

IPR2024-00506

U.S. Patent No. 8,014,394

CISCO SYSTEMS, INC. v. PORTSMOUTH NETWORK CORP.

Petitioner's Demonstrative Exhibit



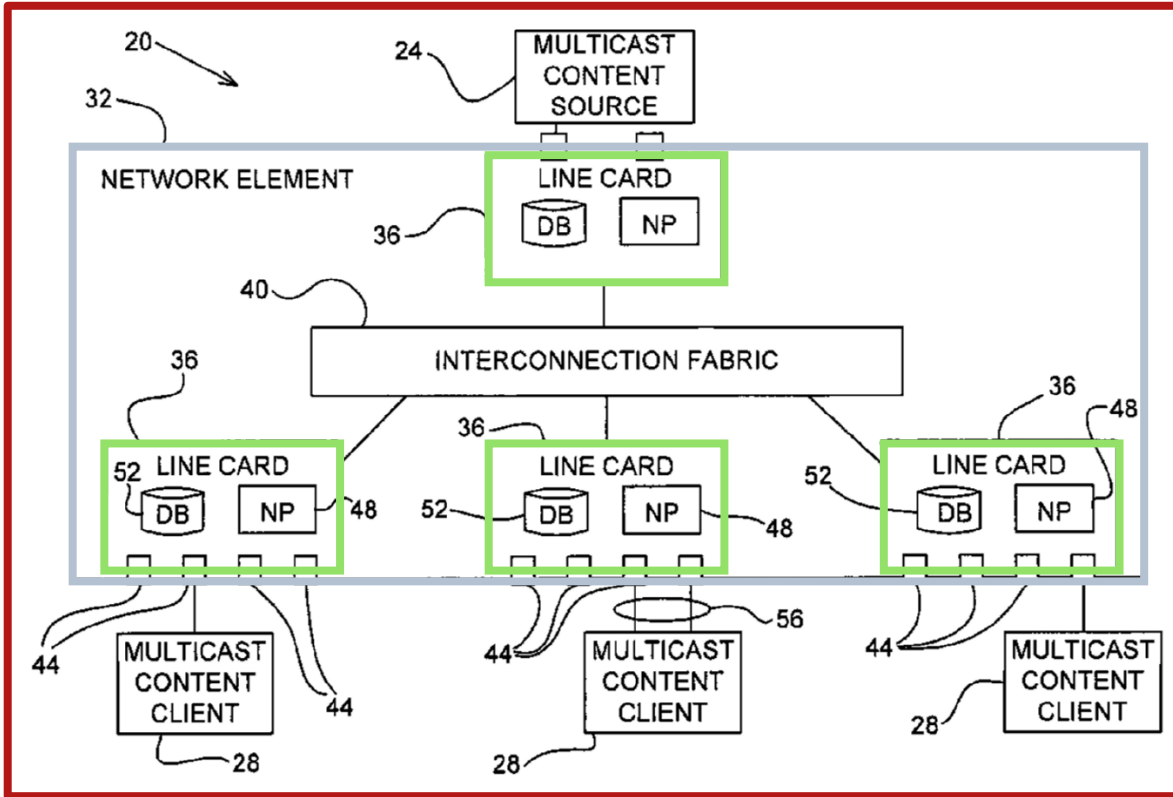
July 23, 2025

IPR2024-00506
Cisco Systems, Inc. v. Portsmouth Network Corp.
Cisco's Exhibit 1040

Roadmap

- 1 Overview of the '394 Patent
- 2 Invalidity Of The Challenged Claims
- 3 Issues Raised By Patent Owner

The '394 Patent Is Directed To A Network Element Routing Multicast Streams Using *Internet Group Management Protocol (IGMP)*



EX1001 ('394 Patent), FIG. 1; Pet., 10

Network element 32 comprises multiple processing units, such as line cards 36. The line cards are interconnected by an interconnection switch fabric 40. The network element comprises multiple Input/Output (I/O) ports 44, and each line card 36 is assigned to process the packets communicated over a given subset of the ports. A given line card may handle a

EX1001 ('394 Patent), 6:23-28; Pet., 9

during the given time period. In a disclosed embodiment, the request specifies a requested action selected from a group of actions consisting of receiving the given multicast packet stream and stopping to receive the given multicast packet stream. The request may conform to one of an Internet Group Management Protocol (IGMP) and a Multicast Listener Discovery (MLD) protocol.

EX1001 ('394 Patent), 3:34-41; Reply, 14-15

In some embodiments, two or more ports 44 are aggregated to form a high-capacity port 56, in order to provide high traffic capacity and redundancy to a certain content client or content source. For example, ports can be aggregated to form a Link

The '394 Patent Includes Two Distinct Sets Of Claims

1. A method for communication, comprising:
operating a network element, wherein the network element

▪ ▪ ▪

wherein operating the network element comprises aggregating two or more of the ports to form a high-capacity port, and

wherein aggregating the ports comprises setting an upper limit on a number of the multicast packet streams that are permitted for forwarding over the high-capacity port, wherein the request indicates that the given multicast packet stream is to be forwarded over the high-capacity port, and wherein updating the list comprises modifying the list to indicate that the given multicast packet stream is permitted for forwarding over the high-capacity port only when the number of the multicast packet streams that are permitted for forwarding over the high-capacity port, including the given multicast packet stream, does not exceed the upper limit.

8. A method for communication, comprising:
operating a network element, wherein the network element

▪ ▪ ▪

wherein operating the network element comprises initializing a new processing unit added to the network element by:

deactivating the ports to which the new processing unit is assigned;

while the ports to which the new processing unit is assigned are deactivated, sending a multicast status request, receiving multicast membership reports sent by multicast clients in response to the multicast status request, constructing the list by the new processing unit based on the received multicast membership reports; and
after constructing the list, activating the ports to which the new processing unit is assigned.

Roadmap

- 1 Overview of the '394 Patent
- 2 Invalidity Of The Challenged Claims
- 3 Issues Raised By Patent Owner

All Claims In The '394 Patent Are Invalid

Ground	Claims	Basis	References
#1	1, 4, 6-7, 11, 14, 16-17	103	Weyman, Li
#2	5, 15	103	Weyman, Li, Rooholamini
#3	16	103	Weyman, Li, Pitcher
#4	8, 18	103	Weyman, Jain, LeMaire
#5	9	103	Weyman, Jain, LeMaire, Li
#6	10	103	Weyman, Jain, LeMaire, Pitcher
#7	2, 12	103	Weyman, Li, Ding

Pet., 6

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Disputed Issues

Ground 1: Weyman In Combination With Li

- It Would Have Been Obvious To Combine Weyman And Li
- The **Combination** Of Weyman And Li Teaches Limitation [1k]

Ground 2: Weyman In Combination With Li And Rooholamini

- It Would Have Been Obvious To Combine Weyman, Li, And Rooholamini

Ground 4: Weyman In Combination With Jain And LeMaire

- The Weyman, Jain, LeMaire Combination Teaches Limitation [8k] Because Jain Teaches **Deactivating User Ports** Of Newly Added Device With "Link Down" Condition.

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- The Weyman, Jain, LeMaire Combination Teaches Limitation [8k] Because Jain Teaches **Deactivating User Ports** Of Newly Added Device With “Link Down” Condition.

Weyman Discloses “Distributed Router” Delivering Multicast Streams Using *Internet Group Management Protocol (IGMP)*

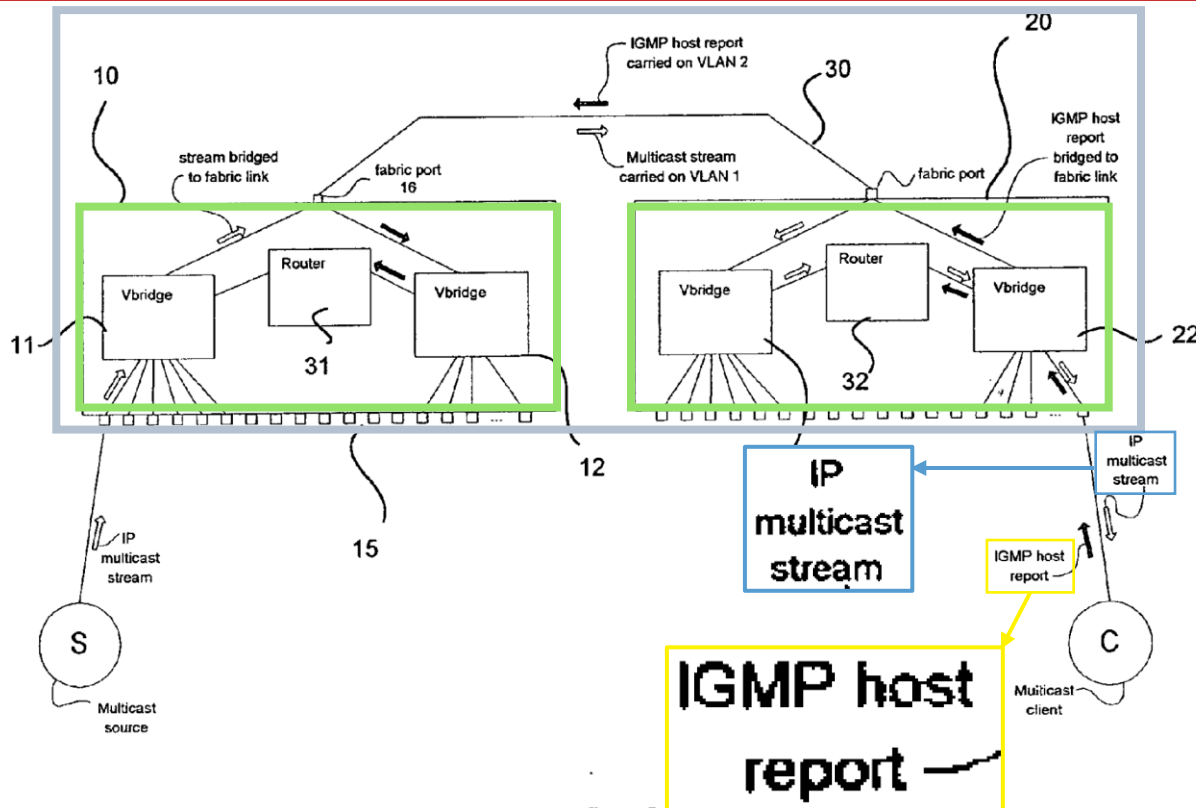


FIG.11

(57)

ABSTRACT

A distributed router composed of individual units connected by links in a routing fabric which appears to be a single network entity routes multicast packets by bridging to the final unit in the fabric. At the final unit the packet is replicated as necessary and routed. The scheme avoids multiple transmission of the same packet across the fabric.

