §102(e) and Applicant respectfully requests that the rejections to claims 41 and 42 be withdrawn.

Claims 2, 4, 6-8, 10, 22, 24, 27-29, and 30 were also rejected as being anticipated by Jacobson. Claims 2 & 4 depend from claim 1; claims 6-8 and 10 depend from claim 5; claims 22 & 24 depend from claim 21; and claims 27-29 and 30 depend from claim 25. Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim. 37 CFR 1.75. As shown above, claims 1, 5, 21, and 25 are not anticipated by Jacobson. Therefore, Applicant respectfully requests that the rejections to claims 2, 4, 6-8, 10, 22, 24, 27-29, and 30 be withdrawn as well.

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Response to Rejections under 35 USC §103(a)

Claims 3, 12-14, 18, 23, 32-34, and 38 were rejected as being unpatentable over Jacobson in view of Skirmont (US 6,252,848 B1). Claims 9 and 29 were rejected as being unpatentable over Jacobson in view of Zikan (US 6,310,881 B1). Claims 11 and 31 were rejected as being unpatentable over Jacobson in view of Afanador (US 6,167,041). Claims 15-17, 35-37 were rejected as being unpatentable over Jacobson in view of Scifres (US 7,113,990 B2). Claims 19, 20, 39, and 40 were rejected as being unpatentable over Jacobson in view of Kejriwal (US 6,934,250 B1).

The prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2143.

Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim. 37 CFR 1.75. Claim 3 is dependent on independent claim1 and therefore includes all the limitations of claim 1. Claims 9, 11-17, 18-20 are dependent on independent claim 5 and therefore include all the limitations of claim 5. Claim 23 is dependent on independent claim 21 and therefore includes all the limitations of claim 21. Claims 29, 31-40 are dependent on independent claim 25 and therefore include all the limitations of claim 25. As explained above with respect to the §102 rejections, independent claims 1, 5, 21, and 25 are not anticipated by Jacobson. It follows that Jacobson, in view of any combination of cited references, does not teach or suggest all the claim limitations of claims 3, 9, 11-17, 18-20, 23, 29, 31-40. Therefore, Applicant respectfully requests that the rejections to these claims be withdrawn.

Moreover, with respect to claims 12 and 32, the Skirmont reference cannot be used to modify Jacobson to apply to non-congestion conditions. Column 5, lines 21-24 were pointed out

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in the Office Action. However, this specific reference simply states the fact that the RED algorithm may drop packets without regard to whether they were the packets causing congestion in the first place. But, the fact that packets were dropped due to the RED algorithm indicating the onset of congestion cannot be ignored. "The dropping of packets effectively signals congestion in a data network" (Skirmont, col. 1, lines 52-53 and col. 5, lines 17-18).

Skirmont's invention may teach a method for identifying *which* packets to drop in a congestion situation, but in the end it is still an invention to be utilized in congestion conditions, with dropped packets (and, as explained above, dropped packets happen at the onset of congestion). In contrast, claims 12 and 32 teach a mechanism that can operate on every packet, in the absence of congestion. Since a mechanism that stores behavioral statistics about *each* packet, and which operates regardless of whether any congestion is encountered, is not taught or suggested by Jacobson and/or Skirmont, Applicant requests that these rejections be withdrawn. Likewise, Skirmont cannot be used in combination with Jacobson as a basis for rejecting any other claim, since independent claims 1, 5, 21, 25, 41, and 42 are all "regardless of the presence or absence of congestion."

Claim 43 was rejected as being unpatentable over Jacobson in view of Yazaki (US 2010/0110889 A1). Claim 43 is currently amended to specify "a second field containing data representing payload-content-agnostic behavioral statistics about dropped and non-dropped packets of a flow." Jacobson does not teach or suggest gathering statistics pertaining to non-dropped packets of a flow. Moreover, Jacobson cannot be modified in any reasonable manner to include statistic or statistical analysis pertaining to any type of packets other than dropped packets. Thus, Jacobson, in view of Yazaki, does not teach or suggest all the claim limitations of claim 43 and Applicant respectfully requests that the rejections to this claim be withdrawn.

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Conclusion

Applicant respectfully asserts that the cited references do not render the claims unpatentable, either singularly or in combination. In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowed and a Notice of Allowance is earnestly solicited. The Examiner is respectfully requested to telephone the undersigned if she can assist in any way in expediting the issuance of a patent.

Respectfully submitted,

By: /Sara Dirvianskis/
Sara Dirvianskis
Reg. No. 62613

Dated: February 22, 2011

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Appendix A: Clean Copy of Amended Claims

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What is claimed is:

1. (Currently Amended) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed, regardless of the presence or absence of congestion;

determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow.

2. (Original) The method of claim 1, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

3. (Original) The method of claim 1, wherein enforcing the penalty comprises:

imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

4. (Original) The method of claim 1, wherein the penalty is enforced when a congestion condition is encountered.

5. (Currently Amended) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each

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information packet belonging to the flow is processed, regardless of the presence or absence of congestion; and

computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

6. (Original) The method of claim 5, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

7. (Original) The method of claim 6, further comprising:

determining, based at least partially upon the badness factor, a penalty to impose on the flow.

8. (Original) The method of claim 7, further comprising: enforcing the penalty on the flow.

9. (Original) The method of claim 8, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

10. (Original) The method of claim 8, wherein the penalty is enforced on the flow when a congestion condition is encountered.

11. (Original) The method of claim 8, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

12. (Original) The method of claim 8, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

13. (Original) The method of claim 8, wherein determining the penalty comprises:

determining an increased drop rate to impose on one or more information packets belonging to the flow.

14. (Original) The method of claim 13, wherein enforcing the penalty comprises:

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imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

15. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

16. (Original) The method of claim 5, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

17. (Original) The method of claim 16, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

18. (Original) The method of claim 5, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

19. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow;

determining whether to forward the particular information packet to a destination; and

in response to a determination to forward the particular information packet to the destination, updating the set of behavioral statistics to reflect processing of the particular information packet.

20. (Original) The method of claim 5, wherein maintaining the set of behavioral statistics comprises:

receiving a particular information packet belonging to the flow; and

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updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

21. (Currently Amended) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed, regardless of the presence or absence of congestion;

means for determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and

means for enforcing, in response to a determination that the flow is exhibiting undesirable behavior, a penalty on the flow.

22. (Original) The MFM of claim 21, wherein enforcing the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior.

23. (Original) The MFM of claim 21, wherein the means for enforcing the penalty comprises:

means for imposing an increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

24. (Original) The MFM of claim 21, wherein the penalty is enforced when a congestion condition is encountered.

25. (Currently Amended) A misbehaving flow manager (MFM) for processing a flow, the flow comprising a series of information packets, the MFM comprising:

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means for maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed, regardless of the presence or absence of congestion; and

means for computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow, wherein the badness factor provides an indication of whether the flow is exhibiting undesirable behavior.

26. (Original) The MFM of claim 25, wherein the badness factor also provides an indication of a degree to which the flow is behaving undesirably.

27. (Original) The MFM of claim 26, further comprising:

means for determining, based at least partially upon the badness factor, a penalty to impose on the flow.

28. (Original) The MFM of claim 27, further comprising: means for enforcing the penalty on the flow.

29. (Original) The MFM of claim 28, wherein enforcing the penalty on the flow causes the flow to exhibit less undesirable behavior, thereby, causing the badness factor of the flow to improve.

30. (Original) The MFM of claim 28, wherein the penalty is enforced on the flow when a congestion condition is encountered.

31. (Original) The MFM of claim 28, wherein no penalty is enforced on the flow unless a congestion condition is encountered, regardless of how undesirably the flow is behaving.

32. (Original) The MFM of claim 28, wherein the penalty is determined and enforced on the flow even when no congestion condition is encountered.

