

EXHIBIT D

**U.S. PATENT NO. 8,243,593
MECHANISM FOR IDENTIFYING AND PENALIZING MISBEHAVING FLOWS IN A NETWORK
CLAIM CHART FOR CLAIMS 1, 3-6, 8-12, 14, 16-18¹**

Practicing Entity: Defendants Dell Technologies Inc., Dell Inc., and EMC Corporation (collectively, “Dell”)

Representative Accused Instrumentality:² The Dell EMC SD-WAN Edge 3000 and the Dell EMC SD-WAN Edge 610, Edge 620, Edge 640, Edge 680) (collectively, the “Dell ‘593

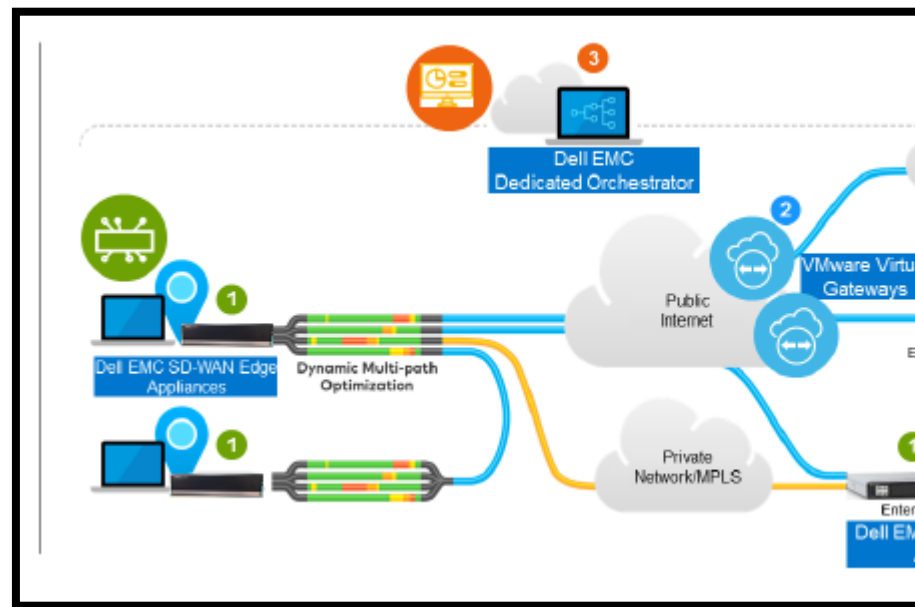
‘593 Patent Claim	Infringing Instrumentality
[1PRE] A machine-implemented method for processing a single flow, the flow comprising a plurality of packets, and the method comprising:	Dell directly infringes the claim by performing, controlling, and/or directing the claimed method. <i>See, e.g.</i> , [1a]-[1f]. Specifically, Dell through the operation of Dell ‘593 Products performs the method of processing a single flow, the flow comprising a plurality of packets. For example, to the extent the preamble is limiting, through operation of the Dell ‘593 Products, Dell performs, controls, and/or directs a method of processing a single flow, the flow comprising a plurality of packets, the method comprising the steps of [1a]-[1f]. <i>See, e.g.</i> , [1a]-[1f]. Additionally, and/or in the alternative, Dell indirectly infringes the claim—by inducing and/or contributing to infringing performance, control, and/or direction of a step of the claimed method by third parties such as Dell ‘593 Product end users, developers, and Dell ‘593 Product partners. <i>See, e.g.</i> , [1a]-[1f].
[1a] creating a flow block as the first packet of a flow is processed by a single router;	The Dell ‘593 Products create a flow block as a first packet of a flow is processed by a single router. Dell ‘593 Products on receiving a data packet process the data packet and if the data packet does not match an existing flow, a new flow block is created in the flow table. A flow block is created that is used to match and process packets.

¹ The limitations of this claim are met literally and under the Doctrine of Equivalents. This infringement analysis is ongoing. Plaintiffs’ infringement investigation is ongoing. Plaintiffs may provide additional theories under which one or more of the Defendants’ products and/or services infringe this patent.

² This list of Infringing Products was created based solely on publicly available information and is not exhaustive.

EXHIBIT D

The flow blocks created by the Dell '593 Products contains both “match fields” and “counters” to track the packets associated with the flow block. The ‘ packet headers, the ingress port, and optionally metadata values. These “ma process packets and match them against existing flow blocks. If when a first the Dell '593 Products and no match is found a new flow block is created.



Dell EMC SD-WAN Solution Overview, DELL DOCUMENTATION at 2 (2019).