EX1005 (Weyman), Abstract; Pet., 13

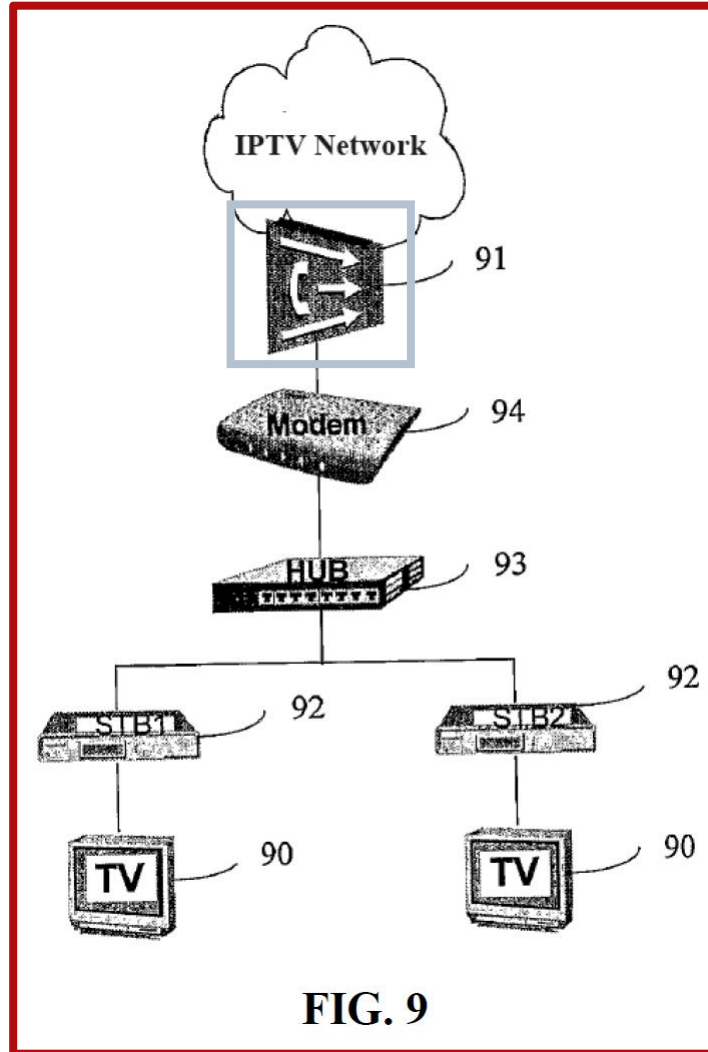
[0137] In order to join the destination group for the stream, the client would need to send an IGMP host report. Vbridge 22 in device 20 would forward this report to the unit's multicast router and also the fabric port. Vbridge 12 in unit 10 would then receive the report and forward it to the router 31.

EX1005 (Weyman), [0137]; Pet., 16

[0050] It is possible for a host to be connected to a multiplicity of units in a fabric by means of an aggregated link, which comprises a multiplicity of physical connections constituting a single logical connection. Although connec-

EX1005 (Weyman), [0050]; Pet., 16-17

Li Teaches Port Bandwidth Control At Multicast Router, Also Using *Internet Group Management Protocol (IGMP)*



EX1007/1032 (Li), FIG. 9; Pet., 19

As illustrated in FIG. 9, in an IPTV access network, an access device 91 of a multicast service is a Digital Subscriber Line Access Multiplexer (DSLAM) functioning as a multicast router, and provides the user with a Digital Subscriber Line (xDSL) service port; and, at a user side, two set-

EX1007/1032 (Li), 26:13-15; Pet., 18

The user to order a multicast channel sends to the access device through the STB an IGMP message requesting for selecting the multicast channel.

EX1007/1032 (Li), 33:17-18; Reply, 14

Correspondingly, a multicast joining message can be processed, as illustrated in FIG. 11.

At Step 111, a multicast joining message is received. At Step 112, it is determined whether a multicast channel requesting to join is permitted to join at a current XDSL port; and, if so, Step 115 is performed; otherwise, Step 113 is performed.

EX1007/1032 (Li), 27:10-13; Pet., 19

Li Teaches Port Bandwidth Control At Multicast Router, Also Using *Internet Group Management Protocol (IGMP)*

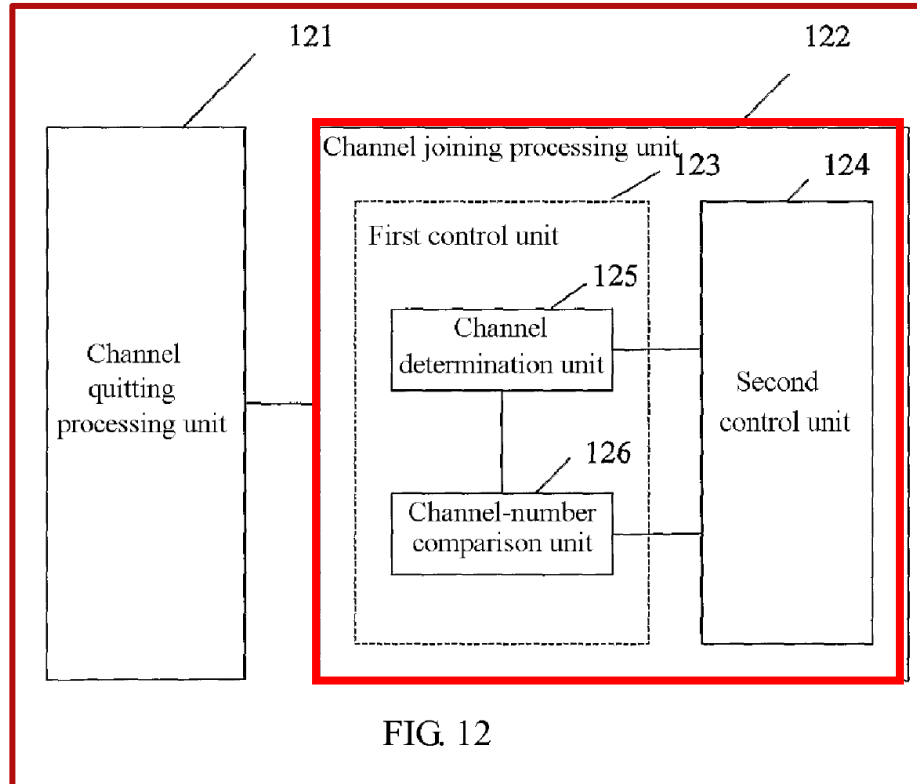


FIG. 12

EX1007/1032 (Li), FIG. 12; Pet., 21

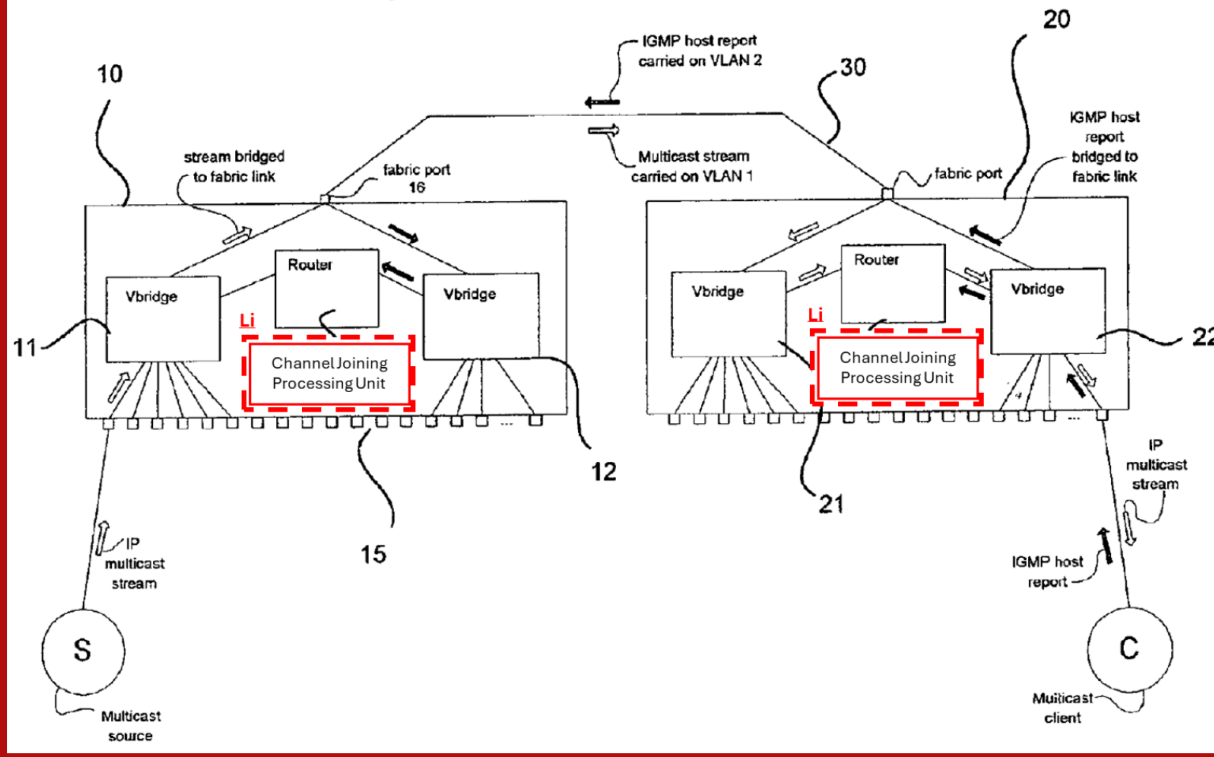
In this situation, each xDSL service port is configured with the maximum number of accessed multicast channels allowable, which can be set dependent upon a bandwidth of the xDSL port or as required for management. It is determined whether the current xDSL service port allows joining the new channel, that is, whether the number of channels being forwarded over the port is below the maximum number of accessed channels allowable, which is set for the port, and if so, the port allows an access to the new channel for joining; otherwise, the new channel cannot be added.

EX1007/1032 (Li), 28:23-29:1; Pet., 20

It Would Have Been Obvious To Combine Weyman And Li

Petition:

Weyman in combination with Li



Pet., 22

A POSITA would have been motivated to incorporate Li's channel joining processing unit into Weyman's distributed router so that Weyman's distributed router does not overload a particular port and degrade the router's reliability, which was a known problem in the art. *See* Section VI.C [Bandwidth Control]. *See also* EX1020, [0003], [0006]. Indeed, Li expressly teaches that "the maximum number of multicast channels that can be selected of a service port *needs to be controlled.*" EX1007, 5:5-23. EX1002, ¶95.

Pet., 22

of multicast streams being carried by the particular port. Accordingly, a POSITA would have understood that Li's channel joining processing unit would have provided a predictable result of limiting the number of multicast streams carried on Weyman's ports and aggregated links. EX1002, ¶¶99-100.

Pet., 24

In POR, Patent Owner Argues Against Weyman/Li Combination For Primarily Two Reasons

1. A POSITA Would Not Have Combined Weyman and Li Because Of Their Distinctions

POR: ¶ 44. Therefore, Weyman and Li relate to two different types of products using two different types of media in two different types of networks. EX2001 at ¶ 45.

POR, 13

2. The Weyman/Li Combination Would Have Contradicted Weyman's Teachings

units of such a fabric.”). Therefore, incorporating Li’s channel joining processing unit in each network unit in Weyman contradicts Weyman’s teachings. *See* EX2001 at ¶ 55.

POR, 15-20

Arg. #1: The Board's Institution Decision Preliminarily Found That Weyman And Li "Relate To Similar Subject Matter"

Institution Decision:

Based on the current record, we are persuaded that a POSITA would have been motivated to combine Weyman and Li as proposed by Petitioner. Pet. 21–25; Ex. 1002 ¶¶ 84–103; Ex. 1005 ¶¶ 4–5, 76, 98, 104–105, 119, 137–139, 162; Ex. 1007, 5:5–23, 1:17–19, 33:16–35:23. Patent Owner does not dispute that a POSITA would have been motivated to combine Weyman with Li's channel joining processing unit. Furthermore, both references relate to similar subject matter, processing multicast stream requests, and Li's channel joining processing unit addresses the problem of potentially overloading a port when doing so. *See, e.g.*, Ex. 1005 ¶¶ 4–5 (“[A] primary

Institution Decision, 25

Arg. #1: Patent Owner Argues That POSITA Would Not Have Combined Weyman And Li Because Of Their Distinctions

Patent Owner's Alleged Distinction #1:

In view of the above, Weyman relates to a packet switched network while Li relates to access networks. Therefore, a POSITA would understand that Weyman and Li are directed to different types of networks. EX2001 at ¶¶ 41–43.

