

Cisco Systems, Inc. v. Portsmouth Network Corp.,

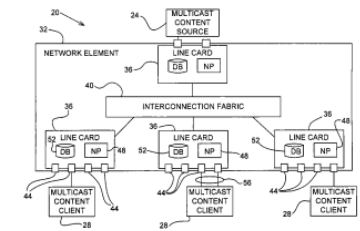
PATENT OWNER PORTSMOUTH'S PRESENTATION

Inter Partes Review of
U.S. Patent No. 8,014,394

IPR2024-00506

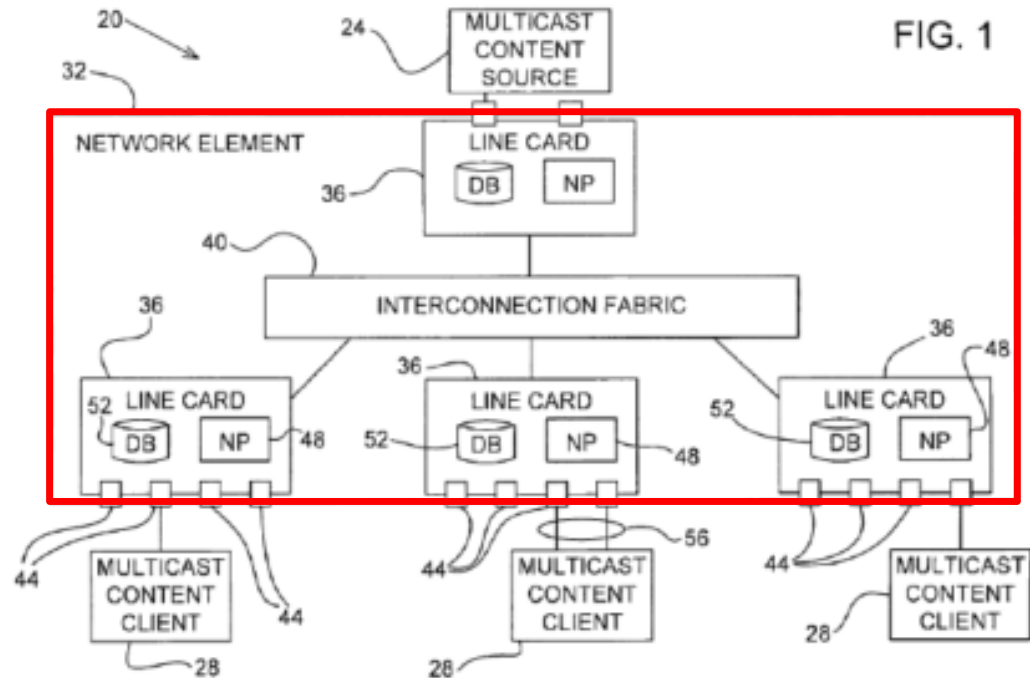
U.S. Patent No. 8,014,394 Overview

The '394 patent, titled "High-Speed Processing of Multicast Content Requests," focuses on improving the delivery of multicast traffic streams in communication networks, particularly for applications like Internet Protocol Television (IPTV). The patent aims to minimize latency when processing events involving changes to multicast forwarding configurations, addressing issues such as "zapping time" (the delay experienced by users switching channels).

 US008014394B2	
(12) United States Patent Ram et al.	(10) Patent No.: US 8,014,394 B2 (45) Date of Patent: Sep. 6, 2011
(54) HIGH-SPEED PROCESSING OF MULTICAST CONTENT REQUESTS	
(75) Inventors: Rafi Ram, Herzliya (IL); Ronen Solomon, Ramat Gan (IL)	
(73) Assignee: Corrigent Systems Ltd, Tel Aviv (IL)	
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 201 days.	
(21) Appl. No.: 12/369,011	
(22) Filed: Feb. 11, 2009	
(65) Prior Publication Data US 2010/0202452 A1 Aug. 12, 2010	
(51) Int. Cl. H04L 12/28 (2006.01) H04L 12/56 (2006.01) H04L 3/26 (2006.01)	
(52) U.S. Cl. 370/390; 370/392; 370/432	
(58) Field of Classification Search None See application file for complete search history.	
(56) References Cited U.S. PATENT DOCUMENTS 2002/0191562 A1 12/2002 Kumaki et al. 2002/0191628 A1* 12/2002 Liu et al. 370/428 2006/0140857 A1* 7/2006 Sakai et al. 370/432 2006/0208871 A1 11/2006 Van Zijl 2008/0072035 A1 3/2008 Johnson et al. 2008/0160118 A1 7/2008 Hickey et al. 2008/0207137 A1 8/2008 Maharaj et al. 2009/0290585 A1* 11/2009 Deng 370/390	
OTHER PUBLICATIONS Diering, S., "Host Extensions for IP Multicasting", RFC 1112, Network Working Group, Internet Engineering Task Force (IETF), Aug. 1989.	
ABSTRACT A method for communication includes operating a network element, which includes multiple ports and multiple interconnected processing units, such that each processing unit is assigned to process packets that are communicated over a respective set of one or more of the ports. Each processing unit stores a respective list, which indicates one or more multicast packet streams that are permitted for forwarding by the network element, and further indicates a respective subset of the ports over which each of the multicast packet streams is permitted for forwarding. A request relating is distributed among the multiple processing units, and the respective list in each processing unit is updated responsively to the request. Multicast packets associated with the given multicast packet stream are forwarded selectively by the processing units in accordance with the respective updated lists.	
18 Claims, 4 Drawing Sheets	
	

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

- Network element 32:
 - Selectively forwards multicast streams instead of flooding all ports.
 - Uses line cards 36 with filtering databases 52 that hold lists of permitted multicast streams and designated ports
 - Dynamically updates databases using request messages (e.g., to start or stop receiving content) sent by clients.



Representative Claim 1

1. A method for communication, comprising:

[a] operating a network element,

[b] wherein the network element further comprises multiple interconnected processing units and multiple ports,

[c] wherein each processing unit is assigned to a different subset of the multiple ports of the network element, and

[d] wherein each processing unit contains a processor for processing packets communicated over the different subset of the multiple ports to which the processing unit is assigned;

[e] storing in each processing unit a respective list, each list indicating all of one or more multicast packet streams that are permitted for forwarding by the network element, and further indicating which of the one or more ports each multicast packet stream is permitted to be forwarded to;

[f] receiving from a client a request relating to reception of a given multicast packet stream;

[g] distributing the request among the multiple processing units within the network element, and

[h] updating the respect list in each processing unit responsively to the request, and

[i] selectively forwarding multicast packets associated with the given multicast packet stream by the processing units in accordance with the respective updated lists,

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

[k] 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,

[l] wherein the request indicates that the given multicast packet stream is to be forwarded over the high-capacity port, and

[m] 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.