33. (Original) The MFM of claim 28, wherein the means for determining the penalty comprises:

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means for determining an increased drop rate to impose on one or more information packets belonging to the flow.

34. (Original) The MFM of claim 33, wherein the means for enforcing the penalty comprises:

means for imposing the increased drop rate on the flow such that the information packets belonging to the flow have a higher probability of being dropped than information packets belonging to other flows that do not exhibit undesirable behavior.

35. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure T of how much total information has been contained in all of the information packets belonging to the flow that have been forwarded up to a current point in time.

36. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises a measure L of how long the flow has been in existence up to a current point in time.

37. (Original) The MFM of claim 36, wherein the set of behavioral statistics comprises a rate R of information transfer for the flow, wherein R is derived by dividing T by L.

38. (Original) The MFM of claim 25, wherein the set of behavioral statistics comprises an average size for the information packets belonging to the flow.

39. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow;

means for determining whether to forward the particular information packet to a destination; and

means for updating, in response to a determination to forward the particular information packet to the destination, the set of behavioral statistics to reflect processing of the particular information packet.

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40. (Original) The MFM of claim 25, wherein the means for maintaining the set of behavioral statistics comprises:

means for receiving a particular information packet belonging to the flow; and

means for updating the set of behavioral statistics to reflect processing of the particular information packet, regardless of whether the particular information packet is discarded or forwarded to a destination.

41. (Currently Amended) A machine-implemented method for processing a single flow, the flow comprising a plurality of packets, and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content-agnostic behavioral statistics pertaining to said flow, regardless of the presence or absence of congestion;

said router updating said flow block with the payload-content-agnostic behavioral statistics of each packet belonging to said flow, as each packet belonging to said flow is processed by said router, regardless of the presence or absence of congestion;

said router heuristically determining whether said flow exhibits undesirable behavior by comparing at least one of said payload-content-agnostic behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow exhibits undesirable behavior, enforcing, relative to at least one packet, a penalty;

wherein the preceding steps are performed on said router without requiring use of inter-router data.

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42. (Currently Amended) A non-transitory computer-readable medium having computer-executable instructions for performing a method to process a single flow, the flow comprising a plurality of packets, and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router;

said flow block being configured to store payload-content agnostic behavioral statistics about said flow, regardless of the presence or absence of congestion;

said router updating said flow block with the flow's behavioral statistics of each packet belonging to said flow, as each packet belonging to said flow is processed by said router, regardless of the presence or absence of congestion;

said router heuristically determining whether said flow is exhibiting undesirable behavior by comparing at least one of said behavioral statistics to at least one pre-determined threshold value; and

upon determination by said router that said flow is exhibiting undesirable behavior, enforcing, relative to at least one packet belonging to said flow, a penalty;

wherein the preceding steps are performed on said router without requiring use of inter-router data.

43. (Currently Amended) An article of manufacture comprising:

a non-transitory computer-readable medium having stored thereon a data structure;

a first field containing data representing a flow block;

a second field containing data representing payload-content-agnostic behavioral statistics about dropped and non-dropped packets of a flow;

a third field containing data representing pre-determined behavior threshold values;

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a fourth field containing data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values;

a fifth field containing data representing at least one penalty to be enforced against at least one packet upon determination that said flow exhibits undesirable behavior.

44. (New) A machine implemented method for processing a flow, the flow comprising a series of information packets, the method comprising:

maintaining a set of behavioral statistics for the flow, wherein the set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed;

determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior, regardless of the presence or absence of congestion; and

in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow.

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Electronic Patent Application Fee Transmittal

Application Number:	11022599
Filing Date:	22-Dec-2004
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Filer:	Sara Elizabeth Dirvianskis
Attorney Docket Number:	SABLE-01008

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	1	26	26
Independent claims in excess of 3	2201	1	110	110
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 3 months with $0 paid	2253	1	555	555
Miscellaneous:				
			Total in USD ($)	**691**

Electronic Acknowledgement Receipt

EFS ID:	9498124
Application Number:	11022599
International Application Number:	
Confirmation Number:	8956
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Customer Number:	43490
Filer:	Sara Elizabeth Dirvianskis
Filer Authorized By:	
Attorney Docket Number:	SABLE-01008
Receipt Date:	22-FEB-2011
Filing Date:	22-DEC-2004
Time Stamp:	20:33:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$691
RAM confirmation Number	11828
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / .zip	Pages (if appl.)

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1	Amendment/Req. Reconsideration-After Non-Final Reject	20110222-SABLE-01008_ROA_FinalSDP.pdf	195074 5bcbe759ac889d2f9de4eaa404af16601aa670ef	no	29
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	33530 5b1312484b72f34d6e1a0876cbfa518b217b8b81	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	228604	

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/022,599	Filing Date 12/22/2004	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	02/22/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 44	Minus	** 43	= 1	X $ =		OR	X $52=	52
	Independent (37 CFR 1.16(h))	* 8	Minus	***7	= 1	X $ =		OR	X $220=	220
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	272

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/TAMARA DARKO/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8956

43490 7590 05/16/2011

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EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2462	

NOTIFICATION DATE	DELIVERY MODE
05/16/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATENT@WESTPATENTLAW.COM
DOCKET@WESTPATENTLAW.COM
STUARTJAMESWEST@COMCAST.NET

Office Action Summary	Application No.	Applicant(s)	
	11/022,599	NATCHU, VISHNU	
	Examiner	Art Unit	
	Xavier Szewai Wong	2462	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22nd February 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims **1**, **2**, **4 – 8**, **10**, **21**, **22**, **24**, **25**, **27 – 30**, **41**, **42** and **44** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Malan** et al (**US 2002/0032717 A1**).

Consider claims **1**, **21** and **44**, **Jacobson** et al teach a dynamic load balancer (e.g. MFM) and machine-implemented method for processing a flow which comprises of a series of information packets (fig. 1: gateway 106; *abstract*: to identify a non-adaptive flow; [0009] lines 13-15: per-flow basis), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow ([0098]: changing parameters… statistical method for a flow); determining, based upon the behavioral statistics, whether the flow is exhibiting undesirable behavior ([0086]: detect non-adaptive flow); enforcing, in response to the determination of undesirable behavior, a penalty on the flow ([0101-0102]: penalty for a flow). **Jacobsen** et al do not very explicitly mention the set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion*. **Malan** et al teaches concept function of set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of*

congestion ([0119]: Flow statistics aggregate a flow's individual packet statistics into a single statistic – when individual packet statistics are aggregated (e.g. accumulated), the single statistic varies accordingly as individual packet statistics get accumulated; there is no congestion condition requirement in **Malan**). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the behavioral statistic update method of Jacobsen et al to that of Malan et al for more effective profiling of network flows.

Consider claims **5** and **25**, **Jacobson** et al disclose a dynamic load balancer (e.g. MFM) for processing a flow which comprises of a series of information packets (fig. 1: gateway 106; *abstract*: to identify a non-adaptive flow; [0009] lines 13-15: per-flow basis; [0056]: a series of packets), the balancer comprising means for: maintaining a set of behavioral statistics, which are updated as information packets belong to the flow are processed, for the flow ([0098]: changing parameters… statistical method for a flow); computing, based at least partially upon the set of behavioral statistics, a badness factor for the flow ([0097]: DEM for a flow), to provide indication of whether the flow is exhibiting undesirable behavior ([0101-0103]: penalty for a flow). **Jacobsen** et al do not very explicitly mention the set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion*. **Malan** et al teaches concept function of set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion* ([0119]: Flow

statistics aggregate a flow's individual packet statistics into a single statistic – when individual packet statistics are aggregated (e.g. accumulated), the single statistic varies accordingly as individual packet statistics get accumulated; there is no congestion condition requirement in **Malan**). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the behavioral statistic update method of Jacobsen et al to that of Malan et al for more effective profiling of network flows.