POR, 12

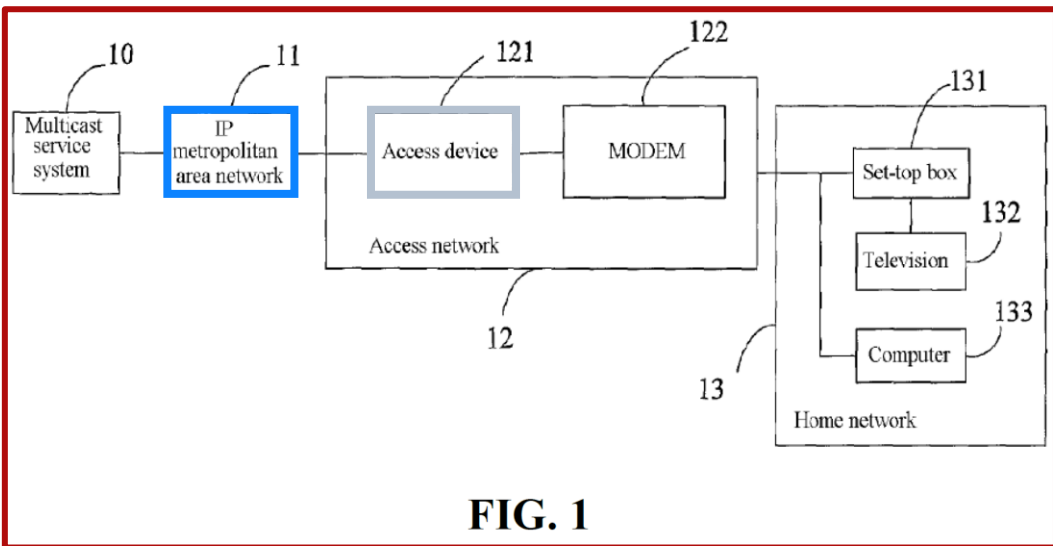
Patent Owner's Alleged Distinction #2:

The devices disclosed in Weyman and Li also operate in different ways. EX2001 at ¶ 43. Weyman discloses operations on layer 2 ethernet. *See e.g.*, EX1005 at [0028]. Weyman also discloses that its distributed bridging fabric uses Vbridges

Li's access devices are not ethernet-based. EX2001 at ¶ 44. Rather, Li

POR, 12-13

Arg. #1: Patent Owner Argues That POSITA Would Not Have Combined Weyman And Li Because Of Their Distinctions



EX1007/1032 (Li), FIG. 1; POR, 12



Dr. Olivier
PO's Expert

Q. So the **IP-based metropolitan area network** is a packet-switched network. Right?

A. At some level, yes.

EX1033 (Olivier Dep. Tr.) at 70:6-8; Reply, 3

high priority program due to preemption of a low priority program. A layer-2 multicast table on a line card can be in a form of {multicast VLAN, multicast group MAC or IP, egress pvc or port list}. A multicast table entry can be created fixedly for and a multicast VLAN can be occupied

EX1007/1032 (Li), 20:10-11; Reply, 3

At Step 506, the access device performs differential processing on the program according to the program priority, for example, by reserving bandwidth for the program, and/or statically forwarding the program to an access layer device, and/or guaranteeing program quality according to 802.1p information, and/or reserving multicast resources for the program, and/or sending IGMP protocol first in concurrent situations. Particularly, reserving bandwidth for the program includes:

EX1007/1032 (Li), 17:23-27; Reply, 3

Arg. #1: The Alleged Distinctions Are Distinctions Without Differences



“The motivation-to-combine analysis is a flexible one,” and “in many cases, a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.”

Intel Corp. v. PACT XPP Schweiz AG, 61 F.4th 1373, 1379-80 (Fed. Cir. 2023).

Reply at 4.

In POR, Patent Owner Argues Against Weyman/Li Combination For Primarily Two Reasons

1. A POSITA Would Not Have Combined Weyman and Li Because Of Their Differences

¶ 44. Therefore, Weyman and Li relate to two different types of products using two different types of media in two different types of networks. EX2001 at ¶ 45.

POR, 13

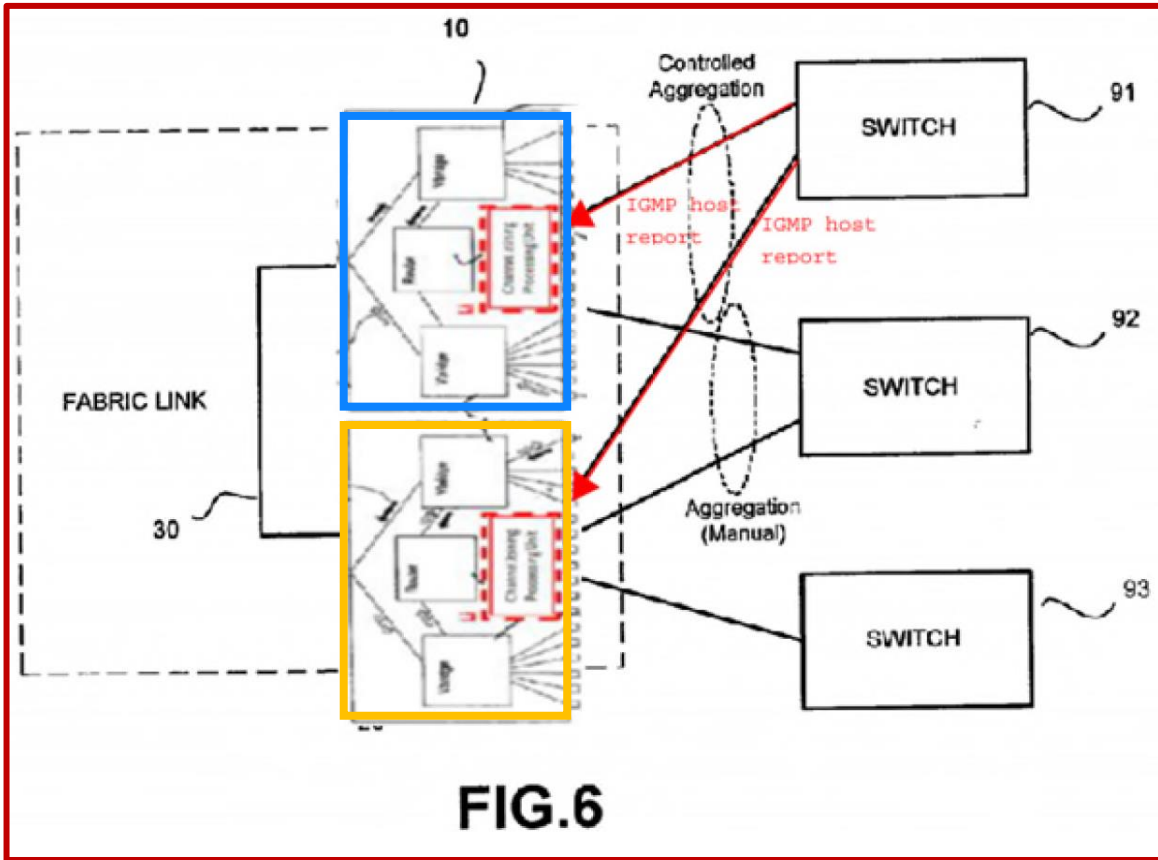
2. The Weyman/Li Combination Would Have Contradicted Weyman's Teachings

POR: units of such a fabric.”). Therefore, incorporating Li’s channel joining processing unit in each network unit in Weyman contradicts Weyman’s teachings. *See* EX2001 at ¶ 55.

POR, 15-20

Arg. #2: Patent Owner Argues That Weyman/Li Combination Would Have Contradicted Weyman's Teachings

POR:



POR, 18

An IGMP host report message may travel from a switch (e.g., switch 91) to either of network units 10 and 20. EX2001 at ¶ 54. Because packets may be distributed in a number of ways under link aggregation, there is no way to determine which network unit will receive a particular IGMP report message beforehand. *Id.* at 55; *see also* EX1025 at 7:15–51. Therefore, the receipt of an IGMP report message on either of the two network units 10 and 20 must be coordinated. *See* EX2001 at ¶ 55. Coordinating the reception of the IGMP report messages at two different network units requires using additional bandwidth on the fabric link. *See id.* However, Weyman is clear that an object of the invention is to minimize the usage of bandwidth on the links between fabrics. EX1005 at [0005] (“A further

POR, 18

Arg. #2: Patent Owner's Argument Is Predicated On The Alleged Need For Further Modification, But Such Modification Is Unnecessary

Reply:

PO's argument is fundamentally flawed. *First*, contrary to PO's assertion, the Weyman/Li combination does **not** require further modification to coordinate "the reception of the IGMP report messages at two different network units" (POR, 19); Weyman already discloses such coordination. Specifically, Weyman teaches that

Reply, 5

[0162] Report messages can be generated by the client units in order to route query messages or a change in an applicant's multicast membership. Changes in the multicast membership reported may affect the multicast distribution tree that the router maintains. Any changes to the multicast distribution tree must be kept synchronised for all the units in the fabric. One possibility is to cause merely one unit to process the IGMP report and to send updates to the remainder of the units in the fabric. Alternatively **the IGMP message could be delivered to every unit in the fabric for processing.**

