

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.
Petitioner,

v.

LIONRA TECHNOLOGIES LTD.
Patent Owner.

U.S. Patent Nos. 7,685,436 & 8,566,612

SYSTEM AND METHOD FOR A SECURE I/O INTERFACE

Inter Partes Review Nos.:
IPR2023-00673
IPR2023-00703

SUPPLEMENTAL DECLARATION OF MARK E. CROVELLA IN
SUPPORT OF
PETITIONER'S REPLY

I, Mark E. Crovella, declare as follows:

1. I am over the age of eighteen (18) and otherwise competent to make this Declaration.

2. I have been retained by Cisco Systems, Inc. (Petitioner) as an independent, technical expert consultant in these proceedings before the United States Patent and Trademark Office (USPTO). I am being compensated at my rate of \$650 per hour for my services. No part of my compensation is dependent on my opinions or on the outcome of this proceeding. I have no financial interest in any of the parties to this proceeding.

3. This Declaration is in support of Petitioner's Replies in the *inter partes* review IPR2023-00673 and IPR2023-00703 of U.S. Patent 7,685,436 (the "'436 Patent") (EX-1001), and its child U.S. Patent 8,566,612 (the "'612 Patent") (EX-1012) both entitled "SYSTEM AND METHOD FOR A SECURE I/O INTERFACE" and listing John Davis and Richard Takahashi as the inventors.

4. In preparing this Declaration, I have reviewed the '436 Patent (EX-1001) its prosecution history (EX-1002), the '612 Patent (EX-1012) and its prosecution history (EX-1013) as well as the patents and documents cited herein, and I have considered these documents in light of the general

knowledge in the art as of October 2, 2003. In formulating my opinions, I have relied upon my experience in the relevant art. For convenience, the materials I considered in arriving at my opinions are listed in Appendix A.

5. I have been asked to provide my technical expertise, analysis, insights and opinions regarding the '436 Patent and the '612 Patent and relevant references that form the basis of the arguments set forth in the accompanying replies in the respective *inter partes* reviews of the '436 Patent and the '612 Patent.

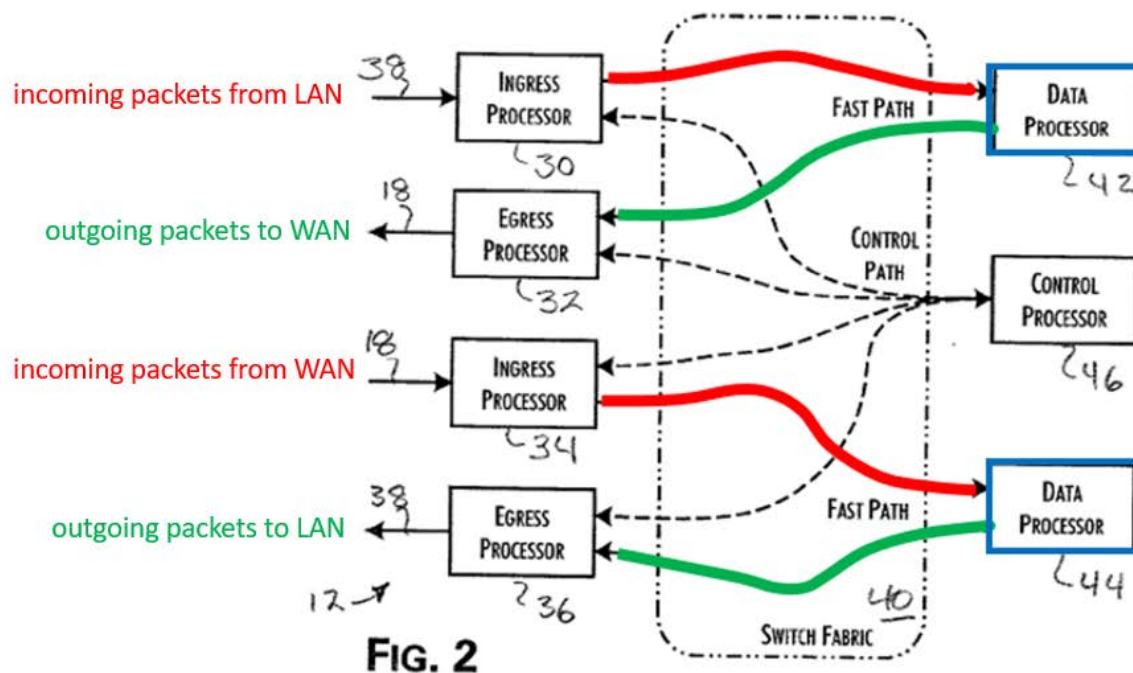
6. Unless otherwise indicated, the emphasis in quotations has been added.