Roadmap

Ground 1

Weyman and Li

Independent Claims 1 & 11 (Dependent Claims 2, 4, 6, 7, 12, 14, 16, and 17)

- No motivation to combine Weyman and Li
- Cited art fails to teach limitations relating to limiting the number of multicast packet streams.
 - Claim 1 - **"Aggregating Ports By Setting An Upper Limit On A Number Of The Multicast Packet Streams That Are Permitted For Forwarding Over The High-Capacity Port."**
 - Claim 11 - **"An Upper Limit Is Set On A Number Of The Multicast Packet Streams That Are Permitted For Forwarding Over The High-Capacity Port."**

Roadmap

Ground 2

*Weyman, Li, and
Rooholamini*

Dependent Claims 5 & 15

- No motivation to combine for the same reasons provided in Ground 1.
- Cited art fails to teach limitations relating to updating the list in each of the processing units.
 - Claim 5 - **"Updating The List In Each Of The At Least Two Processing Units Based On The Respective Local Copies."**
 - Claim 15 – **"At Least Two Processing Units Are Configured To Hold Respective Local Copies Of The Number Of The Multicast Packet Streams That Are Permitted For Forwarding Over The High-Capacity Port, To Update The Local Copies Based On The Distributed Request, And To Selectively Update Their Respective Lists Based On The Respective Local Copies"**

Roadmap

Ground 3

*Weyman, Li, and
Pitcher*

Dependent Claim 16

- No motivation to combine for the same reasons provided in Ground 1.
- Dependent Claim 16 depends on Independent Claim 1, and the cited art fails to teach Claim 16 for the same reasons the cited art fails to teach Claim 1.

Roadmap

Ground 4

*Weyman, Jain and
LeMaire*

Dependent Claims 8 and 18

- Cited art fails to teach limitations relating to a new processing unit with deactivated ports sending multicast status requests, receiving reports in response to the requests, and constructing lists based on the received multicast reports.
- Claim 8 - **"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."**
- Claim 18: **"A New Processing Unit Added To The Network Element Is Configured To Initialize 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."**

Roadmap

Ground 5

*Weyman, Jain,
LeMaire, and Li*

Dependent Claim 9

- No motivation to combine for the same reasons provided in Ground 1.
- Dependent Claim 9 depends on Independent Claim 1, and the cited art fails to teach Claim 9 for the same reasons the cited art fails to teach Claim 1.

Roadmap

Ground 6

*Weyman, Jain,
LeMaire, and Pitcher*

Dependent Claim 10

- No motivation to combine for the same reasons provided in Ground 1.
- Dependent Claim 10 depends on Independent Claim 1, and the cited art fails to teach Claim 10 for the same reasons the cited art fails to teach Claim 1.

Roadmap

Ground 7

*Weyman, Li, and
Ding*

Dependent Claims 2 and 12

- No motivation to combine for the same reasons provided in Ground 1.
- Dependent Claims 2 and 12 depend on Independent Claims 1 and 11, respectively, and the cited art fails to teach Claims 2 and 12 for the same reasons the cited art fails to teach Claims 1 and 11.

Ground 1

Independent Claims 1 & 11 (Dependent Claims 2, 4, 6, 7, 12, 14, 16, and 17)

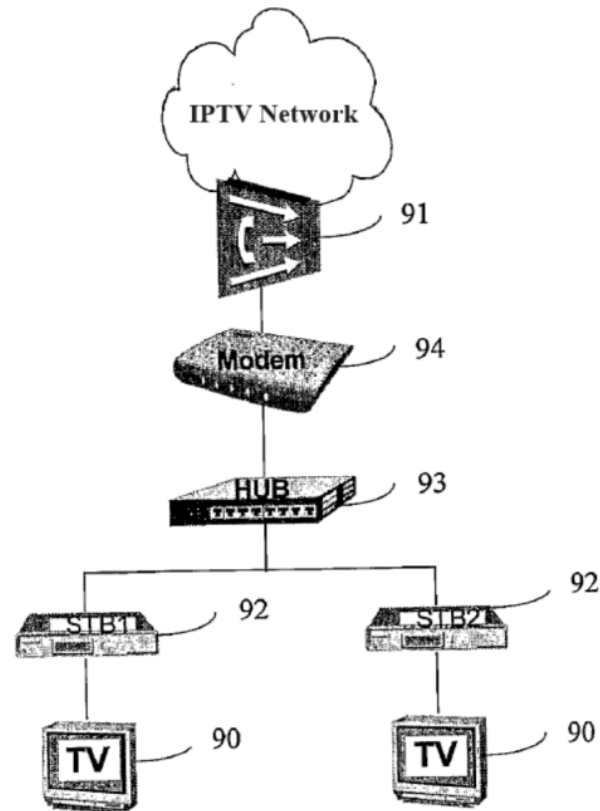
Weyman and Li

No Motivation to Combine *Weyman and Li*

Weyman and Li Relate To Different Products Using Different Types Of Media in Different Networks

Weyman	Li
Packet Switched Communications Network	Access Network
Unable to Directly Connect to Users	Directly Connects to Users
Operates in Layer 2 of OSI model	Operates in Layer 1 of OSI model

POSITA Would Not Combine Weyman And Li



POSITA Would Not Combine Weyman And Li

Channel Joining Processing Unit determines whether the number of channels over the xDSL service port are below a threshold maximum

The first control unit 123 further includes a channel determination unit 125 and a channel-number comparison unit 126. In the above determining process of the channel determination unit 125, it is firstly determined whether the multicast channel that the STB user requests to join is a multicast channel being forwarded at the current service port; and, if so, no processing is executed; otherwise, the channel-number comparison unit 126 continues to determine whether the number of channels being forwarded at the current service port is below the maximum number of accessed channels allowable, which is set for the port; and, if so, the channel-number comparison unit instructs the multicast forwarding unit to start forwarding data of the new channel; otherwise, it is preliminarily determined that the channel is rejected.

Ex. 1007, 31:4-13

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.

Ex. 1007, 28:23-29:1

POSITA Would Not Combine Weyman And Li

Processing Unit receives multicast quitting and joining messages from different set top boxes

56. The issue regarding increased bandwidth usage becomes apparent when combining Weyman with Li. For example, Li discusses the use of multicast quitting and multicast joining messages with respect to the operation of the channel joining processing unit. *See e.g.*, EX1007 at 80:6–22. The channel joining processing unit of Li requires the reception of the multicast joining messages from each of the STBs. EX1007 at 97:18–22 (“Operations of **each STB device 92** can be divided into three types of powering on, channel switching, and powering off. Particularly, the STB device 92 sends a multicast joining message when it powers on, first sends a multicast joining message of a current channel, and then sends a joining message of a new channel when it switches its channel, and sends a multicast quitting message of a current channel when it powers off.”) (emphasis added). Li also requires that

POSITA Would Not Combine Weyman And Li

Processing Unit receives multicast quitting and joining messages from different set top boxes

The first control unit 123 further includes a channel determination unit 125 and a channel-number comparison unit 126. In the above determining process of the channel determination unit 125, it is firstly determined whether the multicast channel that the STB user requests to join is a multicast channel being forwarded at the current service port; and, if so, no processing is executed; otherwise, the channel-number comparison unit 126 continues to determine whether the number of channels being forwarded at the current service port is below the maximum number of accessed channels allowable, which is set for the port; and, if so, the channel-number comparison unit instructs the multicast forwarding unit to start forwarding data of the new channel; otherwise, it is preliminarily determined that the channel is rejected.

