

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner

v.

LIONRA TECHNOLOGIES LIMITED,
Patent Owner

IPR2024-00734
U.S. Patent No. 7,623,518

**SECOND DECLARATION OF MARK E. CROVELLA, PH.D.,
UNDER 37 C.F.R. § 1.68 IN SUPPORT OF PETITIONER'S REPLY**

TABLE OF CONTENTS

I.	INTRODUCTION	3
II.	UNPATENTABILITY ANALYSIS	4
	A. Claims 1 and 3 are Obvious over Gai, Yip, and Kwan.....	4
	B. Claims 15, 17, 19-21 are Obvious over Gai, Kwan, and Georgiou.	9
III.	CONCLUSION.....	10

I, Mark E. Crovella, Ph.D., do hereby declare as follows:

I. INTRODUCTION

1. I previously submitted a Declaration (Ex. 1003) in this proceeding (IPR2024-00734) that set forth my opinions regarding U.S. Patent No. 7,623,518 (“the ’518 patent”).

2. I submit this Second Declaration in reply to Patent Owner Response.

3. In preparing this Second Declaration, I have considered:

- (2) Patent Owner Response (Paper 9);
- (3) Declaration of Dr. Eric Cole (Ex.2001);
- (4) Deposition Transcript of Dr. Paul Cole (Ex.1021);
- (5) Architectures With Bus Based Switch Fabrics Case Study Cisco Catalyst 6000 Series Switches (Ex.1022); and
- (6) Any other document reference herein.

4. My qualifications can be found in my first Declaration, Ex.1003 and in my CV, Ex. 1004. The discussion of the level of ordinary skill in the art and relevant legal standards are also the same as my first Declaration. In forming the opinions expressed below, I have considered the documents list above (and any additional documents discussed below) along with my own knowledge and experience.

II. UNPATENTABILITY ANALYSIS

A. Claims 1 and 3 are Obvious over Gai, Yip, and Kwan.

5. As discussed below, I disagree with Patent Owner and Dr. Cole that Gai, Yip, and Kwan would not have been combined. Resp. 7-20; Ex.2001, ¶¶50-74.

6. I disagree with Patent Owner and Dr. Cole that Gai is directed to or somehow limited to a Layer 3 intermediate device. Resp. 8; Ex.2001, ¶¶50-56. Gai plainly discloses that its invention may be used in a Layer 2 intermediate device:

Nonetheless, it should be understood that **the present invention may also be utilized in whole or in part with other intermediate network devices, such as switches and/or layer 2 intermediate devices**, which are also intended to broadly cover any intermediate device operating primarily at the data link layer.

Ex.1006, 5:35-55.

7. As such, a POSITA would have understood that Gai's teachings are not limited to Layer 3 and equally apply to Layer 2 intermediate devices such as switches.

8. Additional evidence that Gai's teachings apply to Layer 2 devices is provided by Gai itself by disclosing that its invention may be implemented with "the Catalyst® 6000 family of multi layer switches...from Cisco Systems, Inc." Ex.1006, 6:62-65. Cisco Systems' Catalyst® 6000 is a multi layer switch, which means that it operates multiple layers. Indeed, Dr. Cole ultimately conceded this

point during deposition. Ex.1021, 111:18-19 (“So when you're saying multilayer switches, it means it's operating on layers 2 and 3.”). As such, I disagree with Dr. Cole’s suggestion in his declaration that Cisco’s Catalyst® 6000 multilayer switch is not a Layer 2 device.

9. A POSITA would have understood that Cisco’s Catalyst® 6000 multilayer switch is configurable to operate at multiple layers, including operating at Layer 2 to perform ACL filtering, as illustrated below at Figure 7.5:

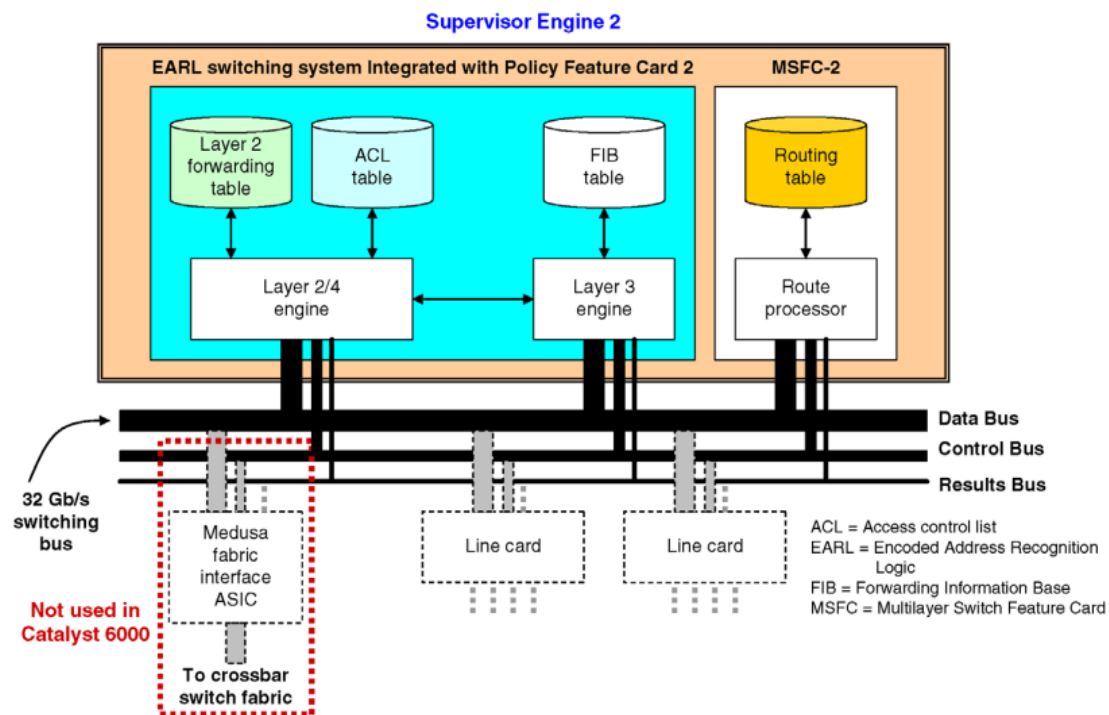


FIGURE 7.5 Catalyst 6000 with Supervisor Engine 2 with Policy Feature Card 2 (PFC2) and Multilayer Switch Feature Card 2 (MSFC2).

Ex.1022, FIG. 7.5

10. Above in Figure 7.5 the Catalyst® 6000 multilayer switch is illustrated as having an ACL at Layer 2, such that it is capable to perform Layer 2 ACL filtering. Ex.1022, 142 (“As shown in Figure 7.5, the EARL switching system is actually integrated into the PFC2. The **Layer 2 and ACL engine** are combined to obtain a single Layer 2/ Layer 4 engine. The capabilities of the **Layer 2 forwarding engine are enhanced to include...ACL filtering.**”). This shows that a POSITA would have understood that Gai’s intermediate network device 316, which may be implemented with a Catalyst® 6000 multilayer switch (Ex.1006, 6:62-65), is a Layer 2 switch that performs ACL filtering. Therefore, Gai’s disclosure is not limited to Layer 3 intermediate devices and expressly teaches Layer 2 intermediate devices.

11. I also disagree with Patent Owner and Dr. Cole that Yip is directed and limited to Layer 3 devices. Resp. 12-14; Ex.2001, ¶¶57-61. Yip plainly teaches that “access lists were developed to combat cyberattacks on the LAN Switch by providing an administrator controlled list of Internet Protocol (IP) addresses or media access control (MAC) addresses that were authorized to access the network.” Ex.1013, 2:43-47; *see also* Ex.1013, 6:23-27 (“In an alternate embodiment, a static layer-2 address, such as the user’s end station MAC address may be adequate for purposes of obtaining access.”). Yip’s disclosure of an ACL including a MAC address means that the ACL is utilized at Layer 2. A POSITA

would readily appreciate that the “alternate embodiment” is within the scope of Yip’s invention and would give weight to this embodiment since it is plainly disclosed.