7. I incorporate, herein, my statements and opinions offered in my previous Declaration (EX-1003) submitted in both IPR2023-00673 and IPR2023-00703.

8. Pham discloses multiple embodiments in which substantially all packets received by the security processor transit a packet engine. Pham fully supports that the VPN gateways shown in FIG. 1 router could work exclusively with the VPN tunnel without routing unencrypted to the Internet, in which case substantially all traffic would be processed by the packet engines and crypto cores identified in the Petition. The specification discusses cryptographic processing that meets or exceeds the overall

throughput of the device which shows that fully saturated VPN throughput usage is disclosed. See [0052] (“Utilizing the BCM5840, each crypto processor 86 is capable of a minimum sustained effective IPsec encryption/decryption and IPsec authentication rate of 2.4 Gbps.”); [0045] (“For the preferred embodiment of the VPN gateway 72, which supports Gigabit Ethernet connections, each ingress and egress processor 80, 82 requires just a single port connection each to the switch fabric 78 to easily support the full bandwidth requirements of in-band network data traffic.”)..

9. FIG. 2 of Pham illustrates another embodiment in which substantially all packets transit a packet engine. FIG. 2 shows incoming packets to an ingress processor from a LAN that are processed and are passed as outgoing packets through a VPN connection on the WAN. FIG. 2 also shows incoming packets from a WAN through a VPN connection that are processed and are passed as outgoing packets to a LAN.



10. FIG. 2 discloses an embodiment where all packets are being sent between LAN 38 and Internet 18, e.g., incoming packets (red) from LAN 38 and Internet 18 and outgoing packets (green) to Internet 18 and LAN 38, respectively, transit one of the plurality of data processors 42, 44 (blue). Pham includes a very broad disclosure of the various packet processing that can be performed by the data processors. For example, Pham describes that data processors can be flexibly configured to implement any of a number of different network protocol processing functions including those that are compute intensive. EX-1004 [0017].

11. I agree with PO's expert that a POSA understood that compute intensive processing would include compute intensive processes including

compression, decompression, protocol translation, encryption, decryption, routing, load balancing, filtering and switching. EX-1004 [0042] EX-1016 22:19-29:25.

12. Pham also describes that data processors can perform single protocol conversion or multiple protocol conversion. For example, Pham describes that the same data processor can perform multiple protocol conversion such as compression before encryption and decompression after decryption. EX-1004 [0042]. Thus, in the embodiment shown in FIG. 2 of Pham, the data processors could be crypto processors having a network processor (*packet engine*) receiving all incoming packets from LAN 38 and Internet 18 through ingress processor 30, 34, respectively, for packet processing including cryptographic processors and any other compute intensive processing. Thus, this embodiment discloses that “substantially all of the incoming packets and outgoing packets to the security processor transit one of the plurality of packet engines.”

13. FIGs. 4 and 6 of Pham illustrates another example in which substantially all packets transit a packet engine in the crypto processor. FIG. 4 illustrates an example of packet processing between a single LAN 74 and WAN 76, and as discussed previously, VPN gateway 74 is capable of encrypting all traffic at line rate from the LAN side to the WAN side:

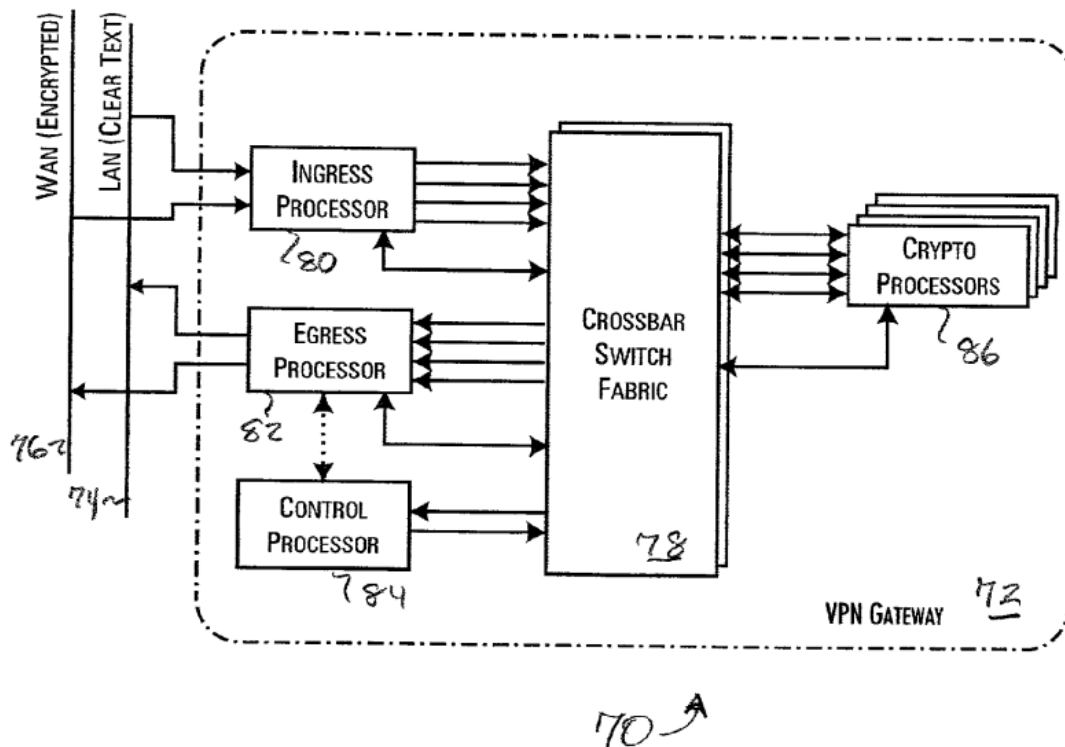


FIG. 4

14. I agree with PO's expert that Pham also discloses that crypto processor 86 in FIG. 4 is a type of data processor illustrated in FIG 3¹, that Pham describes can be flexibly configured to implement any of a number of different network protocol processing functions including those that are compute intensive. EX-1004 [0017], [0042] EX-1016 22:19-23:18. Thus,

¹ Pham describes that FIG. 4 is a preferred VPN embodiment 70 of the present invention, representing a specific implementation of the extended protocol processor architecture 50 shown in FIG. 3. EX-1004 [0045].

a POSA understood crypto processor of FIG. 4 could perform packet processing functions other than encryption and decryption.

15. Further, FIG. 6 illustrates the crypto processor of FIG. 4 is nearly identical to the architecture used for the ingress processor shown in FIG. 5, including an identical network processor memory with route/SA table.