EX1005 (Weyman), [0162]; Reply, 5



Dr. Olivier
PO's Expert

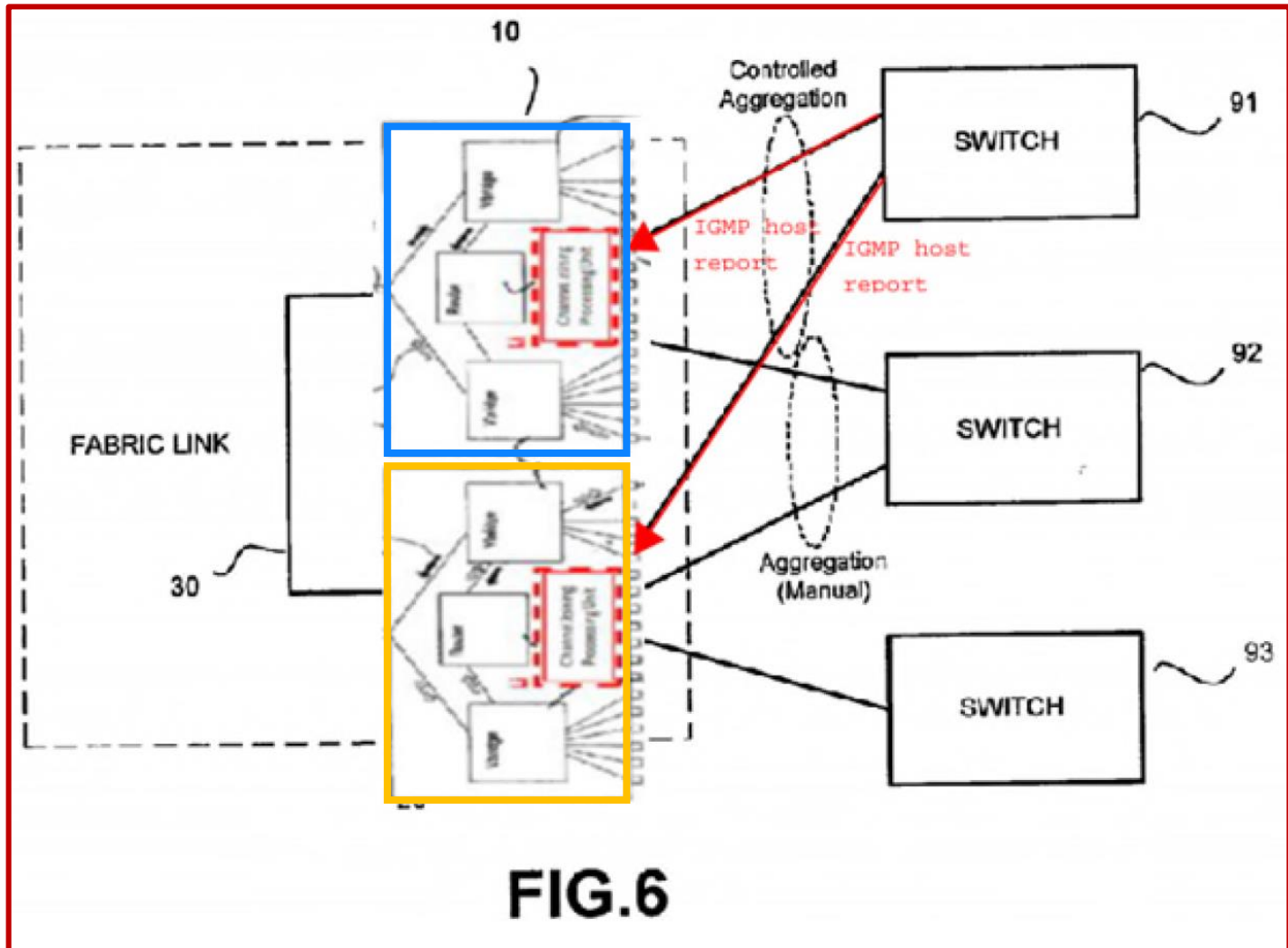
Q. So when one of the units in the distributor router receives an IGMP host report, the IGMP host report is shared with all the units in the distributor router. Correct?

A. Correct.

EX1033 (Olivier Dep. Tr.), 36:14-18; Reply, 5

Arg. #2: Patent Owner's Argument Is Predicated On The Alleged Need For Further Modification, But Such Modification Is Unnecessary

POR:



POR, 18

Arg. #2: Nothing In Weyman Prohibits Using Internal Fabric Link



Dr. Olivier
PO's Expert

Q. Correct. But Weyman – ***there's nothing in Weyman that says you cannot use the fabric link to transmit and receive the IGMP host report.*** Correct?

...

A. **Correct.** It just says you should be very cognizant of any traffic you're sending over that fabric link because in distributor routers such as the one in Weyman, these fabric links are the bottlenecks of the system.

EX1033 (Olivier Dep. Tr.), 37:13-22; Reply, 6

Arg. #2: Patent Owner's Sur-Reply

Sur-Reply:

⁴ Petitioner makes two strawman arguments that require **no response**: 1) “Weyman/Li combination does not require further modification to coordinate the reception of the IGMP report messages at two different networks” and 2) “even if Weyman/LI combination require additional modification . . . nothing in Weyman prohibits distributing the IGMP host reports using the fabric link.” Reply at 5-7.

Sur-Reply, 6

Arg. #2: Patent Owner's Sur-Reply

20. Specifically, PO explained that Petitioner's proposed combination would "require[] increased bandwidth usage on the fabric, which contradicts Weyman's teachings." POR at 17-20.² The Reply does not rebut this point.

Sur-Reply, 2

In the Petition, Petitioner argued local control, as opposed to global control, of the port's workload is desirable. Petition at 23. Now, Petitioner argues that global control rebuts PO's argument because global control is required for all units in Weyman's distributed router to receive IGMP reports regardless of which unit initially receives the report. Reply at 5. But as the Parties previously explained, global control of the port's workload contravenes Weyman's objective to limit bandwidth use on the fabric link. Petition at 23; POR at 14-15. Thus, Petitioner fails to rebut PO's argument that Weyman in combination with Li contravenes Weyman's teachings to minimize bandwidth use on the fabric link.

Sur-Reply, 7

Patent Owner Does Not Present Any Response to Petitioner's Obvious To Try Arguments

Petition:

At a minimum, it would have been obvious to try Li's channel joining processing unit in Weyman's distributed router. As explained in Section VI.C [Port Bandwidth Control], there was a design or market need to control a port's bandwidth, and there were only a finite number of ways to control the port's bandwidth (such as measuring the port's bandwidth real-time and throttling the bandwidth, or limiting the number of multicast streams assigned to the port). EX1013, [0036]; EX1021, [0225]; EX1022, [0024]; EX1019, 2:37-3:14. Each of those solutions would have had a reasonable expectation of success in Weyman's router because those techniques would have been implemented as a conventional logic operation in Weyman's units, yielding predictable results of controlling the port's bandwidth. EX1002, ¶103.

Pet., 25

Reply:

Lastly, the Petition establishes that "it would have been *obvious to try* Li's channel joining processing unit in Weyman's distributed router." Pet., 25. Neither PO nor its expert rebuts Petitioner's prima facie showing of obviousness to try. See *generally* POR, 10-20. Since there is no countervailing argument or evidence, Petitioner respectfully requests the Board to find that, at a minimum, it would have been obvious to try to combine Weyman and Li.

Reply, 7

20. Specifically, PO explained that Petitioner's proposed combination would "require[] increased bandwidth usage on the fabric, which contradicts Weyman's teachings." POR at 17-20.² The Reply does not rebut this point.

² This also rebuts Petitioner's obvious to try argument, which is grounded in the statement that "there was a design or market need to control a port's bandwidth." Petition at 25; POR at 20; *see also* § II.A.4.

Sur-Reply, 2

Disputed Issues

Ground 1: Weyman In Combination With Li

- It Would Have Been Obvious To Combine Weyman And Li
- The **Combination** Of Weyman And Li Teaches Limitation [1k]

Ground 2: Weyman In Combination With Li And Rooholamini

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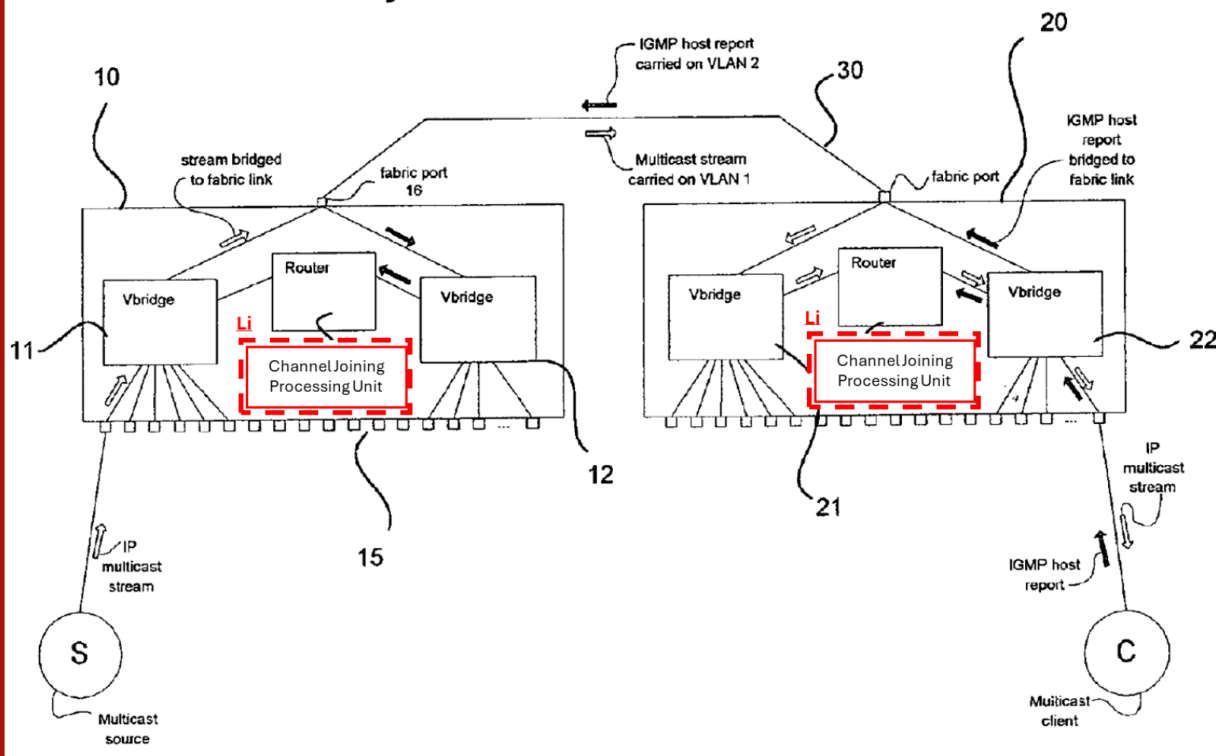
Ground 4: Weyman In Combination With Jain And LeMaire

- The Weyman, Jain, LeMaire Combination Teaches Limitation [8k] Because Jain Teaches **Deactivating User Ports** Of Newly Added Device With “Link Down” Condition.

Limitation [1k]: Weyman/Li Teaches Port Bandwidth Control On Weyman's High-Capacity Port

[1k]: setting an upper limit on a number of the multicast packet streams that are permitted for forwarding over the high-capacity port

Weyman in combination with Li



Pet., 22

Weyman/Li teaches limitation [1k]. For example, Li teaches that “each xDSL service port is configured with the *maximum number of accessed multicast channels allowable*.” EX1007, 28:23-29:1. When the multicast router receives a multicast join request, the Weyman/Li’s channel joining processing unit determines whether the number of channels being forwarded at the port or aggregated link is below the maximum number of accessed channels allowable, and if not, the channel joining processing unit rejects the multicast join request. EX1007, 31:4-19.

Pet., 45

of multicast streams being carried by the particular port. Accordingly, a POSITA would have understood that Li’s channel joining processing unit would have provided a predictable result of limiting the number of multicast streams carried on Weyman’s ports and aggregated links. EX1002, ¶¶99-100.

Pet., 24 29

Patent Owner Argues That Petition Fails Because Li Fails To Show “*high-capacity port*” And “*multicast packet streams*” In [1k]

[1k]: setting an upper limit on a number of the **multicast packet streams** that are permitted for forwarding over the **high-capacity port**

POR:

Li discloses using an xDSL link. *See* EX1007 at 97:13–17 (“As illustrated in
is connected with a television set 90.”). The xDSL link is always a single link
because each end of the link contains a modem. *See* EX2001 at ¶ 61. The xDSL
link therefore cannot be an aggregated link or a high-capacity port, and **Li does not**
describe using a channel joining processing unit with an aggregated link. *Id.*

POR, 21

POR:

over the high-capacity port. *See* Petition at 45–46. In particular, the Petition relies
on **Li to disclose setting an upper limit on a number of the multicast packet streams.**
See Petition at 45. However, Petitioner’s arguments fail. *See* EX2001 at ¶ 60.

POR, 21

Patent Owner's Attack On Li Alone Is Irrelevant Because Petition Relies On Weyman For “*high-capacity port*” And “*multicast packet streams*”

Petition's Analysis of [1k]

Accordingly, the distributed router in Weyman/Li sets an upper limit on a number of multicast streams that are permitted for forwarding over Weyman's ports as well as the aggregated link (“high-capacity port”), as described in Section XI.A.1. [Weyman/Li]. EX1002, ¶¶153-155.