The second control unit 124 starts to operate after the first control unit 123 preliminarily determines not to accept a new channel requesting to join. Upon receiving the instruction from the first control unit 123, the second control unit 124 determine whether there is a multicast channel in a ready-to-quit status among multicast channels being forwarded at the service port; and, if so, the first control unit instructs the multicast forwarding unit to stop forwarding the channel requesting to quit and start forwarding the new multicast channel; otherwise, it is finally determined not to add the new multicast channel.

POSITA Would Not Combine Weyman And Li

Operations of each STB device 92 can be divided into three types of powering on, channel switching, and powering off. Particularly, the STB device 92 sends a multicast joining message when it powers on, first sends a multicast joining message of a current channel, and then sends a joining message of a new channel when it switches its channel, and sends a multicast quitting message of a current channel when it powers off. Therefore, a request from the client STB can be processed as a multicast quitting request or a multicast joining request.

POSITA Would Not Combine Weyman And Li

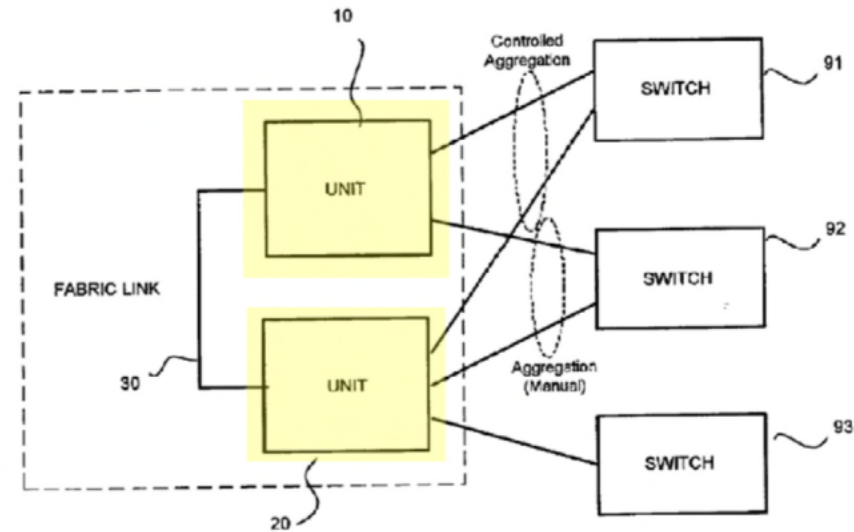


FIG. 6

POSITA Would Not Combine Weyman And Li

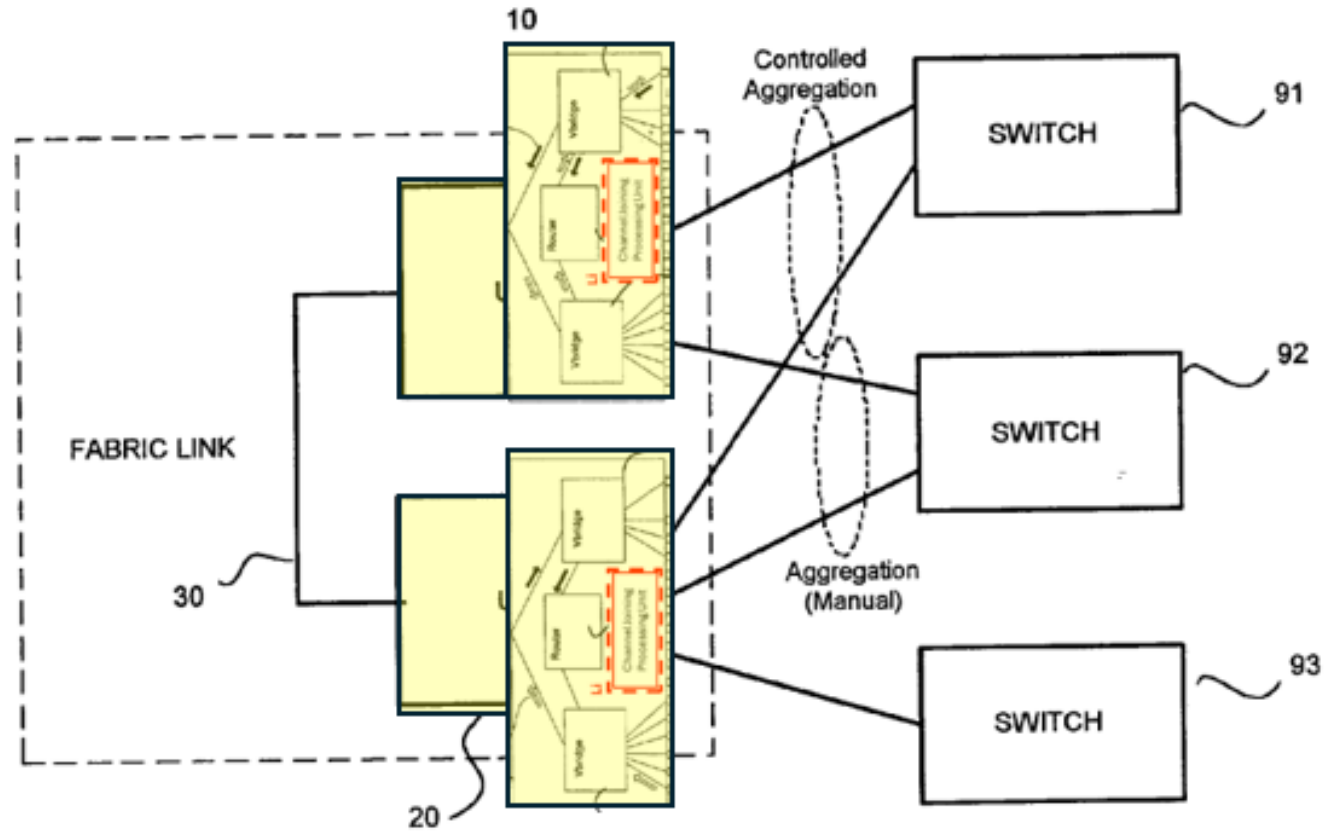
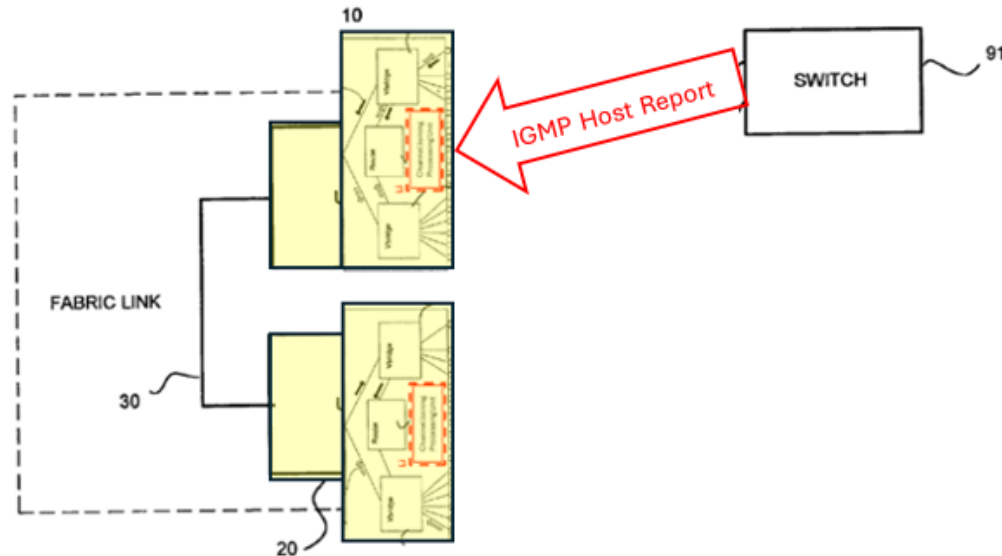
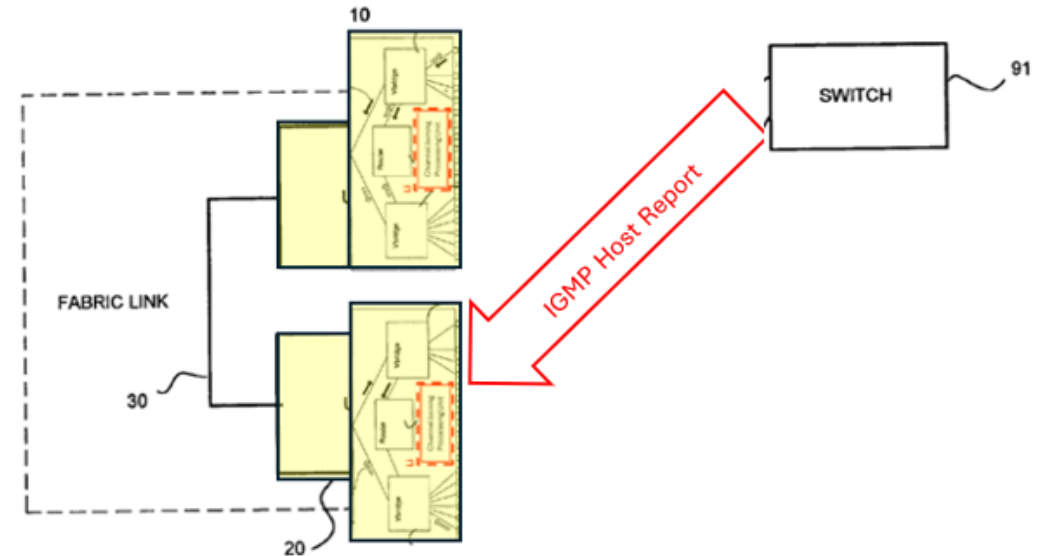


FIG.6

POSITA Would Not Combine Weyman And Li



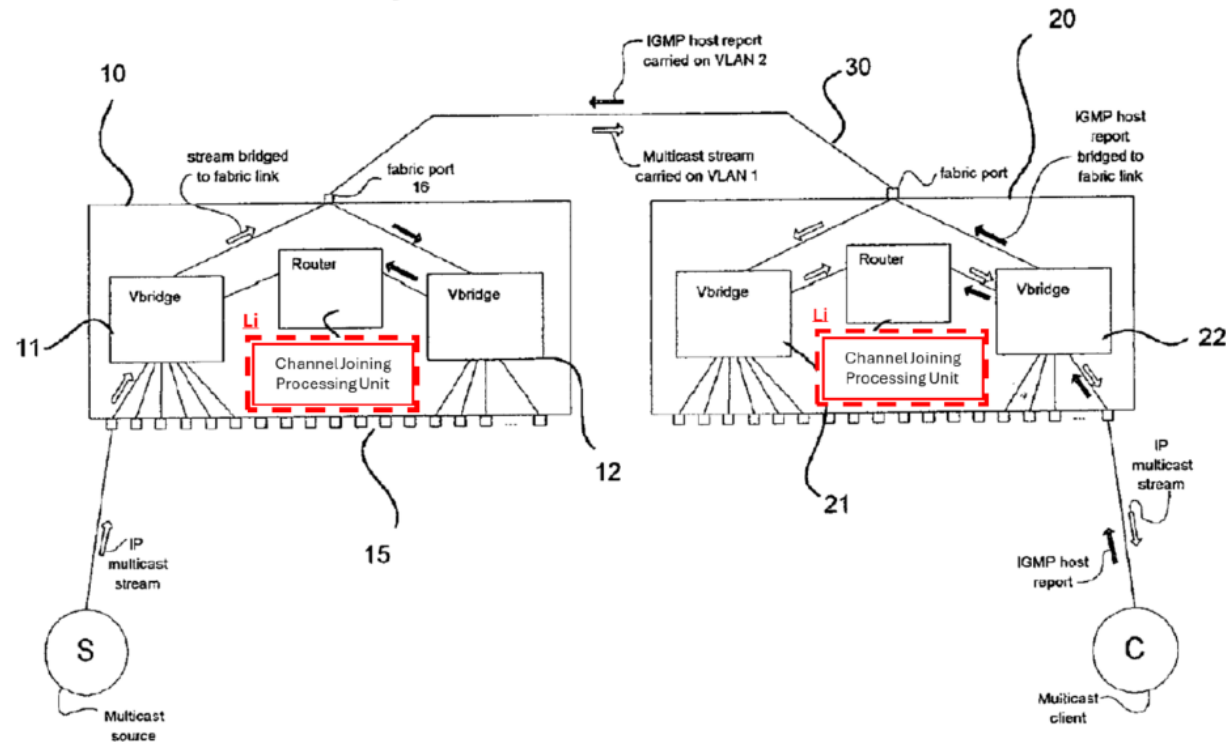
Option 1: IGMP Host Report Received by Network Unit 10