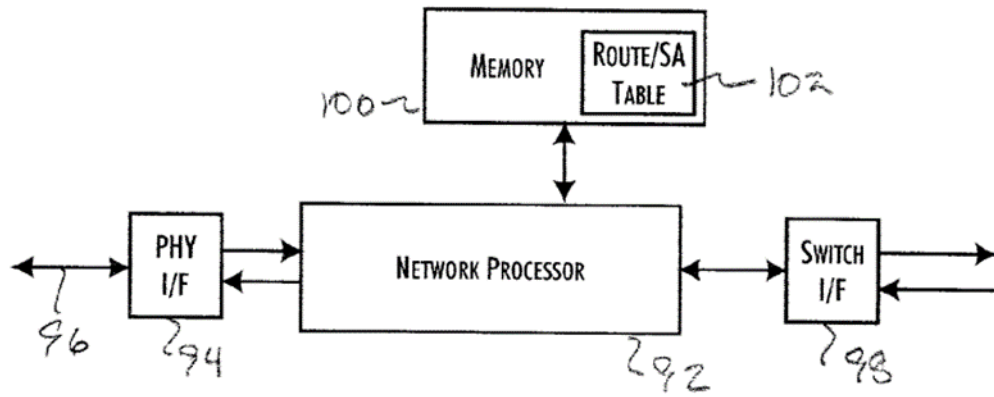


FIG. 5

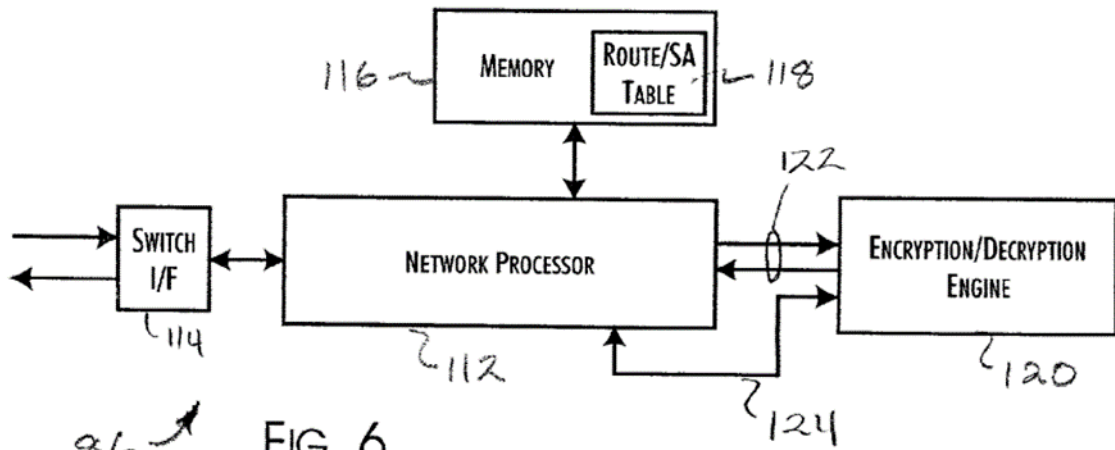


FIG. 6

16. Pham discloses that in some embodiments, all packet processing except basic switching and filtering can be offloaded from the ingress processor to a data processor, which a POSA understood to mean that packet processing performed by the network processor of the ingress processor would be offloaded to the network processor of the crypto processor. I agree with PO's expert that the crypto processor is capable of

performing any packet processing offloaded from the ingress processor, including routing. EX-1016 83:13-21.

17. Pham expressly describes the various types of packet processing that could be performed by Pham's data processors, including data compression, network data traffic switching and routing, various forms of protocol data processing and other computation intensive operations, and explains that this architecture could be employed for reasons of architectural flexibility, simplicity, redundancy and increased capacity for handling control process flows and protocol negotiations. EX-1004 [0042]. A POSA understood the various types of packet processing would be implemented using known software algorithms.

CONCLUSION AND DECLARATION

My findings and opinions set forth in this Declaration are based on my work and examination to date. I may continue my examinations in view of additional documents or other factual evidence over the course of this proceeding that may necessitate supplementing and/or refining my opinions. I reserve the right to add to, alter, or delete my opinions and my Declaration upon discovery of additional information. I reserve the right to make such changes as necessary.

In signing this Declaration, I understand that the Declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and 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.

[SIGNATURE ON FOLLOWING PAGE]



Date: 4/15/2024

By: _____

Mark E. Crovella

APPENDIX A – MATERIALS RELIED UPON

<i>Exhibit #</i>	<i>Description</i>
1001	U.S. Patent No. 7,685,436 (“the ’436 Patent”)
1002	Prosecution history of the ’436 Patent (“’436 File History”)
1004	U.S. 2003/0074473 (“Pham”)
1005	U.S. 7,424,744 (“Wu”)
1006	U.S. 7,996,670 (“Krishna”)
1007	U.S. 6,279,113 (“Vaidya”)
1008	U.S. Patent Publication 20020073316 (“Collins”)
1009	U.S. 7,181,017 (“Nagel”)
1010	US 2004/0039928A1 (“Elbe”)
1011	Related Patents
1012	U.S. Patent No. 8,566,612 (“the ’612 Patent”)
1013	Prosecution history of the ’612 Patent (“’612 File History”)
1015	U.S. Patent Publication US 2003/0145225A1 (“Bruton”)
1016	Deposition Transcript of Dr. Eric Cole