12. Because both Gai and Yip contemplate Layer 2 devices, I disagree with Patent Owner and Dr. Cole that they are not combinable. Resp. 14-16; Ex.2001, ¶¶62-64. A POSITA would have recognized that there is no incompatibility, complexity, or difficulty in implementing the combination of Yip and Gai since a suitable platform for implementing Gai’s teachings is a Layer 2 intermediate device (Ex.1006, 5:35-55), such as a Cisco Systems Catalyst® 6000 multilayer switch (Ex. 1006, 6:62-65) which is configurable to operate at Layer 2. As such, a POSITA would have been motivated to combine the teachings of Yip and Gai and would have done so with relative ease.

13. I also disagree with Patent Owner and Dr. Cole that Kwan and Gai (as modified per Yip) are not combinable because Kwan’s Layer 2 teachings do not apply to Gai’s Layer 3 device. Resp. 16-19; Ex.2001, ¶¶65-74. As I discussed above, Gai’s disclosure contemplates a Layer 2 intermediate device (Ex.1006, 5:35-55), such as a Cisco Systems Catalyst® 6000 multilayer switch (Ex. 1006, 6:62-65) that may be configured to operate at Layer 2.

14. I also disagree with Patent Owner and Dr. Cole that Kwan’s teachings would adversely impact Gai’s switching speeds because the number of hosts are

limited. Resp. 18; Ex.2001, ¶¶69-70. A POSITA would have understood that the switching speeds are not diminished if the number of hosts are limited per port—there is no logical relationship. Gai obtains high switching speeds by utilizing ACL TCAM. A POSITA would have recognized that Kwan’s technique to learn a new IP address (e.g., one that was assigned with DHCP) does not impact switching speeds of an already learned IP addresses. In fact, Kwan’s technique would benefit Gai because a new IP address would be learned quickly without manual administrator intervention, which is time intensive.

15. Furthermore, I disagree that it would not have been feasible to combine the functionality of ACLs and MAC addresses—indeed Yip plainly teaches doing just that. Also, I disagree with the assertion that the proposed combination would introduce new vulnerabilities into the network, such as IP spoofing the MAC address. Resp. 18; Ex.2001, ¶¶72-73. To the contrary, a POSITA would have understood that in the combination vulnerabilities are reduced and IP spoofing the MAC address would not be an issue. In the proposed combination of Kwan with Gai (as modified per Yip), the MAC addresses are provided by the administrator as text inputs in the ACL and Kwan teaches that a seed IP address is provided by the administrator (*see* Ex.1007, 6:14-18). This means that spoofing in the combined system is reduced because an IP address attempting to spoof the MAC address would have to both spoof the IP (to match

the seed) and the MAC address (to match a paired MAC address *see* Ex.1007, 3:1-4; 6:14-18), which would be very difficult.

B. Claims 15, 17, 19-21 are Obvious over Gai, Kwan, and Georgiou.

16. I disagree with Patent Owner and Dr. Cole that a person of ordinary skill would not have combined Gai, Kwan, and Georgiou and that the “*memory circuit*” limitation is not satisfied. Resp. 21-28; Ex.2001, ¶¶75-103.

17. Georgiou’s teachings would not have slowed Gai’s processing of incoming packets because in Gai, most packets are forwarded by Gai’s forwarding entity 404 to their destination and only packets that Gai does not forward, e.g., because they need additional processing (e.g., encrypt, learn new IP addresses...) would be stored in dynamic memory 409. Ex.1006, 1:22-27, 5:44-67, 17:44-48. As such, in the proposed combination only a small number of packets (e.g., packets that need additional processing by CPU 406) are stored in the dynamic memory 409 and the majority of packets are forwarded by the forwarding entity 404 to the various interfaces 402*a-e* of device 316. Furthermore, the proposed combination would not be “extremely costly and inefficient” because using a DMA circuit and dynamic memory, as Georgiou teaches, was well known in the art and such well known devices would add minimal complexity to Gai’s system that already has dynamic memory 409. Resp. 25; Ex.2001, ¶83.

18. Lastly, in view of the specification, a POSITA would not understand the claims of the '518 patent to require a “single” “*memory circuit*.” There is no such embodiment disclosed in the '518 patent and the claim language broadly covers one or more “*memory circuits*.” Resp. 30; Ex.2001, ¶92.

III. CONCLUSION

19. I 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 that these statements were made with 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.

Dated: _____ 4/29/2025 _____



Mark E. Crovella, Ph.D.