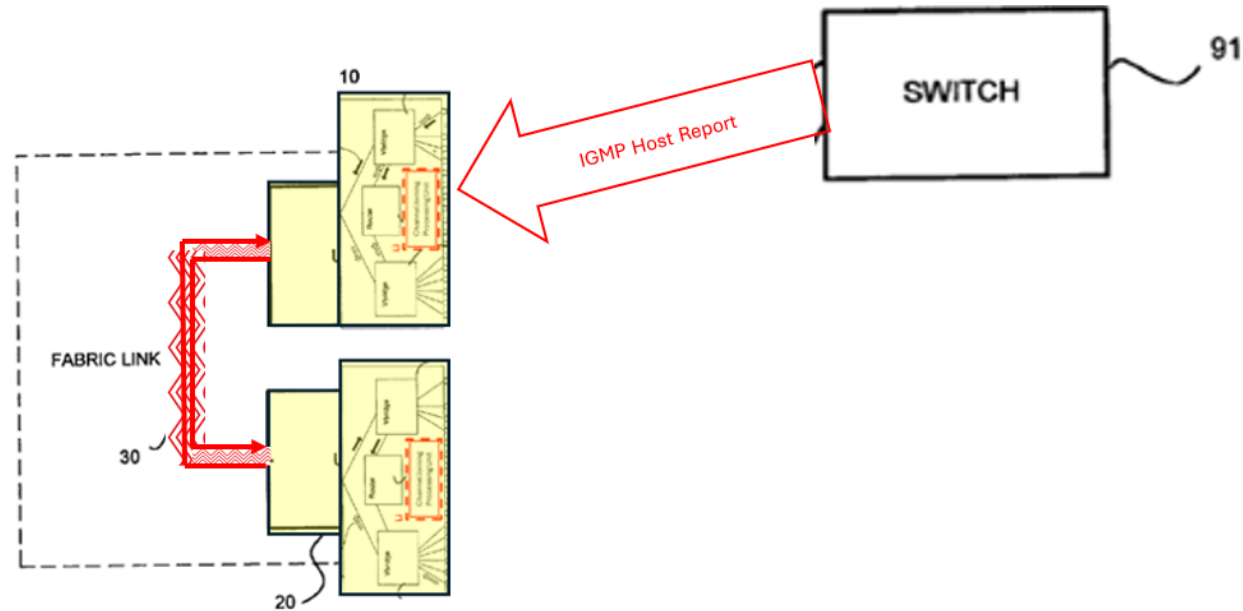
Option 2: IGMP Host Report Received by Network Unit 20

POSITA Would Not Combine Weyman And Li

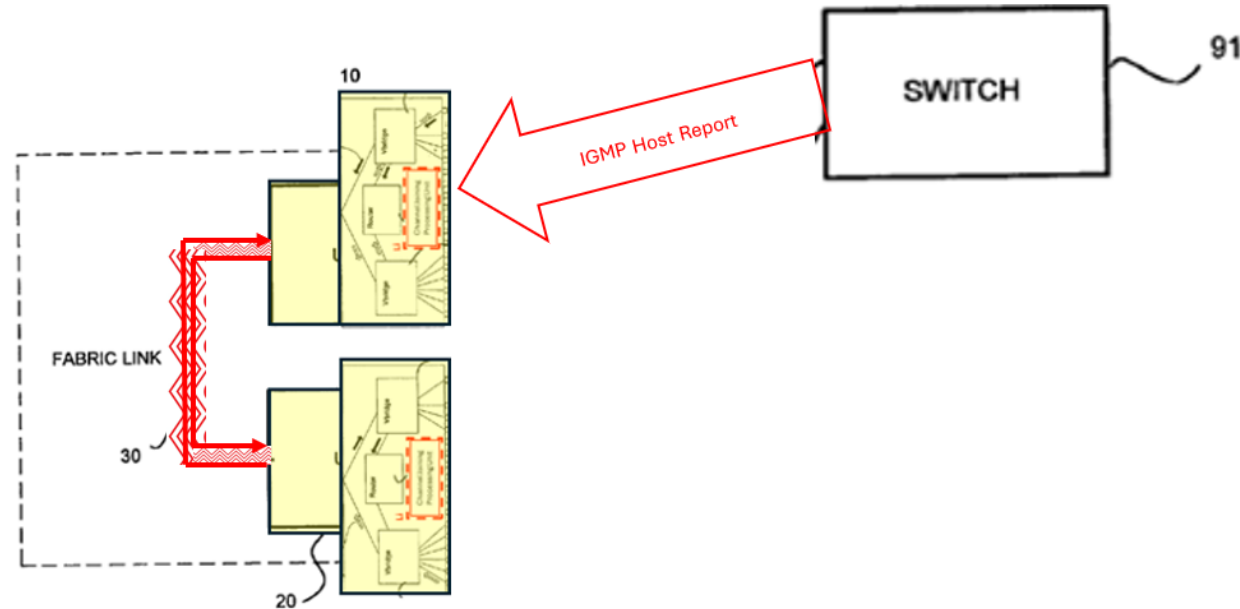
Weyman in combination with Li



POSITA Would Not Combine Weyman And Li



POSITA Would Not Combine Weyman And Li



Increasing Bandwidth On The Fabric Link Contravenes The Teachings Of Weyman To Minimize Bandwidth Use On The Fabric Link

US 20050041665A1

(19) **United States**
 (12) **Patent Application Publication** (10) Pub. No.: **US 2005/0041665 A1**
 Weyman et al. (43) Pub. Date: **Feb. 24, 2005**

(54) **SYSTEM AND METHOD FOR DISTRIBUTED MULTICAST ROUTING** (21) Appl. No.: **10/644,155**
 (22) Filed: **Aug. 20, 2003**

(75) Inventors: **Raphael J. Weyman, Hemel Hempstead (GB); Francisco Aquino, Marlborough, MA (US); Maurice A. Goodfellow, Dunstable (GB)**

(51) Int. Cl.⁷ **H04L 12/56**
 (52) U.S. Cl. **370/390**

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.

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 P O BOX 8489
 RED BANK, NJ 07701**

(73) Assignee: **3Com Corporation**

[0005] A further object of the invention is to minimise the usage of bandwidth on links between the units of such a fabric. A yet further object of the invention is to provide consistency and compatibility with bridging fabrics and unicast routing fabrics.

Petitioner Failed To Meet Burden Of Showing There Was A Motivation To Combine Weyman and Li

- Weyman and Li are different products using different types of media in different networks
- The channel joining unit described in Li teaches receiving coordinated channel join and quit messages.
- The Distributed Router in Weyman teaches controlled aggregation links and two different network units in the distributed router.
 - The IGMP host report message may travel from the aggregation links to either network unit in Weyman's distributed router.
- Petitioner fails to explain how a POSA would combine the channel joining unit of Li with the distributed router in Weyman.
- Petitioner's argument that IGMP host reports are ultimately distributed to both network units in Weyman's distributed router combined with Li's channel joining unit, fails to consider that bandwidth on the fabric link would be increased which contravenes the teachings of Weyman.