Pet., 45-46 ([1k])

of multicast streams being carried by the particular port. Accordingly, a POSITA would have understood that Li's channel joining processing unit would have provided a predictable result of limiting the number of multicast streams carried on Weyman's ports and aggregated links. EX1002, ¶¶99-100.

Pet., 24 (Section XI.A.1 [Weyman/Li])



Dr. Houh
Petitioner's Expert

Q. And Li's channel joining processing unit is being used to count the number of multicast streams that is disclosed in Weyman, right?

...

A. Yes, both at the port layer and the aggregated port lay -- level.

EX1034 (Houh Dep. Tr.), 73:5-10; Reply, 11

Weyman/Li **Combination** Teaches Limiting Number Of Weyman's "multicast packet streams" Carried On Weyman's "high-capacity port"

1. "Li ... teaches limiting the number of **multicast groups** handled by a port." Reply, 13

In practice, each service port of the access device is configured with a maximum number of accessed multicast channels allowable, which can be set dependent on bandwidth of the service port or as required by management. Checking whether a new channel is allowed to join at the current service port is checking whether the number of channels being forwarded at the port is below the maximum number of accessed channels allowable set for the port; and, if so, the new channel is allowed to join; otherwise, the new channel is rejected.

EX1007/1032 (Li), 30:25-31:3; Reply, 13

source network 23, and an authorization server 24. While joining a multicast group, which is often referred to as a channel, the terminal device 21 sends an IGMP report message to the access device 22 via the modem 20. Upon receiving the IGMP report message, the access device 22 adds the

EX1007/1032 (Li), 2:14-16; Institution Decision, 26-27

Li clearly defines "channel" as a multicast group.

POPR, 11

2. "Weyman teaches that its **multicast stream** is associated with a 'multicast group.'" Reply, 12

[0152] In the system of FIG. 12 it may be supposed that router 157 and client 1 are the only network devices that need to receive the multicast stream for multicast group A.

EX1005 (Weyman), [0152]; Reply, 12



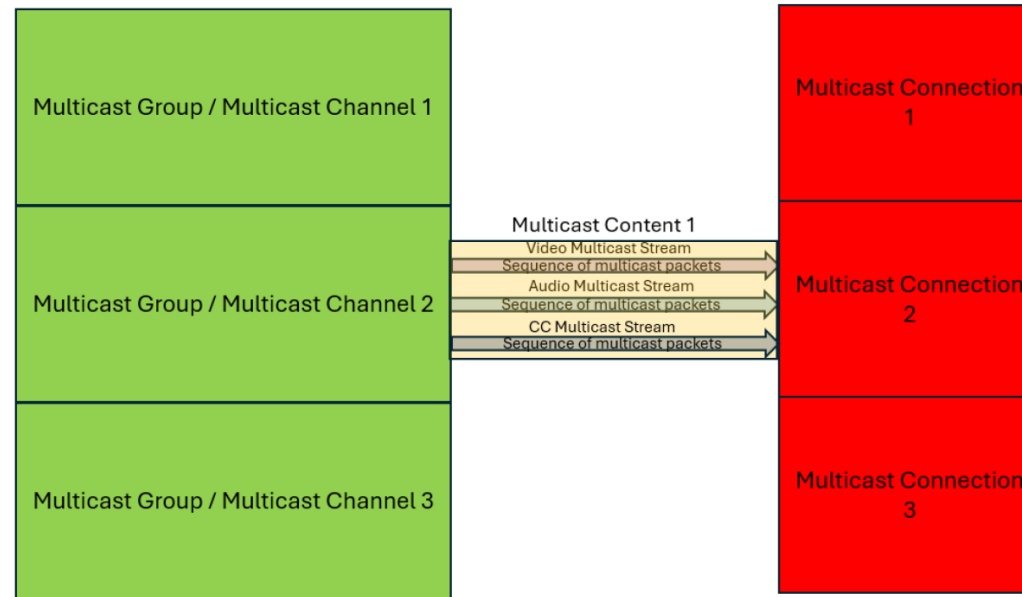
Dr. Olivier
PO's Expert

Q. Yeah. So the multicast group identifies the multicast connection that transmits a sequence of multicast packets. Right?

A. Yeah, packets that are -- the multicast packets are packets within the multicast connection.

EX1033 (Olivier Dep. Tr.) at 28:14-20; Reply, 12

Patent Owner's Sur-Reply



As PO explained (and Petitioner does not appear to dispute) multicast channels provide consumers with multicast content (e.g., movies or shows) which consists of multicast streams (e.g., audio multicast stream, video multicast stream). POR at 22-23. And as Dr. Olivier explained, “a multicast group [synonymous with a multicast channel] identifies the multicast connection that transmits a sequence of multicast packets.” Reply at 12; Ex. 1033, 28:14-20.

Even If Li Is Considered Alone, Li's "Channel" Teaches Claimed "*multicast packet stream*"

Institution Decision:

We are persuaded, based on the current record, that the multicast "channel" in Li teaches the "multicast packet stream" recited in claim 1 of the '394 patent. The word "channel" is described throughout Li as the flow of data (communication packets) that carry the multicast content, such as a TV channel. *See, e.g.*, Ex. 1007, 3:9–22 (referring to a channel as an IPTV

Institution Decision, 27

'394 Patent:

during the given time period. In a disclosed embodiment, the request specifies a requested action selected from a group of actions consisting of receiving the given multicast packet stream and stopping to receive the given multicast packet stream. The request may conform to one of an Internet Group Management Protocol (IGMP) and a Multicast Listener Discovery (MLD) protocol.

EX1001 ('394 Patent), 3:34-41; Reply, 14-15

Li:

However, a problem arises in the practice of IPTV service, due to the time delay resulting from the above procedure of multicasting a specific group query message. In IPTV service implemented by multicast, the operations of a user switching channels include: sending an IGMP quitting message of an original channel and sending an IGMP joining message of a new channel. Upon

EX1007/1032 (Li), 3:9-12; Reply, 14

The user to order a multicast channel sends to the access device through the STB an IGMP message requesting for selecting the multicast channel.

EX1007/1032 (Li), 33:17-18; Reply, 14

Patent Owner's Contrary Argument Based On Unrelated Reference Is Untenable

POR:

comparison is improper. *Id.* at ¶ 64. Li's channels are content provider or program channels sent over an xDSL link. *See e.g.*, EX1007 at 97:13–17; *see also* EX2001 at ¶ 64. A POSITA would understand that such channels typically have multiple streams, including at least one video stream and at least one audio stream. EX2001 at ¶ 64. For example, U.S. Patent No. 8,516,531 (“’531 Patent”), which was published in 2007 as U.S. Patent Pub. No. 2007/0280298, discloses that program channels contain both video and audio multicast streams. *See* EX2005 (’531 Patent) at 6:26–33 (“A source video stream 202 received and/or propagated (Step A of FIG. (emphasis added). The ’531 Patent also makes clear that the streams that make up the program channels correspond to multicast data streams. *Id.* at 1:19–23

POR, 22-23

The '531 Patent Does Not Support Patent Owner's Proposition That Li's "Channel" Includes Multiple Multicast Packet Streams

decoder joins a new multicast video stream. Although the exemplary illustration refers only to a single multicast video stream, it should be appreciated by those skilled in the art that the concepts described herein may apply to multiple incoming video streams: those in which it is desired to reduce channel change delays, and to changes to video streams distributed by other means, such as by broadcast and unicast methods.

A source video stream 202 received and/or propagated (Step A of FIG. 2) through network 102 (FIG. 1). In one embodiment, video stream 202 is a real-time multicast video stream which has been encoded for eventual transmission to a presentation device 116 via network 102. Video stream 202 typically contains multimedia content corresponding to a program channel, such as video and audio content of a content provider's channel. Video stream 202 is encoded using a digital video compression and transmission format, such as MPEG.

gated (Step A of FIG. 2) through network 102 (FIG. 1). Video stream 202 (FIG. 2) is a real-time multicast video stream which has been encoded for eventual transmission to a presentation device 116 via network 102.

EX2005 ('531 Patent), 8:44-47; Reply, 16

EX2005 ('531 Patent), 6:18-35; POR, 22-23; Reply, 16

Petitioner then argues that the '531 Patent does not support PO's position that channels have multiple streams. Reply at 15. This conclusion is based on a misleading partial quote taken out of context that says "single multicast video stream." *Id.* at 16 (citing Ex. 2005 6:18-25). But the full quote, makes clear that the '531 Patent is not limited to single multicast video streams:

Although the exemplary illustration refers only to a single multicast video stream, it should be appreciated by those skilled in the art that the **concepts described herein may apply to multiple incoming video streams.**

Ex. 2005 at 6:18-22. Thus, Petitioner's conclusion that "nothing in the '531 Patent suggests that 'channels typically have multiple streams'" is contrary to the express language of the '531 Patent. *Id.*; Reply at 16.

Patent Owner Incorrectly Suggests That Limitation [1k] Cannot Be Met Because No Single Unit Receives Both Join And Quit IGMP Messages

POR:

The Petition also states that [w]hen the multicast router receives a multicast join request, the Weyman/Li's channel joining processing unit determines whether the number of channels being forwarded at the port or aggregated link is below the maximum number of access channels allowable." Petition at 45. However, as discussed above in connection with section II.A, such determination is not possible because no single channel joining processing unit is guaranteed to receive both the channel joining and channel quit messages. See *supra* section II.A; see EX2001 at ¶ 62.

POR, 21-22

Reply:

channel joining and channel quit messages." POR, 21-22. But PO is technically wrong here. As explained above, Weyman discloses a mechanism that ensures that IGMP messages—*i.e.*, channel joining and channel quit messages—are received by all units in Weyman's distributed router. See Section II.A; EX1005, [0162].

Reply, 10

[0162] Report messages can be generated by the client units in order to route query messages or a change in an applicant's multicast membership. Changes in the multicast membership reported may affect the multicast distribution tree that the router maintains. Any changes to the multicast distribution tree must be kept synchronised for all the units in the fabric. One possibility is to cause merely one unit to process the IGMP report and to send updates to the remainder of the units in the fabric. Alternatively the IGMP message could be delivered to every unit in the fabric for processing.

EX1005 (Weyman), [0162]; Reply, 10

Disputed Issues

Ground 1: Weyman In Combination With Li

- It Would Have Been Obvious To Combine Weyman And Li
- The Combination Of Weyman And Li Teaches Limitation [1k]

Ground 2: Weyman In Combination With Li And Rooholamini

- It Would Have Been Obvious To Combine Weyman, Li, And Rooholamini

Ground 4: Weyman In Combination With Jain And LeMaire

- The Weyman, Jain, LeMaire Combination Teaches Limitation [8k] Because Jain Teaches ***Deactivating User Ports*** Of Newly Added Device With “Link Down” Condition.

Petition:



Pet., 60

Patent Owner Argues That POSITA Would Not Have Made The Combination Because Of Supposed “Additional Synchronization Efforts”

POR:

The Petition’s modified figure shows that Rooholamini’s port count table is added to each unit in the Weyman/Li system. Doing so would once again force further synchronization efforts in the distributed router system because multicast messages traveling to each Vbridge need to be coordinated in some way. EX2001 at ¶ 87. A POSITA would understand that the additional synchronization efforts would lead to increased bandwidth usage in the fabric, which contradicts Weyman’s teachings to minimize fabric bandwidth usage. *Id.* Therefore, a POSITA would not have been motivated to combine Weyman, Li, and Rooholamini. *See* EX2001 at ¶ 86–87. Accordingly, Weyman, Li, and Rooholamini fail to teach or render obvious dependent claims 5 and 15. EX2001 at ¶ 88.