Consider claims **2** and **22**, as applied to claims **1** and **21**, **Jacobson** et al teach means for the penalty has an effect of correcting the flow's behavior such that the flow exhibits less undesirable behavior ([0101]: reduce sending rate for non-adaptive flow).

Consider claims **4**, **10**, **24** and **30**, as applied to claims **1**, **8**, **21** and **28**, **Jacobson** et al teach that the invention is to solve, among other misbehaviors/faults, congestion in a network ([0098]: congestion); the penalty function is enforced when a misbehavior/fault, such as a congestion, is encountered ([0100-0103]: penalty).

Consider claims **6** and **26**, as applied to claims **5** and **25**, **Jacobson** et al teach the badness factor providing an indication of a degree to which the flow is behaving undesirably ([0097]: DEM for a flow).

Consider claims **7**, **8**, **27** and **28** as applied to claims **6**, **7**, **26** and **27**, **Jacobson** et al teach means for determining, based on the badness factor, a penalty to impose and enforce on the flow ([0098] lines 15-24).

Consider claims **41** and **42**, **Jacobson** et al teach a machine-implemented method for processing a single flow by a computer readable medium having computer-executable instructions (fig. 1: gateway 106; *abstract*: to identify a non-adaptive flow; [0009] lines 13-15: per-flow basis), the flow comprising a plurality of packets ([0056]: a series of packets) and the method comprising:

creating a flow block as the first packet of a flow is processed by a single router (fig. 9: flow block 904 in gateway 106);

said flow block being configured to store payload-content-agnostic behavioral statistics pertaining to said flow ([0095-0097]);

said router updating said flow block with the payload-content-agnostic behavioral statistics as packets belonging to said flow are processed by the router ([0098]: changing parameters… statistical method for a flow);

said router heuristically determining whether said flow exhibits undesirable behavior by comparing at least one of said payload-content-agnostic behavioral statistics to at least one pre-determined threshold value (fig. 2: lower and upper thresholds; [0098] + claims 4 and 5: comparing DEM of a flow to a range); and

upon determination by said router that said flow exhibits undesirable behavior, enforcing, relative to at least one packet, a penalty ([0101-0103]: penalty);

wherein said payload-content-agnostic behavioral statistics for said flow are calculated by said router without (independent of) use of inter-router data (fig. 1: only gateway 106 is used, so there is not other “inter-router” data for gateway 106 to depend on).

Jacobsen et al do not very explicitly mention the set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion*. **Malan** et al teaches concept function of set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion* ([0119]: Flow statistics aggregate a flow's individual packet statistics into a single statistic – when individual packet statistics are aggregated (e.g. accumulated), the single statistic varies accordingly as individual packet statistics get accumulated; there is no congestion condition requirement in **Malan**). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the behavioral statistic update method of Jacobsen et al to that of Malan et al for more effective profiling of network flows.

Claims **3**, **12**, **13**, **14**, **18**, **23**, **32**, **33**, **34** and **38** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Malan** et al (**US 2002/0032717 A1**) and in further view of **Skirmont** (**US 6,252,848 B1**).

Consider claims **3**, **13**, **14**, **23**, **33** and **34**, as applied to claims **1**, **8**, **13**, **21**, **28** and **33**, **Jacobson** et al teach the penalty imposed involve lost packets (Jacobsen, [0103]: dropped packet record … penalty box). However, **Jacobson** et al may not have *explicitly* mentioned an increased drop rate such that a misbehaving flow has a higher probability of being dropped than flows that do not exhibit undesirable misbehavior.

Skirmont teaches means for assigning not well-behaved flows to higher drop probabilities and therefore, creating an increased drop rate, than a flow that is well-behaved (col. *4* ln. *64-67*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Jacobson** et al for penalty enforcement on misbehaving flows.

Consider claims **12** and **32**, as applied to claims **8** and **28**, **Jacobson** et al teach the claimed invention except may not have *explicitly* mentioned the penalty is determined and enforced on the flow even when no congestion condition is encountered. **Skirmont** mentions a Random Early Detection (RED) algorithm comprising means for allowing the dropping of packets *without regard* to the characteristics (e.g. congestion) of a flow (col. *5* ln. *21-24*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to incorporate the RED algorithm as mentioned by **Skirmont** to the load balancer of **Jacobson** et al for improving network flow performance.

Consider claims **18** and **38**, as applied to claims **5** and **25**, **Jacobson** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising an average size for the information packets of a flow. **Skirmont** teaches in figure *2* an average queue (flow) size is taken into account when deciding a drop probability (col. *4* ln. *26-34*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Skirmont** to the penalty function of **Jacobson** et al for enforcing flow traffic.

Claims **9** and **29** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Malan** et al (**US 2002/0032717 A1**) and in further view of **Zikan** et al (**US 6,310,881 B1**).

Consider claims **9** and **29**, as applied to claims **8** and **28**, **Jacobson** et al teach means for the penalty has an effect (enforcing) of correcting the flow's behavior such that the flow exhibits less undesirable behavior ([0097-0098]: DEM for a flow). **Jacobson** et al do not very explicitly teach "causing the badness factor to improve." **Zikan** et al teach concept of causing $E_{\alpha,\beta}(f)$ (e.g. badness factor) to improve (*maximization* of merit functions: col. *10* ln. *20-28*). It would have been obvious to one skilled in the art to apply a function of causing improvement in some badness factor as taught by **Zikan** et al to the single flow processing means of **Jacobson** et al to dynamically regulate each flow individually.

Claims **11** and **31** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Malan** et al (**US 2002/0032717 A1**) and in further view of **Afanador** (**US 6,167,041**).

Consider claims **11** and **31**, as applied to claims **8** and **28**, **Jacobson** et al disclose the claimed invention except may not have *explicitly* mentioned no penalty is enforced on a flow unless a congestion is encountered, regardless of how undesirably the flow is behaving. **Afanador** teaches that only offending queues (flows) are penalized in time of congestion (col. *8* ln. *25-33*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the teachings of **Afanador** to the penalty function of **Jacobson** et al for fair penalization of flows.

Claims **15**, **16**, **17**, **35**, **36** and **37** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Malan** et al (**US 2002/0032717 A1**) and in further view of **Scifres** et al (**US 7,113,990 B2**).

Consider claims **15**, **16**, **17**, **35**, **36** and **37**, as applied to claims **1**, **5**, **16**, **25** and **36**, **Jacobson** et al teach the claimed invention except may not have *explicitly* mentioned the behavioral statistics comprising: T for an amount of total information contained in all of the information packets belonging to a flow, an L for how long the flow has been existing, and using T/L to obtain R, which is a rate for information transfer of the flow. **Scifres** et al teach a flow volume *32* (e.g. T) is divided by a time period *46* (e.g. L) to obtain an average flow rate (e.g. R) (col. *5* ln. *9-13*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the calculation method as taught by **Scifres** et al to the penalty function of **Jacobson** et al for flow restriction and allocation.

Claims **19**, **20**, **39** and **40** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Malan** et al (**US 2002/0032717 A1**) and in further view of **Kejriwal** et al (**US 6,934,250 B1**).

Consider claims **19**, **20**, **39** and **40**, as applied to claims **5** and **25**, **Jacobson** et al disclose the claimed invention except may not have *explicitly* mentioned means for receiving and determining whether to forward a particular information packet to a destination; updating, in response to a determination to forward the particular packet, a

set of behavioral statistics to reflect processing of the particular packet; and updating regardless of whether the particular information packet is discarded or forwarded to a destination. **Kejriwal** et al teach means for a policing embodiment determines whether a received packet is to be rejected (discarded) or enqueued (forwarded out of a processor pipeline) to a destination based on a length indicator (packet conforming or non-conforming information); as a statistics table *921* is being written based on the information of the packet, *either* rejected or forwarded. (col. *24* lines *30-43* & *47-65*; fig. *9* @ *917*,*922*,*924*,*950* → fig. 5*A*). It would have been obvious to one of ordinary skill in the art at the time the invention was created to apply the functions as taught by **Kejriwal** et al to the penalty function of **Jacobson** et al for distinguishing good and bad flows individually.