Weyman and Li Fail To Teach Limitations Relating To Limiting The Number Of Multicast Packet Streams

Setting An Upper Limit On Channels Does Not Satisfy The Claim Limitation Requiring Setting An Upper Limit On The Number of Multicast Packet Streams

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.

Claim Limitation 1[k]

Setting An Upper Limit On Channels Does Not Satisfy The Claim Limitation Requiring Setting An Upper Limit On The Number of Multicast Packet Streams

wherein two or more of the ports are aggregated to form a high-capacity port, and wherein an upper limit is set 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 the processing units are configured to update the lists 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.

Claim Limitation 11[k]

Petitioner Relies On Li's Channel Joining Processing Unit To Meet The "Setting . . . Limit On A Number Of The Multicast Packet Streams" limitations

- xii. [1k] 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,

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. Accordingly, the distributed router in Weyman/Li sets an upper limit on a number

LI's Channel Joining Processing Unit Is Configured With A Maximum Number Of Accessed Multicast Channels

The first control unit 123 further includes a channel determination unit 125 and a channel-number comparison unit 126. In the above determining process of the channel determination unit 125, it is firstly determined whether the multicast channel that the STB user requests to join is a multicast channel being forwarded at the current service port; and, if so, no processing is executed; otherwise, the channel-number comparison unit 126 continues to determine whether the number of channels being forwarded at the current service port is below the maximum number of accessed channels allowable, which is set for the port; and, if so, the channel-number comparison unit instructs the multicast forwarding unit to start forwarding data of the new channel; otherwise, it is preliminarily determined that the channel is rejected.

Ex. 1007, 31:4-13

Petitioner Does Not Rely On Weyman To Teach “Setting . . . Limit On A Number Of The Multicast Packet Streams”

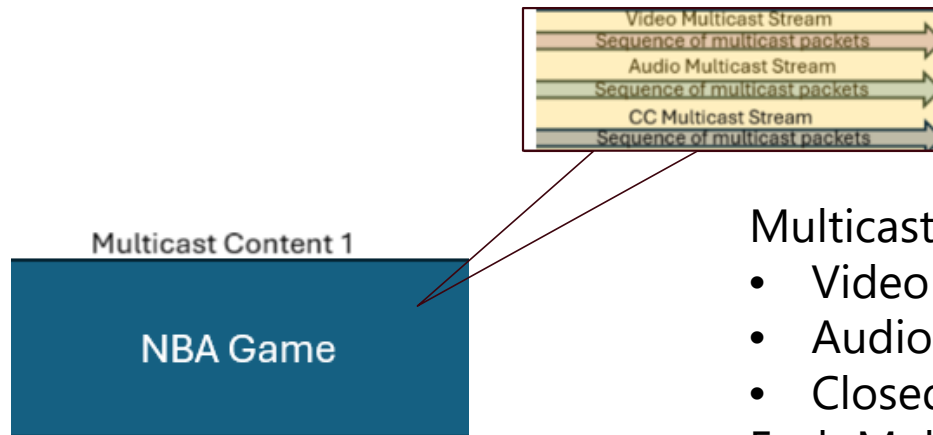
- xii. [1k] wherein aggregating the ports comprises setting an upper limit on a number of the multicast packet streams that are permitted for forwarding over the high-capacity port,

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. Accordingly, the distributed router in Weyman/Li sets an upper limit on a number

Li Distinguishes Between Channels And Programs (i.e., Multicast Streams)

An access device can be configured with a **program** priority via a configuration interface, by a command line, a network administrator, or a policy server. In practice, a **program** priority is not constant but associated with time or region. For example, shopping, cooking, and **entertainment channels** are popular in daytime, and **football channels** would be hot during the World Cup; electronic gaming and **sports channels** may be popular in dormitories; and finance, geography, and **traveling channels** may be watched most in a high class neighborhood. Device adaptability and IPTV service performance can be improved greatly if **program** priorities in a particular period of time of a region can be predicted automatically and accurately, and configured automatically to a bearer device of MAN.

In Either Scenario, The Multicast Content Contains Multicast Streams That Consist Of A Sequence Of Multicast Packets



Multicast Content consist of:

- Video Multicast Stream
- Audio Multicast Stream
- Closed Caption Multicast Stream

Each Multicast Stream is a sequence of Multicast Packets

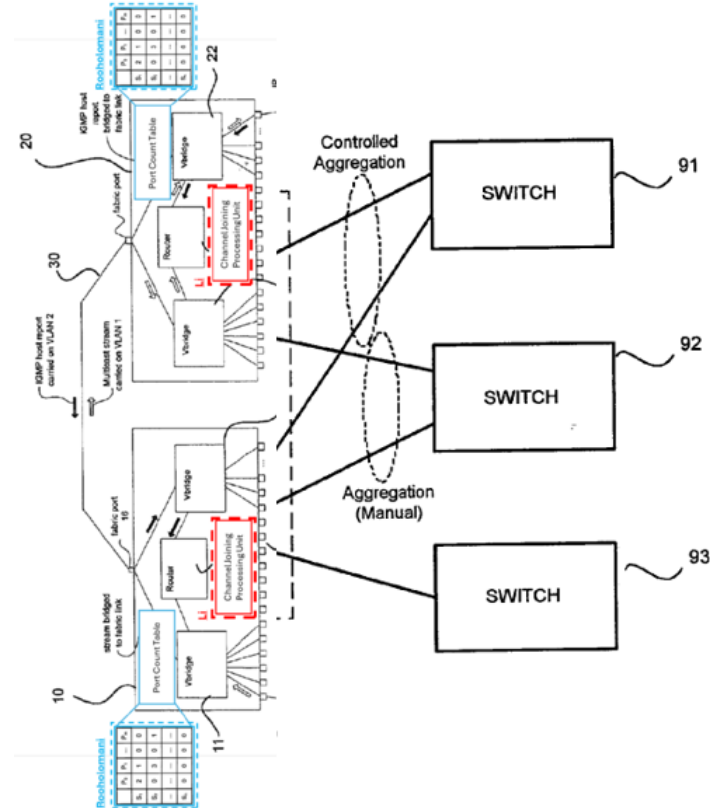
Therefore, the prior art's teachings of limiting the number of multicast groups and/or multicast channels does not meet the claim limitations requiring limiting the number of multicast streams forwarded over the high-capacity port.