POR, 31

Weyman/Li/Rooholamini Combination Does Not Require “Additional Synchronization Efforts”

Reply:

But the Weyman/Li/Rooholamini combination requires no such “additional synchronization efforts.” As explained in the Petition, the port count tables in each of the units are synchronized using the IGMP host reports distributed between each of the units. Pet., 63-64; EX1005, [0162]. As long as the IGMP messages are shared amongst all units in the distributed router, the port count tables would remain synchronized. And as explained in Section II.A, under the *default configuration of Weyman*, IGMP messages are distributed to each of the units in the distributed router. EX1005, [0162]; EX1033 [Olivier Dep. Tr.], 36:14-18. Because Weyman, by default, provides IGMP reports to each unit, the Weyman/Li/Rooholamini combination does not require any additional synchronization effort.



Dr. Olivier
PO's Expert

Q. So when one of the units in the distributor router receives an IGMP host report, the IGMP host report is shared with all the units in the distributor router. Correct?

A. Correct.

Reply, 18

EX1033 (Olivier Dep. Tr.), 36:14-18; Reply, 18

Sur-Reply:

Petitioner also fails to show that the combination meets the “updating the list in each of the at least two processing units” limitation of claims 5 and 15. Here Petitioner concludes that “as long as the IGMP messages are shared amongst all units in the distributed router, the port count tables would remain synchronized.” Reply at 18. However as previously explained, a single channel joining processing unit must be guaranteed to receive the IGMP messages. *See generally* § II.B.3. This is because the Weyman/Li combination does not teach coordinating IGMP messages received by different channel joining processing units in Weyman’s distributed router. *Id.* To illustrate, if IGMP messages are received at all units in the distributed router, the combination with Rooholamini fails to disclose the “updating the list in each of the at least two processing units” claim limitation without coordination. *Id.*

Sur-Reply, 17

Disputed Issues

Ground 1: Weyman In Combination With Li

- It Would Have Been Obvious To Combine Weyman And Li
- The Combination Of Weyman And Li Teaches Limitation [1k]

Ground 2: Weyman In Combination With Li And Rooholamini

- It Would Have Been Obvious To Combine Weyman, Li, And Rooholamini

Ground 4: Weyman In Combination With Jain And LeMaire

- The Weyman, Jain, LeMaire Combination Teaches Limitation [8k] Because Jain Teaches **Deactivating User Ports** Of Newly Added Device With "Link Down" Condition.

Claim 8 Is Directed To Initializing New Processing Unit While Its Ports Are Deactivated

8. A method for communication, comprising:
operating a network element, wherein the network element

▪ ▪ ▪

wherein operating the network element comprises initializing a new processing unit added to the network element by:

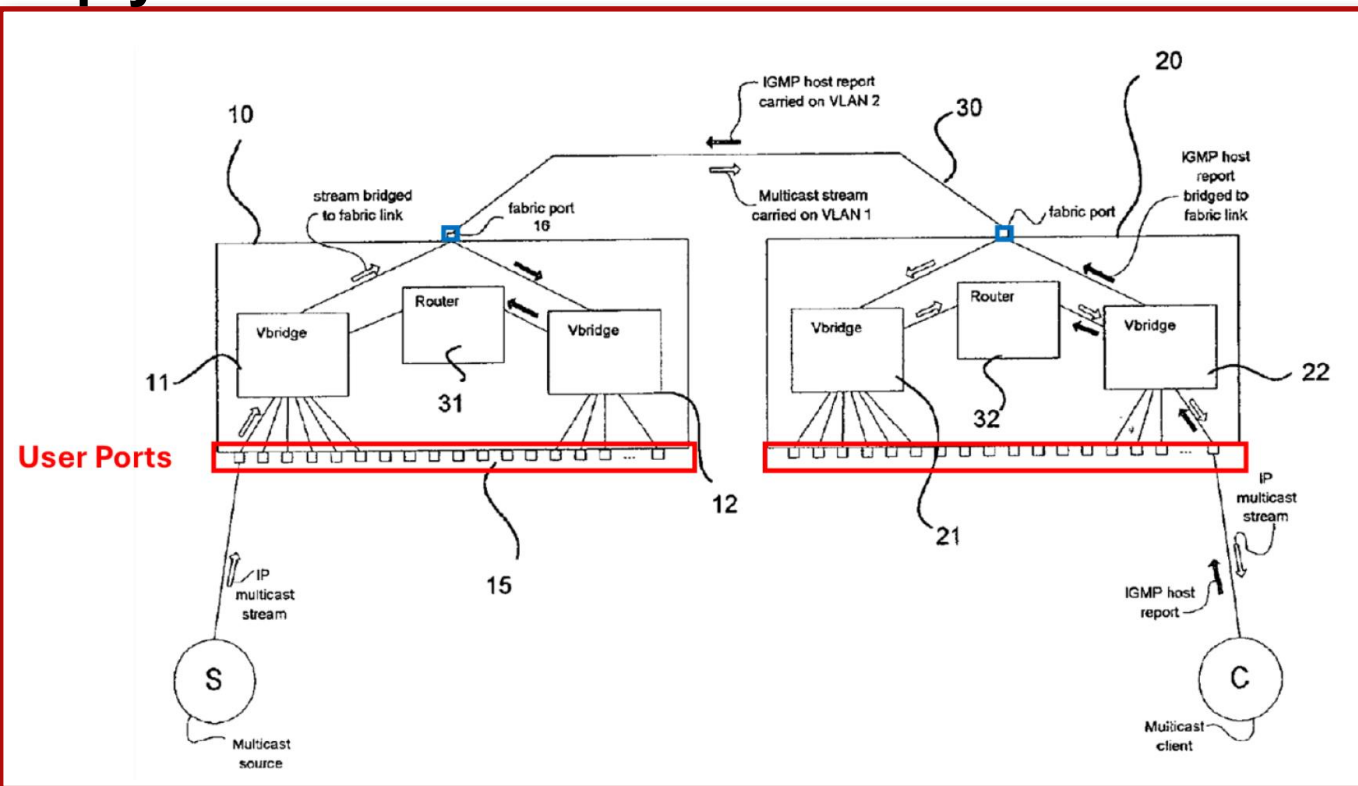
[8k]

deactivating the ports to which the new processing unit is assigned;

while the ports to which the new processing unit is assigned are deactivated, sending a multicast status request, receiving multicast membership reports sent by multicast clients in response to the multicast status request, constructing the list by the new processing unit based on the received multicast membership reports; and
after constructing the list, activating the ports to which the new processing unit is assigned.

Weyman Teaches Adding Units To The Distributed Router

Reply:



[0069] For the routers to operate as a single distributed router every defined router configuration should be identical on all units in the fabric. Preferably the configuration is stored in non-volatile storage in all the units. If the system can accommodate the addition or removal of units, then when a unit with a default configuration joins the fabric, it needs to update its configuration to that of the distributed router. If a unit with a non-default configuration joins the fabric then there should be a selection mechanism which determines the distributed router's configuration. This may be as simple as selecting the lowest numbered unit to provide the configuration. Alternatively, the fabric could be configurable through a priority system.

EX1005 (Weyman), [0069]; Pet., 68

Reply, 20

Jain Teaches Deactivating “A Portion Of The Link Ports” During Initialization

embodiment. When the Ethernet node (such as, e.g., network node 102A described above in reference to FIG. 1) is put into a system reset or power-up condition, the boot-up process involving initialization and configuration of both hardware and system software is commenced (blocks 202 and 204). Upon detecting the reset condition and in response thereto, a “Link Down” condition is effectuated on at least a portion of the link ports of the network node. When the Link Down condition is sensed by the entities (i.e., devices and nodes) connected to the network node via respective links, network traffic on the links is discontinued (block 206). That is, e.g., a remote device that is transmitting network traffic via a particular link to the network node that has initiated the boot-up processes may cease data transmission on that interface. In one implementation, the Link Down condition may be effectuated by maintaining an appropriate logic level on a particular pin (e.g., TX DISABLE pin) associated with a physical layer (“PHY”) device of the network node that is responsible for interfacing with at least a portion of the link ports. Depending on how the hardware is realized, the logic level may comprise a logic high (e.g., a particular voltage level) for assertion (i.e., active high). In particular, this implementation is applicable

[0021] While the Link Down (or, disabled) condition is maintained on the link ports, the system software of the network node continues with its initialization and configuration process until it is complete and operational (blocks 208 and 210). Thereafter, upon a suitable indication to the port hardware that the system software has completed the requisite configuration process, a “Link Up” condition is effectuated on the ports (block 212). Similar to the implementation of the Link Down condition, an appropriate logic signal (e.g., a logic low) may be provided on TX DISABLE pins of the PHY device(s) interfacing with the link ports in order to indicate the “enabled” state of the ports. Upon

EX1010 (Jain), [0021]; Pet., 69

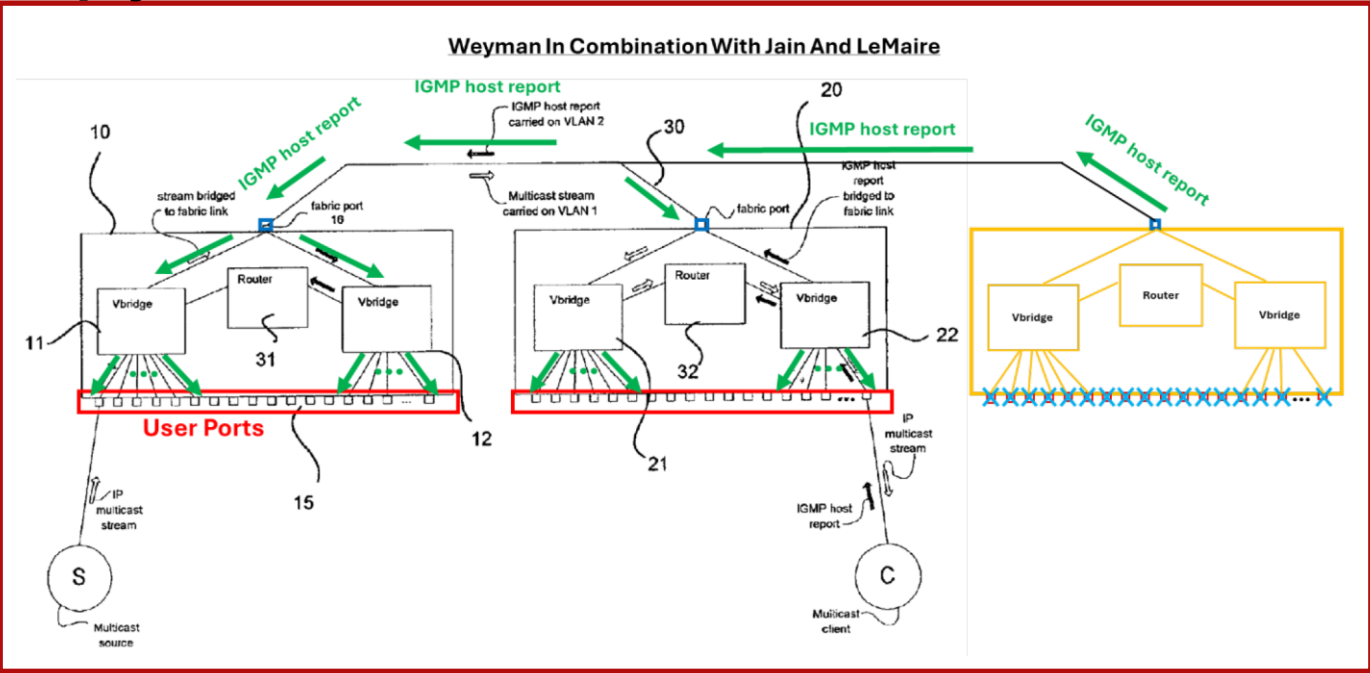
LeMaire Teaches Performing Initialization By Sending IGMP Host Report To Clients