Claim **43** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Jacobson** et al (**US 2005/0226149 A1**) in view of **Yazaki** et al (**US 2010/0110889 A1**) and in further view of **Malan** et al (**US 2002/0032717 A1**).

Consider claim **43**, **Jacobson** et al teach an article of manufacture (fig. 1: gateway 106) comprising:

a computer-readable medium having stored thereon a data structure (figs. 9 and 10 tables);

a first field containing data representing a flow block (fig. 9: column 904 contains indicia of flow of packet; [0082] lines 10-18); and

a second field containing data representing payload-content-agnostic behavioral statistics about a flow (fig. 9: column 906 drop times; [0083] – drop times involve behavior of the packet as shown in [0101]).

While **Jacobson** et al mention:

i.) data representing pre-determined behavior threshold values (fig. 2: lower and upper thresholds; [0098] + claims 4 and 5: comparing DEM of a flow to a range);

ii.) data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values ([0098]: changing parameters… statistical method for a flow; [0098] + claims 4 and 5: comparing DEM of a flow to a range); and

iii.) data representing at least one penalty to be enforced against *at least one* packet upon determination that said flow exhibits undesirable behavior ([0101-0103]: penalty);

Jacobson et al may not have very explicitly mentioned "a third field," "a fourth field," and "a fifth field" to indicate on the table of processes i., ii. and iii. respectively.

Yazaki shows fields ([0061]) that indicate i ([0097] lines 1-4: THR – threshold); ii ([0097] lines 1-4: CNT – count of bytes); and iii ([0097] lines 1-4: W – weight; [0061] lines 13-23: PRIC/PRIN – priority conformance or non-conformance) (see claim 1 also). It would have been obvious to one skilled in the art to modify the data structure (table) of **Jacobson** et al to include fields for i., ii. and iii. as taught by **Yazaki** et al for the purpose of providing more information to judge whether a flow or packet is conformant or not.

Jacobsen-Yazaki do not very explicitly mention the set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion*. **Malan** et al teaches concept function of set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion* ([0119]: Flow statistics aggregate a flow's individual packet statistics into a single statistic – when individual packet statistics are aggregated (e.g. accumulated), the single statistic varies accordingly as individual packet statistics get accumulated; there is no congestion condition requirement in **Malan**). It would have been obvious to one of ordinary skill in the art when the invention was made to modify the behavioral statistic update method of Jacobsen-Yazaki to that of Malan et al for more effective profiling of network flows.

Response to Arguments

Arguments filed on 22nd February 2011 have been considered but are moot in view of *new grounds* of rejections. See **Malan** et al for "set of behavioral statistics is updated based on *each* information packet belonging to the flow, as *each* information packet belonging to the flow is processed, *regardless of the presence or absence of congestion*" limitation.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is 571.270.1780. The examiner can normally be reached on Monday through Friday 10:30 am - 8:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571.272.3174. The fax phone number for the organization where this application or proceeding is assigned is 571.273.8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866.217.9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800.786.9199 (IN USA OR CANADA) or 571.272.1000.

/Xavier Szewai Wong/
Patent Examiner AU 2462
4th May 2011

Notice of References Cited	Application/Control No. 11/022,599	Applicant(s)/Patent Under Reexamination NATCHU, VISHNU	
	Examiner Xavier Szewai Wong	Art Unit 2462	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0032717 A1	03-2002	Malan et al.	709/105
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11022599	NATCHU, VISHNU
	Examiner	**Art Unit**
	Xavier Szewai Wong	2462

SEARCHED

Class	Subclass	Date	Examiner
370	229-236	10.30.09	XSW
updated	above	08.14.2010	/XSW/
updated	above	2011.05.09	/XSW/

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	10.30.09	XSW
Inventor Name and Assignee search in PALM and EAST	10.30.09	XSW
updated above	08.14.2010	/XSW/
updated above	2011.05.09	/XSW/

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L5	131	(Natchu near Vishnu).in. SABLE. as.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 16:51
L6	1	L5 and (penalty and behavio$1r$5). clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 16:51
L7	8750	370/229-236.ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 16:57
L8	7	L7 and (each individual$3) with behavio$5 with (packet frame)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 16:57
L9	117781	("370"/$ "455"/$.709/$).ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:24
L10	46	L9 and (each individual$3) with behavio$5 with (packet frame)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:24
L11	1	L9 and (each individual$3) near (packet frame) with (behavio$5 statis$5) same conges$6	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:49
L12	272321	("370"/$ "455"/$ "709"/$).ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:51

L13	0	L12 and (each individual$3) near3 (packet frame) with (behavio$5 statis$5) same updat$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:54

EAST Search History (Interference)

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5/9/2011 5:55:14 PM
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L10	46	L9 and (each individual$3) with behavio$5 with (packet frame)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:24
L11	1	L9 and (each individual$3) near (packet frame) with (behavio$5 statis$5) same conges$6	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:49
L12	272321	("370"/$ "455"/$ "709"/$).ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:51
L13	51	L12 and (each individual$3) near (packet frame) with (behavio$5 statis$5)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/09 17:55

EAST Search History (Interference)

<This search history is empty>

5/9/2011 7:32:35 PM
C:\Documents and Settings\xwong\Desktop\Amendo\Natchu\Natchu_08.15.10.wsp

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	11022599	Filing Date	2004-12-22	Docket Number (if applicable)	SABLE-01008US	Art Unit	2462
First Named Inventor	NATCHU			Examiner Name	Xavier S. Wong		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 503203

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

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Signature of Registered U.S. Patent Practitioner			
Signature	/Stuart J. WEST/	Date (YYYY-MM-DD)	2011-09-02
Name	Stuart J. WEST	Registration Number	43258

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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Electronic Patent Application Fee Transmittal

Application Number:	11022599
Filing Date:	22-Dec-2004
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Filer:	Stuart James West/Carolina Nunez
Attorney Docket Number:	SABLE-01008

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	2251	1	65	65

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	2801	1	405	405
		Total in USD ($)		**470**

Electronic Acknowledgement Receipt

EFS ID:	10875514
Application Number:	11022599
International Application Number:	
Confirmation Number:	8956
Title of Invention:	Mechanism for identifying and penalizing misbehaving flows in a network
First Named Inventor/Applicant Name:	Vishnu Natchu
Customer Number:	43490
Filer:	Stuart James West/Carolina Nunez
Filer Authorized By:	Stuart James West
Attorney Docket Number:	SABLE-01008
Receipt Date:	02-SEP-2011
Filing Date:	22-DEC-2004
Time Stamp:	17:36:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$470
RAM confirmation Number	4046
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / .zip	Pages (if appl.)

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1	Amendment After Final	20110902_ROA_SABLE-01008.pdf	25119 99f012a449444ef7e6a5a2926a1b3eaaa7211880	no	16
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	20110902-RCE-SABLE-01008US.pdf	705812 49f696dffa468552e64c7f1915c21e799dd0cbf8	no	3
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32274 398078e59ae11c4ea47aa9f742b0cee6824b95c4	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	763205		

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application
Inventor(s): Natchu, Vishnu
Appln. No.: 11/022,599
Confirm. No.: 8956

PATENT APPLICATION

Art Unit: 2462
Examiner: Wong, Xavier S.