Weyman, Li, And Rooholamini Fail To Teach Limitations Relating To Updating The List In Each Of The Processing Units

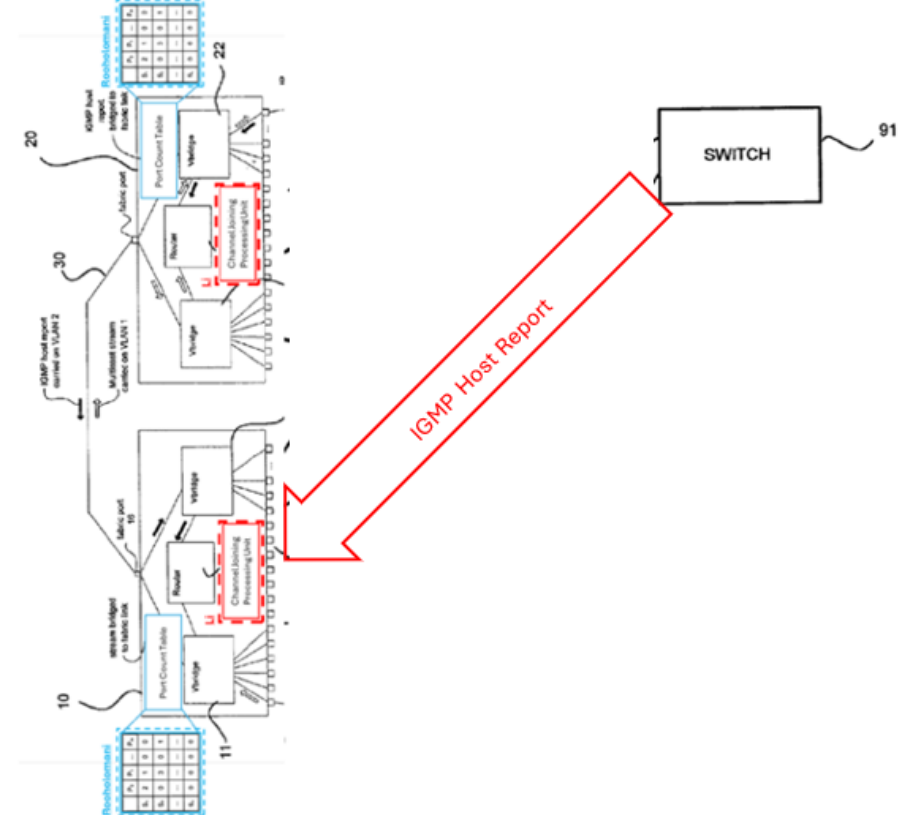
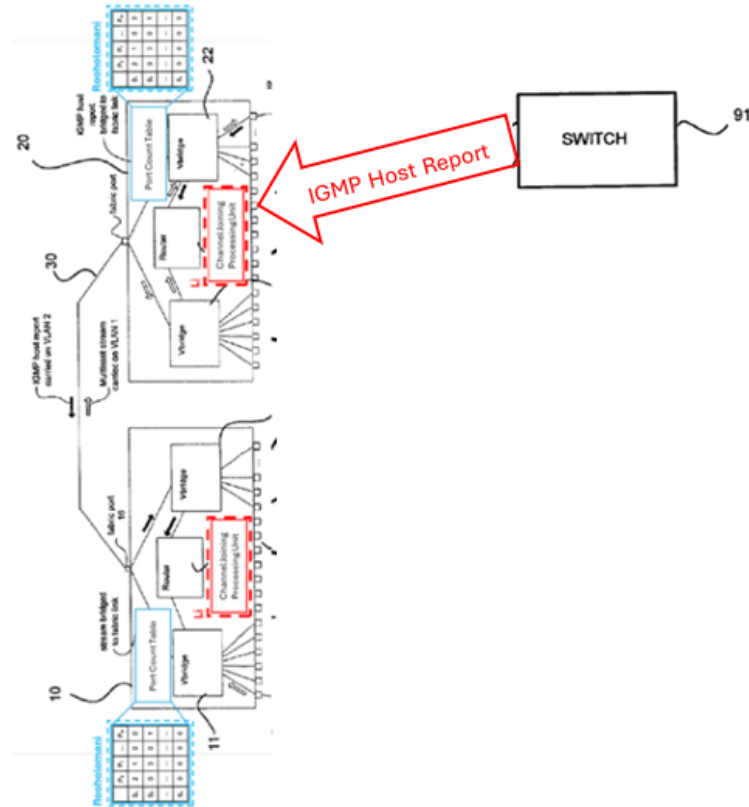
For Ground 2, Petitioner Relies On The Weyman Distributed Router and Li's Channel Joining Unit Combination With Rooholamini's Port Count Tables

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,

The Proposed Combination



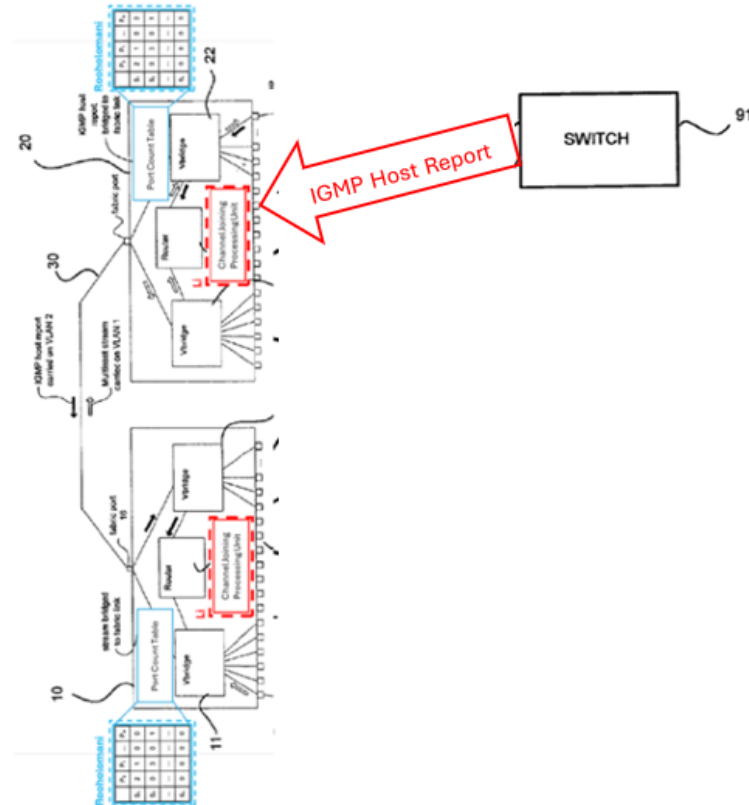
The Proposed Combination



Petitioner Fails To Explain How Sharing IGMP Messages In The Distributed Router Keeps Separate Rooholamini's Port Count Tables Synchronized

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,

Petitioner Fails To Explain How The Separate Port Count Tables In Different Network Units Are Synchronized



Because there is no evidence that the port count tables are synchronized, Petitioner fails to meet its burden of showing that Weyman, Li, and Rooholamini disclose "updating the list in each of the at least two processing units."