On power up or system reset or when none of its ports are designated as Router Ports, an improved bridge 62 according to the invention, transmits IGMP Query packets at regular intervals out of each of its ports A–E. Initially, each of these ports are designated by bridge 62 as non-Router Ports. Bridge 62 transmits IGMP Queries with a WAN source address which is assigned to it according to the invention. Standard prior art bridges do not have a WAN source address because they do not communicate at layer 3. In response to IGMP Queries, ESs attached to bridge 62 that wish to receive WMPs will transmit IGMP Reports on their segments. These reports will be received at bridge 62. These

EX1011 (LeMaire), 9:12-23; Pet., 73

Weyman/Jain/LeMaire Teaches Sending IGMP Host Report To Clients While User Ports Of New Unit Is Deactivated

Reply:



Reply, 22

Petition:

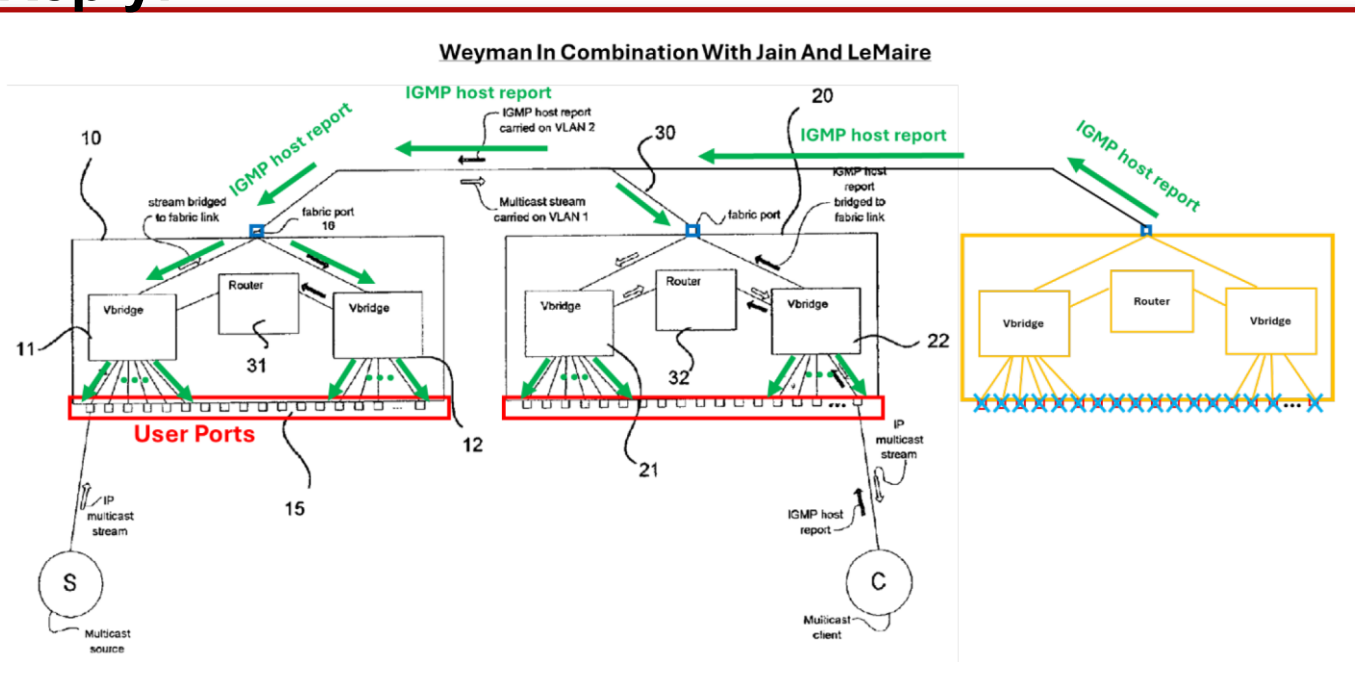
are disabled. For example, when a **new unit** is added to the distributed router, the distributed router can **disable its user ports** as discussed in Section XI.D.1.i. [Weyman/Jain], and it can then **transmit IGMP queries to its clients, as taught by LeMaire, using other units in the distributed router.** EX1011, 9:12-19. In response to the IGMP queries, the other units can receive IGMP reports from the clients and forward those IGMP reports to the new unit via the fabric link and the new unit's fabric port, as taught by LeMaire and Weyman. EX1011, 9:21-23; EX1005, [0137]-[0139], [0162]. The new unit can then update its forwarding table in accordance with the received IGMP reports, as taught by both Weyman and LeMaire. EX1005,

Pet., 73

Weyman/Jain/LeMaire Teaches [8k]

[8k] deactivating the ports to which the new processing unit is assigned;

Reply:



Reply, 22

Petition:

xii. [8k] deactivating the ports to which the new processing unit is assigned;

Weyman/Jain/LeMaire teaches this limitation. As explained in Section XI.D.1. [Weyman/Jain/LeMaire], when a new unit is added to the distributed router, the distributed router can disable or discontinue (“deactivat[e]”) the user ports of the new unit. EX1010, [0020] (“a ‘*Link Down*’ condition is effectuated on at least a portion of the link ports in the network node. ... When the Link Down condition is sensed by the entities (i.e., devices and nodes) connected to the network node via respective links, network traffic on the links is discontinued (block 206).”). EX1002, ¶¶254-255.

Pet., 78

Patent Owner Alleges That Weyman/Jain/LeMaire Combination Does Not Satisfy Limitation 8k

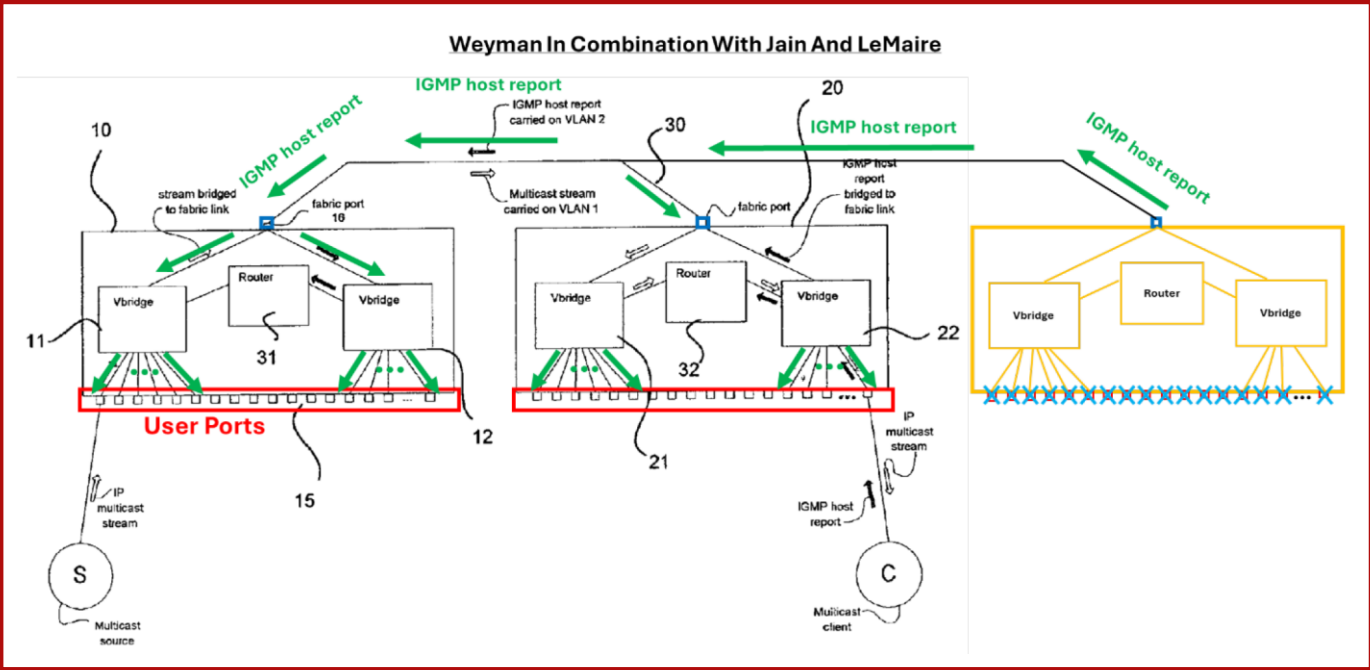
POR:

Weyman, Jain, and LeMaire do not teach “deactivating the ports to which the new processing unit is assigned” (claim limitation 8k)

POR, 24

POR Arg. #1: A POSITA Would Have Deactivated Not Only User Ports Of Newly Added Unit, But Also Its Fabric Port

Reply:



Reply, 22

POR:

The Petition asserts that Jain’s controlled boot-up process teaches disabling “at least some of the node’s ports” and that a POSITA would be motivated to combine Weyman’s distributed router with Jain’s controlled boot-up process to disable some of the user ports. Petition at 69–70. However, the Petition’s characterization of Jain’s controlled boot-up process is inconsistent with Jain’s own teachings, which teach deactivating all of the active ports in a network node while the system software is in an incomplete operational state. See EX1010 at [0019]; see also EX2001 at ¶ 71.