Filed: December 22, 2004
Title: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

Customer No. 43490

RESPONSE TO OFFICE ACTION UNDER 37 C.F.R. §1.111

Mail Stop Amendment
Commissioner for Patents
P.O. 1450
Alexandria, VA 22313-1450

Sir:

This RESPONSE is in reply to the Office Action mailed May 16, 2011. The time for response was set for three months and ended on August 16, 2011. A one-month extension of time is hereby requested and the required fee submitted. This response filed on September 2, 2011, is therefore timely. A Request for Continued Examination is also hereby requested and the required fee submitted.

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Remarks

These remarks are in response to the Office Action mailed May 16, 2011. The total number of claims submitted for consideration is forty-four (44).

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Response to Rejections under 35 USC § 103

Claims 1, 2, 4-8, 10, 21, 22, 24-28, 30, 41, 42, and 44 were rejected as being unpatentable over Jacobson et al (US 2005/0226149 A1) in view of Malan et al (2002/0032717 A1). Claims 3, 12-14, 18, 23, 32-34, and 38 were rejected as being unpatentable over Jacobson in view of Malan, and in further view of Skirmont (US 6,252,848 B1). Claims 9 and 29 were rejected as being unpatentable over Jacobson in view of Malan, and in further view of Zikan et al (US 6,310,881 B1). Claims 11 and 31 were rejected as being unpatentable over Jacobson in view of Malan, and in further view of Afanador (US 6,167,041). Claims 15-17 and 35-37 were rejected as being unpatentable over Jacobson in view of Malan, and in further view of Scifres et al (US 7,113,990 B2). Claims 19, 20, 39 and 40 were rejected as being unpatentable over Jacobson in view of Malan, and in further view of Kejriwal et al (US 6,934,250 B1). Claim 43 was rejected as being unpatentable over Jacobson in view of Yazaki et al (US 2010/0110889 A1), and in further view of Malan.

I. Jacobson is Not Analogous Prior Art

Jacobson is not analogous prior art, and therefore cannot be used for an obviousness determination under § 103. A reference can only qualify as prior art for § 103 when it is analogous to the claimed invention. ***In re Klein***, No. 2010-1411, slip op. at 7 (Fed. Cir. June 6, 2011) (citing ***Innovention Toys, LLC v. MGA Entertainment, Inc.***, No 2010-1290, slip op. at 12 (Fed. Cir. Mar. 21, 2011)). "Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved." ***In re Bigio***,

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381 F.3d 1320, 1325 (Fed. Cir. 2004) (citing ***In re Deminski***, 796 F.2d 436, 442 (Fed. Cir. 1986)).

A. First Test For the Scope of Analogous Prior Art is Not Met

The first test for the scope of analogous prior art, "whether the art is from the same field of endeavor," is not met here because the current application is related to a different field of endeavor than Jacobson. The field of endeavor must be determined by looking at the "explanations of the invention's subject matter in the patent application, including the embodiments, function, and structure of the claimed invention." ***In re Bigio***, 381 F.3d 1320, 1325 (Fed. Cir. 2004). The embodiments, function, and structure of the invention described in the present application are very different than those of Jacobson.

For purposes of applying the first test, and not for purposes of claim construction or interpretation, the embodiments and functions of the inventions are different. Jacobson's invention "is only instantiated during periods of congestion and most of the state is only for a subset of flows receiving drops." (Paragraph [0102]). In contrast, claim 1 of the present application has a clear order, and requires that before anything else is done, the "set of behavioral statistics is updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed, regardless of the presence or absence of congestion." (Emphasis added.) Only then does claim 1 describe "determining, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior; and in response to a determination that the flow is exhibiting undesirable behavior, enforcing a penalty on the flow." The other claims have a similar order that requires processing each information packet in a flow prior to any penalty or computation of a badness factor. Therefore, the

inventions have different embodiments and functions since Jacobson works only on congested flows using dropped packets, and Natchu works on all packets regardless of congestion.

Also for purposes of applying the first test, and not for purposes of claim construction or interpretation, the structures of the inventions are different. Jacobson's technique will only begin if the network is experiencing congestion. (Paragraph [0102]). If it is, Jacobson will record timestamps of dropped packets, determine time intervals between the dropped packets, determine a "Departure from Exponential Mean" (DEM) from the drop intervals, and use the DEM to determine if a flow is non-responsive. (Paragraphs [0097-98]). In contrast, as an example for purposes of determining the structure of the invention for application of the first test and not for limiting the claims, Natchu's written description indicates that an embodiment of the behavioral statistics can include a total byte count, a life duration, a flow rate, a number of packets processed up to the current time, an average packet size, a badness factor, a timestamp of when the flow block was created, as well as other sets of information. (Paragraph [0035]). These types of statistics are based on all the packets in a flow, not just a subset of dropped packets within a flow like Jacobson's DEM, and therefore the inventions have different structures. Since the embodiments, function, and structure of the two inventions are different, Jacobson and Natchu are in different fields of endeavor, and the first test for the scope of analogous prior art is not met.

B. <u>Second Test for the Scope of Analogous Prior Art is Not Met</u>

The second test for the scope of analogous prior art, if the reference is not within the field of the inventor's endeavor, is "whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved." ***In re Bigio***, 381 F.3d 1320, 1325 (Fed. Cir. 2004) (citing ***In re Deminski***, 796 F.2d 436, 442 (Fed. Cir. 1986)). A court recently applied this test

and found that an inventor seeking to solve the problem of how to make a container with a movable divider in order to ***mix*** its contents would not have been motivated to consider references with containers that used movable dividers to ***separate*** its contents, because those references were not pertinent to the mixing problem the inventor was addressing. ***In re Klein***, No. 2010-1411, slip. op. at 11-12. (Fed. Cir. June 6, 2011). Similarly, Jacobson is not analogous prior art here because it is not pertinent to the problem addressed by Natchu's present invention. Natchu is concerned with a problem of how to detect misbehaving flows based on the flow's observed behavior such that the misbehaving flows cannot avoid detection. (Natchu paragraph [0005]). Jacobson can only detect misbehaving flows in a congested network where packets are being dropped and DEM can be computed (Jacobson paragraph [0092]), but would not detect them in non-congested networks where there are no dropped packets and DEM cannot be computed. An inventor looking to solve the problem addressed by Natchu in the present application would not find Jacobson pertinent to the problem because misbehaving flows would avoid detection in Jacobson when the network is not congested. Since Jacobson is not pertinent to the particular problem with which Natchu's present invention is involved, it is not analogous prior art and cannot be used in a § 103 obviousness rejection.

II. The Prior Art References Do Not Teach or Suggest All Claim Limitations

Even if Jacobson were analogous prior art, it would not have been obvious to combine Jacobson with the other cited references. The prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP § 2143. The Examiner states that Jacobson does not mention the concept of a "set of behavioral statistics is updated based on ***each*** information packet belonging to the flow, as ***each*** information packet belonging to the flow is

processed, ***regardless of the presence or absence of congestion***" The Examiner believes that Malan does teach those elements, specifically the concept of a "set of behavioral statistics is updated based on ***each*** information packet belonging to the flow, as ***each*** information packet belonging to the flow is processed, ***regardless of the presence or absence of congestion***" Examiner argues that it would have been obvious to modify Jacobson's method of updating statistics to the method used in Malan to gain "more effective profiling of network flows."

A. Malan Does Not Teach the Claimed Behavioral Statistics

The Examiner's interpretation of Malan is incorrect, because Malan does not teach the concept of a "set of behavioral statistics is updated based on ***each*** information packet belonging to the flow, as ***each*** information packet belonging to the flow is processed, ***regardless of the presence or absence of congestion***" Malan does describe flow-based statistics that "aggregate a flow's individual packet statistics into a single statistic," such as a "flow's duration, number of packets, mean bytes per packet, etc." (Paragraph [0119]). However, Malan goes on to say that "Cisco System's Netflow and Juniper Network's Cflowd mechanism are widely deployed flow-based statistic packages." ***Id.*** Malan's exemplary listing of Netflow and Cflowd show that Malan did not anticipate the type of behavioral statistics claimed in Natchu. Natchu requires that the statistics be "updated based on each information packet belonging to the flow, as each information packet belonging to the flow is processed," but Netflow and Cflowd type statistics do not update "as each information packet belonging to the flow is processed."