EXHIBIT D

- Matching is directional. For example, you can allow hosts on VLAN 1 to initiate a session with hosts on VLAN 2, but deny the reverse. Stateless firewalls translate simple ACLs (Access lists) which don't allow for this kind of granular control.
- A stateful firewall is session aware. Using TCP's 3-way handshake as an example, a stateful firewall will not allow a SYN-ACK or an ACK to initiate a new session. It only allows a SYN, and all other packets in the TCP session must also follow the protocol correctly or the firewall will drop them. A stateless firewall has no concept of a session and instead filters packets based purely on a packet by packet, individual basis.
- A stateful firewall enforces symmetric routing. For instance it is very common for asymmetric routing to happen in an SD-WAN network where traffic enters the network through one Hub but exits through another. Leveraging third-party routing, the traffic is still able to reach its destination. With a stateful firewall, such traffic would be dropped.
- Stateful firewall rules get rechecked against existing flows after a configuration change. So if an existing flow has already been accepted, and you configure the stateful firewall to now drop those packets, the firewall will recheck the flow against the new rule and then drop it. For those scenarios where an "allow" is changed to "drop" or "reject", pre-existing flows will time out and a firewall log will be generated for the session.

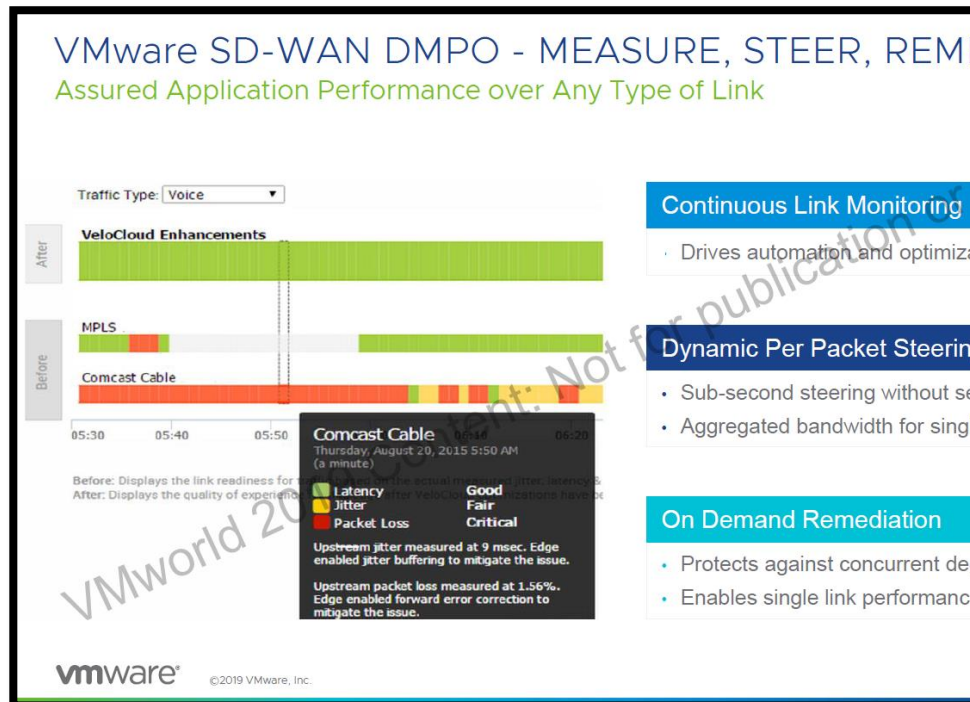
VMware SD-WAN by VeloCloud Stateful Firewall (78116), VMWARE KNOWLEDGE CENTER (78116, 2020), available at: <https://kb.vmware.com/s/article/78116>

Further, the Dell '593 Products describe that as packets are processed the data is logged. Edges is now session-aware, there is much more information that can be reported in the logs. The logs will contain the following fields: Time, Segment, Edge, Action, Source IP, Source Port, Destination IP, Destination Port, Rule, Bytes Received, etc. *VMware SD-WAN by VeloCloud Stateful Firewall (78116)*, VMWARE KNOWLEDGE CENTER (78116, 2020), available at: <https://kb.vmware.com/s/article/78116>
The Dell '593 Products compile statistics

EXHIBIT D

[1b] said flow block being configured to store payload-content-agnostic behavioral statistics pertaining to said flow, regardless of the presence or absence of congestion;

The Dell '593 Products are configured to store payload content agnostic statistics. Specifically, the Dell '593 Products contain functionality for "counters" in each packet is processed by the router the "counter(s)" associated with the flow and block. On information and belief, counters that are utilized by the Dell '593 "received packets," "flow duration," "received bytes," "transmission rate," '593 Products compile statistics for each flow and based on the monitoring take "On Demand Remediation" to penalize misbehaving flows.



Tony Banuelos and Jaspreet Bhatia, *Know, Understand, Execute: Network Monitoring and Analytics with SD-WAN*, VMWORLD 2019 SESSION NEDG2576BU PRESENTATION

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