POR, 26

But Jain Teaches Deactivating Only “A Portion” Of Ports

Petition:

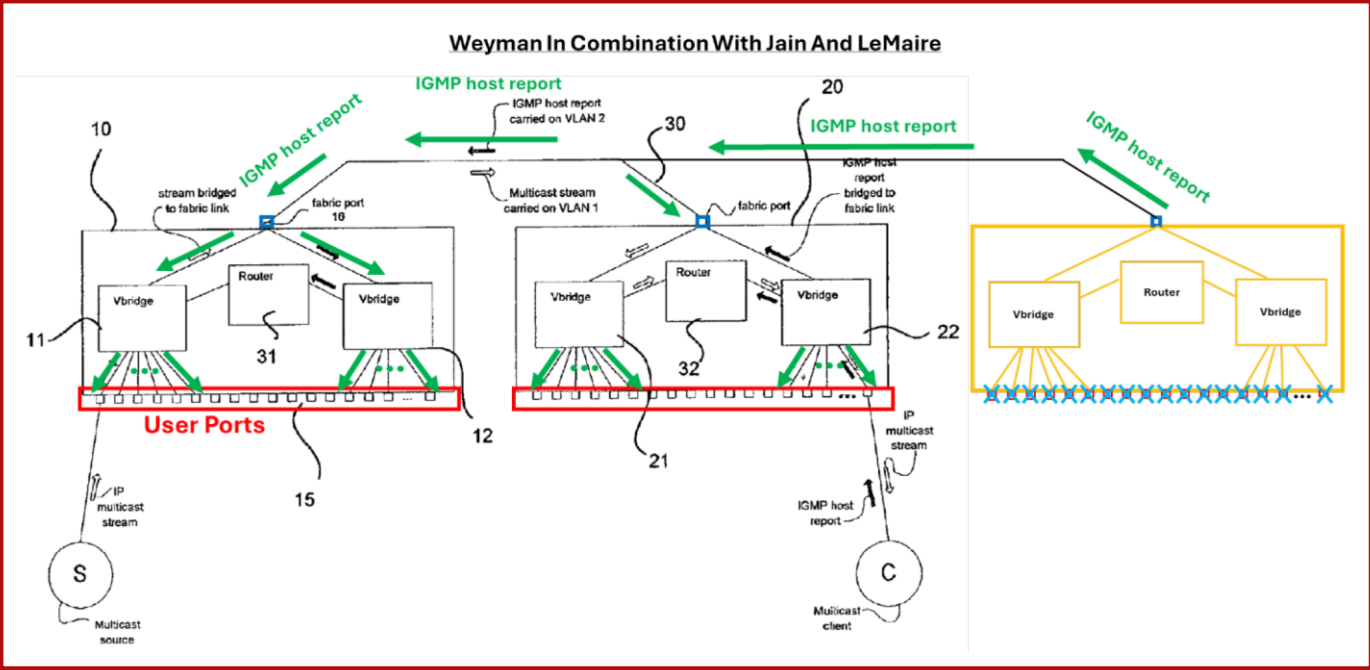
- xii. [8k] deactivating the ports to which the new processing unit is assigned;

Weyman/Jain/LeMaire teaches this limitation. As explained in Section XI.D.1. [Weyman/Jain/LeMaire], when a new unit is added to the distributed router, the distributed router can disable or discontinue (“deactivat[e]”) the user ports of the new unit. EX1010, [0020] (“a **‘Link Down’ condition** is effectuated on at least a **portion of the link ports in the network node**. ... When the Link Down condition is sensed by the entities (i.e., devices and nodes) connected to the network node via respective links, network traffic on the links is *discontinued* (block 206).”). EX1002, ¶¶254-255.

Pet., 78

POR Arg. #2: Jain Requires Deactivating Internal-Facing Fabric Port, Which Would Have Interfered With Weyman's Operations

Reply:



Reply, 22

POR:

Additionally, Weyman teaches that fabric ports are ports which are connected internally to other units within the fabric and not externally. *See EX1005 at [0025]* ports that may be configured to be either user ports or fabric ports.”). Because there is no material difference between fabric ports and user ports, fabric ports would experience the same issues as the active ports of Jain, such as spurious logic conditions and various deleterious effects with respect to the integrity of the traffic when the new unit is powering-on or booting up. EX2001 at ¶ 73. Petitioner does not address how only the user ports and not the fabric ports would experience these issues. Therefore, a POSITA would not be motivated to combine Jain with Weyman because a POSITA would understand that the fabric ports would also need to be deactivated, which would interfere with critical operations described in Weyman. *See EX2001 at ¶ 73.*

POR, 26-27

But Jain Does **Not Require** Deactivating Internal Ports, Like Weyman's Fabric Port

102B. When network node 102A is powered up again (i.e., power-on or system reset condition), it engages in a controlled boot-up process thereafter, as will be set forth in detail below, such that its link ports do not exhibit spurious logic conditions that may cause the interfacing entities (i.e., remote devices as well as other network nodes) to commence network traffic while the switch software (i.e., system software) is still in an incomplete operational state. As pointed out in the Background section of the present disclosure, such a situation gives rise to various deleterious effects with respect to the integrity of the traffic received at the network node.



Dr. Olivier
PO's Expert

Q. Okay. And by issuing the 'Link Down' position, Jain prevents unintended network traffic with other remote devices and network nodes. Right?

A. Correct.

EX1033 [Olivier Dep. Tr.], 87:10-14; Reply, 25

EX1010 (Jain), [0019]; Reply, 24-25

agement protocol), routing protocols and network login. In the following description, there will be an explanation of the requirements which must be met in practice by the data plane and control plane in each device so that when several units are connected through their fabric ports (i.e. ports connected only to other units within the fabric and not to the external network), they will appear from outside the fabric as if they were a single entity. EX1005 (Weyman), [0025]; Reply, 25



Dr. Olivier
PO's Expert

Q. So fabric ports are *not connected to the external network*. Correct?

A. Correct.

Q. The fabric ports are ports that are connected *internally to other units in the distributed router*. Right?

A. That -- yes.

EX1033 [Olivier Dep. Tr.], 21:1-3, 23:7-10; Reply, 25

POR Arg. #3: LeMaire Teaches The Opposite Of Jain

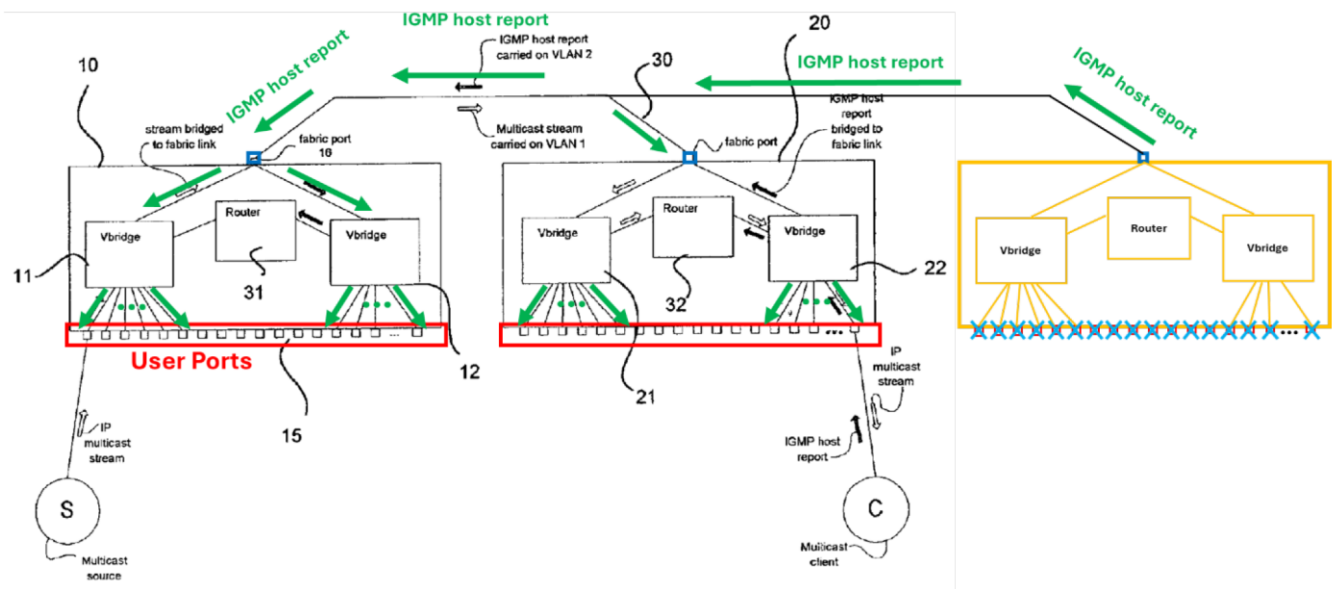
POR:

Petitioner's proposed combination of Weyman, Jain, and LeMaire also fails because LeMaire teaches the opposite of Jain. See EX2001 at ¶ 74. LeMaire teaches that on power-up or reset, ports should begin to transmit IGMP Query messages. EX1011 at 9:12–15 (“**On power up or system reset** or when none of its ports are designated as Router Ports, an improved bridge 62 according to the invention, **transmits IGMP Query packets at regular intervals out of each of its ports A-E.**”) (emphasis added). When discussing LeMaire, Petitioner asserts that a POSITA would have found it obvious to combine LeMaire with the combined Weyman/Jain distributed router to initialize a new unit that is added to the distributed router. Petition at 73. However, LeMaire does not disclose the concept of user ports or other user ports. See EX2001 at ¶¶ 74–75. Instead, LeMaire teaches that all ports that are not router ports begin transmitting on system reset. See EX2001 at ¶ 74.

POR, 27

But LeMaire And Jain Are Compatible—IGMP Host Reports Are Sent To Clients Using Available Active Ports In Other Units

Weyman In Combination With Jain And LeMaire



[0162] Report messages can be generated by the client units in order to route query messages or a change in an applicant's multicast membership. Changes in the multicast membership reported may affect the multicast distribution tree that the router maintains. Any changes to the multicast distribution tree must be kept synchronised for all the units in the fabric. One possibility is to cause merely one unit to process the IGMP report and to send updates to the remainder of the units in the fabric. Alternatively the **IGMP message could be delivered to every unit in the fabric for processing.**

EX1005 (Weyman), [0162]; Reply, 27

Reply, 27

Patent Owner's Sur-Reply

Sur-Reply:

In the Petition, Petitioner argues that “the distributed router (e.g., Jain/Weyman combination), uses LeMaire’s initialization technique to update its forwarding table while the new unit’s user ports are disabled.” Petition at 73. To overcome PO’s argument that LeMaire’s initialization technique only functions when ports are disabled, the Reply ignores this and raises a new argument based on LeMaire’s teachings of transmitting IGMP queries to clients using other units in the distributed router. Reply at 26-27.

Sur-Reply, 22

Reply:

user ports are disabled.” Pet., 73. And as in LeMaire, the newly added unit in the Weyman/Jain/LeMaire combination sends the IGMP queries to its clients. Pet., 73. Because the added unit’s user ports are disabled in the Weyman/Jain combination, the added unit “transmit[s] IGMP queries to its clients, as taught by LeMaire, using other units in the distributed router” (Pet., 73), as illustrated below. Nothing in

Reply, 26

Petition:

are disabled. For example, when a new unit is added to the distributed router, the distributed router can disable its user ports as discussed in Section XI.D.1.i. [Weyman/Jain], and it can then transmit IGMP queries to its clients, as taught by LeMaire, using other units in the distributed router. EX1011, 9:12-19. In response to the IGMP queries, the other units can receive IGMP reports from the clients and forward those IGMP reports to the new unit via the fabric link and the new unit’s fabric port, as taught by LeMaire and Weyman. EX1011, 9:21-23; EX1005, [0137]-[0139], [0162]. The new unit can then update its forwarding table in accordance with the received IGMP reports, as taught by both Weyman and LeMaire. EX1005,

Pet., 73

Sur-Reply:

Sur-Reply, 19

Sur-Reply, 21

[81]

Patent Owner's Sur-Reply

Sur-Reply:

26. As explained below, both arguments fail because 1) the Link Down condition disclosed in Jain does not deactivate any ports and 2) the plain language of Jain says

Sur-Reply, 18

In its Reply, Petitioner interprets “at least a portion of the link ports” to mean “deactivating a portion of . . . the active ports during the controlled boot-up process.” Reply at 23. But the “Link Down” condition¹⁰ has nothing to do with deactivating ports because all link ports (externally and internally connected) are already deactivated before the boot-up process. Ex. 1010 at [0019].

Sur-Reply, 20-21

POR:

disable some of the user ports. Petition at 69–70. However, the Petition’s characterization of Jain’s controlled boot-up process is inconsistent with Jain’s own teachings, which teach deactivating *all* of the active ports in a network node while the system software is in an incomplete operational state. See EX1010 at [0019]; see also EX2001 at ¶ 71.

POR, 26

Sur-Reply:

A. The Link Down Condition Disclosed In Jain Deactivates All Active Ports

Sur-Reply, 19