Cisco's website shows that Netflow captures flow data over a period of time, but does not update or calculate statistics about the flow as each packet is processed. Instead, flow statistics are not analyzed until after raw flow data has been collected and packets have been processed. Introduction to Cisco IOS NetFlow - A Technical Overview,

http://www.cisco.com/en/US/prod/collateral/iosswrel/ps6537/ps6555/ps6601/prod_white_paper0900aecd80406232.html (last visited Aug. 25, 2011). Statistics or reports are not generated until a user requests the information manually, or the data is exported to a "NetFlow collector" that analyzes the data. ***Id.*** The data can be automatically exported after a flow has become inactive, lasts longer than a preset period of time, or terminates. ***Id.*** Juniper Network's Cflowd operates similarly to Netflow. NetFlow at AllExperts, http://www.associatepublisher.com/e/n/ne/netflow.htm (last visited Aug. 25, 2011). The type of flow statistics envisioned by Malan are therefore statistics that are calculated about the data at some point after the data is collected and after the packets within the flow have been processed. The statistics are not "updated as each information packet belonging to the flow is processed" as Natchu's claim limitations require.

B. Combination of Jacobson and Malan Is Not Obvious

Even if the type of statistics described and envisioned by Malan were the type used in the present application, the combination of Jacobson and Malan would still not have been obvious to one of ordinary skill in the art when the invention was made, because the combination would not achieve the desired result. Malan does include the idea of keeping statistics that are updated based on all packets in a flow, but there would have been no motivation to use that idea in combination with Jacobson since Jacobson relies exclusively on data kept about dropped packets. If Jacobson kept statistics on the overall flow based on each and every one of the flow's packets, Jacobson would not be able to detect adaptive flows from non-adaptive flows.

Critically, Jacobson requires that information is kept about dropped packets only. The system described in Jacobson saves timestamp information reflecting when packets are dropped (paragraph [0083]), and then compares the timestamps to calculate the interval of time between

dropped packets (paragraph [0084]). Adaptive flows and non-adaptive flows can be identified by comparing the distribution of drop intervals for each type of flow. (Paragraph [0085]). "Responsive and non-responsive flows can be differentiated by the experimentally determined distribution of their drop intervals." Paragraph [0127] (emphasis added).

Jacobson therefore requires that data be kept on certain individual packets, specifically dropped packets, in order to calculate the drop intervals required for the invention to identify non-adaptive flows. Malan teaches the concept of flow-based statistics that "aggregate a flow's individual packet statistics into a single statistic." (Paragraph [0119]). The Examiner argues that Malan's flow-based statistics are "updated based on ***each*** information packet belonging to the flow, as ***each*** information packet belonging to the flow is processed." As discussed above, Applicant disputes this interpretation of Malan's flow-based statistics. However, even if it were taken as true, Malan would not keep flow-based statistics on only those packets within a flow that are dropped, it would update them based on each packet in the flow. If Jacobson were to use Malan's flow-based statistics, information on each individual packet would be combined into a single statistic, and the individual timestamps of individual dropped packets that Jacobson requires to function would be lost. One single statistic that represents a characteristic of the overall flow based on dropped and non-dropped packets could not be used to calculate the drop intervals between specific dropped packets, or the distribution of drop intervals within a flow.

Jacobson in fact teaches away from the idea of tracking statistics on all packets. Paragraph [0102] states that "[p]reviously, all proposed techniques to identify non-responsive flows have required keeping a good deal of per-flow state continuously, on responsive as well as non-responsive flows." It goes on to say "[o]ur approach requires a smaller amount of state, is only instantiated during periods of congestion and most of the state is only for a subset of flows

receiving drops." Therefore, Jacobson indicates that keeping statistics on only a smaller subset of packets is desirable for its invention. Jacobson gives no suggestion or motivation for one of skill in the art to generate statistics based on all packets as described by Malan.

In contrast, claim 1 of the pending application describes "maintaining a set of behavioral statistics for the flow" that is "updated based on each information packet belonging to the flow" and then "determines, based at least partially upon the set of behavioral statistics, whether the flow is exhibiting undesirable behavior." As shown above, Jacobson does not maintain "a set of behavioral statistics for the flow" that is "updated based on each information packet belonging to the flow" (emphasis added). Malan may teach that idea, but as shown above, it would not have been obvious to modify the behavioral statistic update method of Jacobson to that of Malan for more effective profiling of network flows, because such a combination would render Jacobson's invention inoperable, and because Jacobson taught against the idea. Since the combination cited by the Examiner would not have been obvious to one of skill in the art, Applicant respectfully requests that the rejection to claim 1 be withdrawn.

Independent claims 21 and 44 were also rejected as being unpatentable over Jacobson in view of Malan for the same reasons described in the rejection of claim 1. The elements of claims 21 and 44 parallel those of claim 1. Thus, the arguments made above with respect to the rejection of claim 1 also apply to the rejection of claims 21 and 44 under §103, and Applicant respectfully requests that the rejections to claims 21 and 44 be withdrawn.

Independent claims 5, 25, 41, and 42 were also rejected as being unpatentable over Jacobson in view of Malan for the same reasons described in the rejection of claim 1. While not all elements of claims 5, 25, 41, and 42 directly parallel those of claim 1, claims 5, 25, 41, and 42 all include similar limitations regarding a set of behavioral statistics being updated based on each

information packet belonging to the flow, as each information packet belonging to the flow is processed, regardless of the presence or absence of congestion. The Examiner rejected claims 5, 25, 41, and 42 based on these specific shared limitations for the same reasons as in the rejection of claim 1. Thus, the arguments made above with respect to the rejection of claim 1 also apply to the rejection of claims 5, 25, 41, and 42 under §103, and Applicant respectfully requests that the rejections to claims 5, 25, 41, and 42 be withdrawn.

C. Yazaki Does Not Teach the Claimed Data Fields

Independent claim 43 was rejected as being unpatentable over Jacobson in view of Yazaki, and in further view of Malan. The Examiner believes that Jacobson teaches "data representing pre-determined behavior threshold values," "data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values," and "data representing at least one penalty to be enforced against at least one packet upon determination that said flow exhibits undesirable behavior," but that Jacobson does not teach storing these types of data in "a third field," "a fourth field," and "fifth field" respectively.

The Examiner believes that Yazaki does teach storing these types of data in fields. Regarding the "data representing pre-determined behavior threshold values," the Examiner points to data disclosed in Yazaki as THR, defined as a "bucket capacity" for important or unimportant packets, as measured in bytes. (Paragraph [0061]). Regarding the "data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values," the Examiner points to data disclosed in Yazaki as CNT, defined as the "water level of important packets and that of unimportant packets" as measured in bytes. (Paragraph [0061]).

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Applicant respectfully disagrees with the Examiner's interpretation of the variables THR and CNT stored in data fields in Yazaki, and believes that they are different from the data types disclosed in claim 43. First, THR is not "data representing pre-determined behavior threshold values." It is an expression of the total number of bytes capable of being stored in a "bucket." (Paragraph [0061]). THR is therefore not a "behavioral threshold value" since the capacity of a bucket does not depend on the behavior of the data placed into it. THR simply describes the capacity of the bucket itself, and not any behavioral characteristic of the packets within the bucket.

Similarly, Yazaki's CNT is not "data representing the results of a heuristic determination of whether said flow exhibits undesirable behavior determined by comparing said behavioral statistics to said pre-determined threshold values." CNT indicates the "water level" of packets within a "bucket." (Paragraph [0061]). CNT is therefore determined by simply counting the number of packets within a given bucket, not through a "heuristic determination of whether said flow exhibits undesirable behavior." CNT is also not "determined by comparing said behavioral statistics to said pre-determined threshold values" since CNT is a count, not a comparison.

Because the data fields disclosed in Yazaki hold different types of data than described in claim 43, it would not have been obvious to one of skill in the art to combine Jacobson and Yazaki. Applicant therefore respectfully requests that the rejection to claim 43 be withdrawn.

Moreover, even if the Jacobson-Yazaki combination were obvious, the combination would still not teach the elements of claim 43 that Examiner believes are taught by Malan. The Examiner stated on page 12 of the Office Action that Jacobson-Yazaki combination did not mention that "the set of behavioral statistics is updated based on ***each*** information packet belonging to the flow, as ***each*** information packet belonging to the flow is processed, ***regardless***

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of the presence or absence of congestion" but that Malan did teach those concepts. Examiner rejected claim 43 in further view of Malan for the same reasons as in the rejection of claim 1. However, the cited claim limitations regarding "the set of behavioral statistics is updated based on ***each*** information packet belonging to the flow, as ***each*** information packet belonging to the flow is processed, ***regardless of the presence or absence of congestion*** do not actually appear in claim 43. Applicant presumes that the Examiner meant to reference the limitation about "behavioral statistics about dropped and non-dropped packets of a flow" since that limitation most nearly corresponds to "the set of behavioral statistics is updated based on ***each*** information packet belonging to the flow, as ***each*** information packet belonging to the flow is processed, ***regardless of the presence or absence of congestion***" Since this claim limitation includes "behavioral statistics about dropped and non-dropped packets in a flow" the arguments made above with respect to the rejection of claim 1, which pointed out that Jacobson required keeping data on only dropped packets and that a combination with Malan would render Jacobson's invention inoperable, also apply to the rejection of claim 43 under §103. Applicant therefore respectfully requests that the rejection to claim 43 be withdrawn.

III. Dependent Claims

Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim. 37 CFR 1.75. Claims 2-4 are dependent on independent claim 1 and therefore include all the limitations of claim 1. Claims 6-20 are dependent on independent claim 5 and therefore include all the limitations of claim 5. Claims 22-24 are dependent on independent claim 21 and therefore include all the limitations of claim 21. Claims 26-40 are dependent on independent claim 25 and therefore include all the

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limitations of claim 25. As explained above with respect to the rejection of claim 1, it would not have been obvious to one skilled in the art to combine Jacobson and Malan, and therefore independent claims 1, 5, 21, 25, and 41-44 are not obvious. It follows that Jacobson, in view of any combination of cited references, does not teach or suggest all of the claim limitations of dependent claims 2-4, 6-20, 22-24, or 26-40. Therefore, Applicant respectfully requests that the rejections to these dependent claims be withdrawn.

Moreover, with respect to claims 12 and 32, the Examiner stated that Jacobson did not mention that a "penalty is determined and enforced even when no congestion condition is encountered," but that Skirmont mentioned "a Random Early Detection (RED) algorithm comprising means for allowing the dropping of packets ***without regard*** to the characteristics (e.g. congestion) of a flow (col. 5 ln. 21-24)." The Examiner's interpretation of Skirmont's discussion of RED algorithms is incorrect. It is clear that the RED algorithm only works in the presence of congestion. "When the network becomes congested, packets can be dropped due to a lack of resources. . . . A packet is dropped according to the RED algorithm (Random Early Detection) in the packet's corresponding queue." (Col. 1, ln. 31-37). The RED algorithm therefore requires the presence of congestion before it is triggered.

Furthermore, the Examiner's belief that the "characteristics of a flow" can include "congestion" is misplaced. Congestion is a characteristic of an overall network, not an individual flow. Congestion can occur when a flow, or multiple flows, overwhelm a network. "A flow of data entering a network is routed to a designated queue while other flows are simultaneously routed to their designated queues. A queue can build up (i.e., congest) when the egress rate is less than the ingress rate for a queue." (Col. 1, ln.14-17). Congestion is therefore related to the overall level of traffic through a network, not a characteristic of any individual

flow. The sentence regarding "characteristics of a flow" pointed to by the Examiner goes on to say that the RED algorithm can drop packets "in a flow that is critical for system performance but is not responsible for congestion in the system." (Col. 5, ln. 23-24). The "characteristics of a flow" therefore can include whether the flow is critical for system performance, and whether it is responsible for congestion in the overall system. They cannot include whether the flow itself is congested, as congestion is a characteristic of the overall network. Applicant therefore respectfully requests that the rejections to claims 12 and 32 be withdrawn.

The Examiner also used Skirmont to reject claims 18 and 38. The Examiner says that Jacobson taught the claimed invention except for the limitation regarding "behavioral statistics comprising an average size for the information packets of a flow," but that Skirmont taught an average queue size in Figure 2. Skirmont does show and describe an average queue size, but an average queue size is entirely different than the claimed "average size for the information packets belonging to the flow." Queues are different from flows, as Skirmont makes clear. "The data in each of the flows F1'-F9' consists of a sequence of packets (i.e., units of data). The packets corresponding to a given flow (i.e., one of F1'-F9') pass through a designated channel (i.e., one of C1'-C3') and are routed by Switch S' to a designated queue (i.e., one of Q1'-Q3-)." (Col. 1, ln. 26-30). The average queue size would therefore be the average number of packets at a specific queue, which is very different than the claimed "average size for the information packets belonging to a flow." Applicant therefore respectfully requests that the rejections to claims 18 and 38 be withdrawn.

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Conclusion

Applicant respectfully asserts that the cited references do not render the claims unpatentable, either singularly or in combination. In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowed and a Notice of Allowance is earnestly solicited. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting the issuance of a patent.

Respectfully submitted,

By: /Shaun Sluman/
Shaun Sluman
Reg. No. 63295

Dated: September 2, 2011

West & Associates, A PC
2815 Mitchell Drive, Suite 209
Walnut Creek, CA 94598
(925) 262-2220

Cloudflare - Exhibit 1002, page 250

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 11/022,599	Filing Date 12/22/2004	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	09/02/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 44	Minus	** 44	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 8	Minus	***8	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/JEFFERY L. OLSEN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

43490 7590 04/03/2012

WEST & ASSOCIATES, A PC
2815 Mitchell Drive
Suite 209
WALNUT CREEK, CA 94598

EXAMINER
WONG, XAVIER S

ART UNIT	PAPER NUMBER
2462	

DATE MAILED: 04/03/2012

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8956

TITLE OF INVENTION: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/03/2012

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

43490 7590 04/03/2012
WEST & ASSOCIATES, A PC
2815 Mitchell Drive
Suite 209
WALNUT CREEK, CA 94598

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8956

TITLE OF INVENTION: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	07/03/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
WONG, XAVIER S	2462	370-229000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8956

43490 7590 04/03/2012

WEST & ASSOCIATES, A PC
2815 Mitchell Drive
Suite 209
WALNUT CREEK, CA 94598

EXAMINER	
WONG, XAVIER S	

ART UNIT	PAPER NUMBER
2462	

DATE MAILED: 04/03/2012

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 315 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 315 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	11/022,599	NATCHU, VISHNU	
	Examiner	Art Unit	
	Xavier Szewai Wong	2462	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *2nd September 2011*.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-44 renumbered as 5-44 and 1-4 respectively*.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Xavier Szewai Wong/
Primary Examiner, Art Unit 2462

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Reason to Allow

See applicant's amendments and responses filed on 2nd September 2011.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xavier Wong whose telephone number is 571.270.1780. The examiner can normally be reached on Monday through Friday 10:30 am - 8:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on 571.272.7905. The fax phone number for the organization where this application or proceeding is assigned is 571.273.8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866.217.9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800.786.9199 (IN USA OR CANADA) or 571.272.1000.

/Xavier Szewai Wong/

Primary Examiner, Art Unit 2462
23rd March 2012

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11022599	NATCHU, VISHNU
	Examiner	Art Unit
	Xavier Szewai Wong	2462

SEARCHED

Class	Subclass	Date	Examiner
370	229-236	10.30.09	XSW
updated	above	08.14.2010	/XSW/
updated	above	2011.05.09	/XSW/
Updated	Searches Above	2012.03.23	/XSW/

SEARCH NOTES

Search Notes	Date	Examiner
EAST image, class and keyword search in USPAT, US-PGPUB, DERWENT, EPO, JPO, and IBM_TDB (please see search history)	10.30.09	XSW
Inventor Name and Assignee search in PALM and EAST	10.30.09	XSW
updated above	08.14.2010	/XSW/
updated above	2011.05.09	/XSW/
Updated Searches Above	2012.03.23	/XSW/

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner
See	Above	2012.03.23	/XSW/

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11022599	NATCHU, VISHNU
	Examiner	**Art Unit**
	Xavier Szewai Wong	2462

ORIGINAL		INTERNATIONAL CLASSIFICATION															
CLASS	SUBCLASS	CLAIMED										NON-CLAIMED					
370	229	G	0	1	R	31 / 08 (2006.01.01)											
CROSS REFERENCE(S)		G	0	6	F	11 / 00 (2006.01.01)											
		G	0	8	C	15 / 00 (2006.01.01)											
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)	H	0	4	J	1 / 16 (2006.01.01)											
		H	0	4	J	3 / 14 (2006.01.01)											
		H	0	4	L	1 / 00 (2006.01.01)											
		H	0	4	L	12 / 26 (2006.01.01)											

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
5	1	21	17	37	33										
6	2	22	18	38	34										
7	3	23	19	39	35										
8	4	24	20	40	36										
9	5	25	21	41	37										
10	6	26	22	42	38										
11	7	27	23	43	39										
12	8	28	24	44	40										
13	9	29	25	1	41										
14	10	30	26	2	42										
15	11	31	27	3	43										
16	12	32	28	4	44										
17	13	33	29												
18	14	34	30												
19	15	35	31												
20	16	36	32												

(Assistant Examiner) (Date)	**Total Claims Allowed:** 44	
/Xavier Szewai Wong/ Primary Examiner, Art Unit 2462 (Primary Examiner) (Date)	O.G. Print Claim(s) 1 - FINAL	O.G. Print Figure 2

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	135	(Natchu near Vishnu).in. SABLE.as.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L2	1	L1 and (penalty and behavio$1r$5).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L3	9098	370/229-236.ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L4	8	L3 and (single individual one) adj (flow stream block train) same penal$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L5	0	L3 and (single individual one) adj (flow stream block train) same penal$5 and ((absen$5 "no" none "not") near3 congest$5)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:23

EAST Search History (Interference)

< This search history is empty>

3/ 23/ 2012 4:24:50 PM
C:\ Users\ xwong\ Desktop\ Natchu\ Natchu_08.15.10.wsp

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	135	(Natchu near Vishnu).in. SABLE.as.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L2	1	L1 and (penalty and behavio$1r$5).clm.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L3	9098	370/229-236.ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L4	8	L3 and (single individual one) adj (flow stream block train) same penal$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:21
L5	53	L3 and ((absen$5 no "not" none) near3 congest$5) and penal$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:25
L11	120854	("370"/$ "455"/$.709/$).ccls. and (@rlad < "20041222" @ad < "20041222")	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:58
L12	6	L11 and absen$5 same (behavio$1r$4 penalty) same threshold same (flow stream block)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2012/03/23 16:58

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	191	((absen$5 no "not" none) near3 congest$5) and penal$5	USPAT; UPAD	OR	ON	2012/03/23 16:48
L7	4250440	@rlad < "20041222" @ad < "20041222"	USPAT; UPAD	OR	ON	2012/03/23 16:48
L8	126	L6 and L7	USPAT; UPAD	OR	ON	2012/03/23 16:48
L9	26	(Natchu near Vishnu).in. SABLE.as.	USPAT; UPAD	OR	ON	2012/03/23 16:48
L10	0	L9 and (penalty and behavio$1r$5).clm.	USPAT; UPAD	OR	ON	2012/03/23 16:49

3/ 23/ 2012 5:08:35 PM
C:\ Users\ xwong\ Desktop\ Natchu\ Natchu_08.15.10.wsp

PART B – FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to Mail Mail Stop ISSUE FEE
Commissioner for Patents
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

43490
WEST & ASSOCIATES, A PC
2815 Mitchell Drive, Suite 209
WALNUT CREEK, CA 94598

07/10/2012 EEKUBAY2 00000043 11022599

01 FC:2501 870.00 OP
02 FC:1504 300.00 OP

OPAP JUL 09 2012 IAP11 PATENT & TRADEMARK OFFICE

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Stuart J. West	(Depositor's name)
	(Signature)
7/3/12	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	09/02/2004	Vishnu Natchu	SABLE-01008	8956

TITLE OF INVENTION: MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
Nonprovisional	Yes	$870.00	$300.00	$0.00	$1,170.00	07/03/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
WONG, XAVIER S	2462	370-229000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 WEST & ASSOCIATES, A PC
2 Stuart J. West, Reg. No. 43,258
3 Shaun N. Sluman, Reg. No. 63,295

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: SABLE NETWORKS, INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): Santa Clara, California

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:
- ☒ Issue Fee
- ☒ Publication Fee (No small entity discount permitted)
- ☐ Advanced Order - # of Copies _____

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- ☐ A check is enclosed.
- ☒ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☒ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27 (g)(2).

NOTE: The Issue Fee and publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date July 3, 2012

Typed or printed name Stuart J. West Registration No. 43258

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.
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Cloudflare - Exhibit 1002, page 263

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2815 Mitchell Drive, Suite 209
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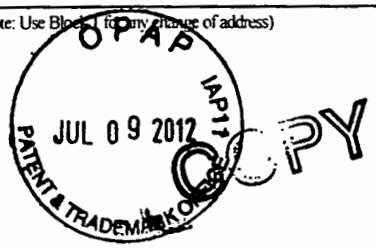

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Stuart J. West	(Depositor's name)
	(Signature)
7/3/12	(Date)

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1 WEST & ASSOCIATES, A PC
2 Stuart J. West, Reg. No. 43,258
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SABLE NETWORKS, INC.	Santa Clara, California

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- ☒ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27 (g)(2).

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Authorized Signature _____ Date July 3, 2012

Typed or printed name Stuart J. West Registration No. 43258

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PTO/SB/92 (07-09)
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on July 3, 2012
Date

Signature

Stuart J. West
Typed or printed name of person signing Certificate

43258
Registration Number, if applicable

925.262.2220
Telephone Number

Note: Each paper must have its own certificate of mailing, or this certificate must identify each submitted paper.

*Part B transmittal (2 copies)
*Credit Card Payment form PTO-2038
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/022,599	08/14/2012	8243593	SABLE-01008	8956

43490 7590 07/25/2012

WEST & ASSOCIATES, A PC
2815 Mitchell Drive
Suite 209
WALNUT CREEK, CA 94598

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 1098 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Vishnu Natchu, Santa Clara, CA;

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY.DOCKET NO./TITLE	REQUEST ID
11/022,599	12/22/2004	Vishnu Natchu	SABLE-01008	8005

Acknowledgement of Change to Small Entity Status

The entity status change request below filed through Private PAIR on 11/25/2015 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

X Applicant asserting small entity status. See 37 CFR 1.27.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Stuart J. West/
Name:	Stuart J. West
Registration Number:	43258