Weyman, Jain, and LeMaire Fail To Teach limitations relating to a new processing unit with deactivated ports sending multicast status requests, receiving reports in response to the requests, and constructing lists based on the received multicast reports.

There Is No Support For Petitioner's Argument

- Petitioner argues that just the user ports of the Weyman/Jain combination are deactivated.
- But there is no support in Jain suggesting that “internal ports” (e.g., user ports) and “externally connected ports” (e.g., fabric port) are deactivated differently.

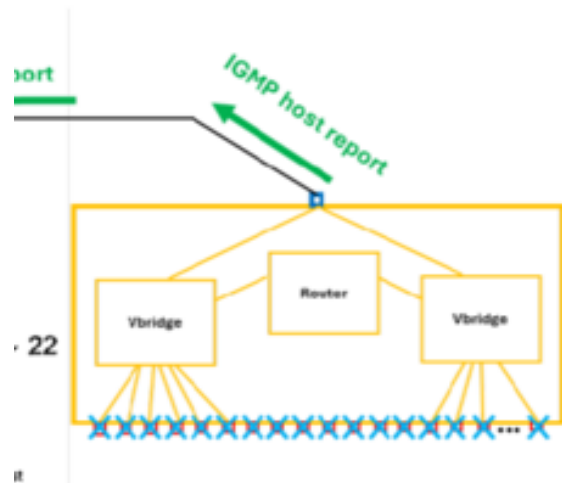
Jain Discloses Deactivating All Ports

[0019] When network node 102A is down for some reason, e.g., a catastrophic switch software and/or hardware failure, reset, power down, rebooting, etc., its link port interfaces are deactivated or de-energized, including the device-side and network-side interfaces. Accordingly, upon

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

- The plain language of Jain says that all link port interfaces are deactivated
- The Link Down condition describes sensing entities and discontinuing their traffic, without any discussion of deactivating ports.

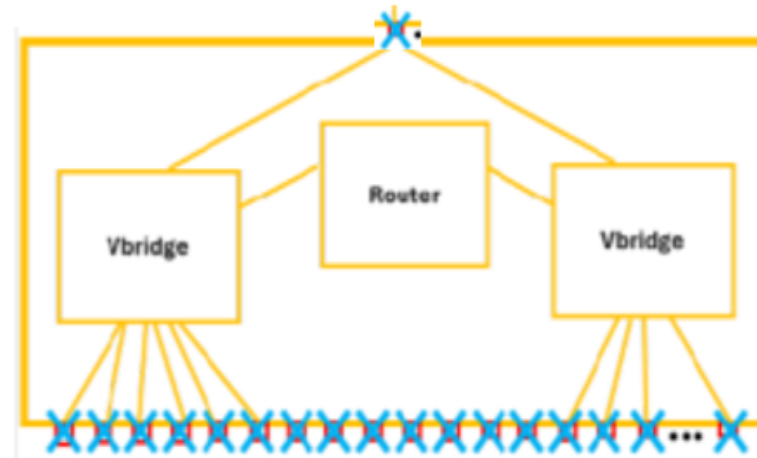
There Is No Support For Petitioner's Position That The Fabric Port Is Activated While The New Processing Unit Is In An Incomplete Operational State



Excerpt of Petitioner's Fig. 11 at Reply 22

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.

Petitioner Fails To Meet Its Burden Of Showing That Jain Discloses Sending Requests and Receiving Reports When A New Processing Unit Is Added To The Network Element



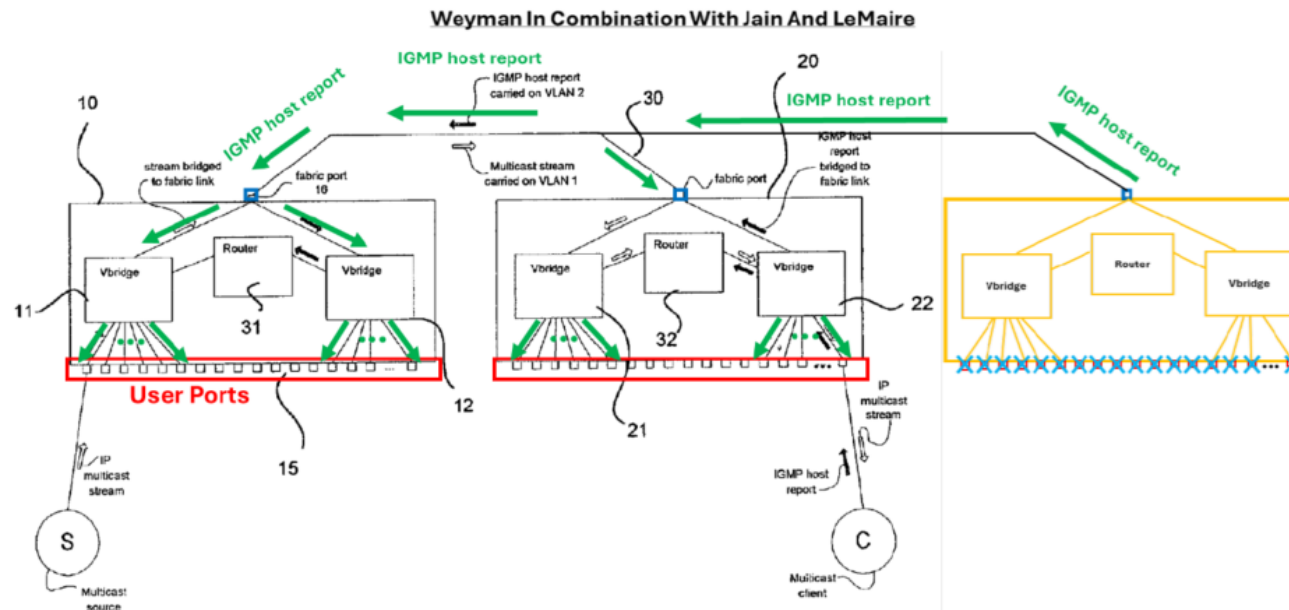
LeMaire's Bridge Initialization Technique Only Operates When Ports Of The New Processing Unit Are Activated

- Next, Petitioner unsuccessfully attempts to use LeMaire to meet the “while the ports to which the new processing unit is assigned are deactivated, sending a multicast status requests” claim limitation.

Second, Weyman/Jain/LeMaire teaches that the initialization step includes “sending a multicast status request.” As explained in Section XI.D.1 [Weyman/Jain/LeMaire], while the ports are disabled, the distributed router transmits IGMP queries to its clients, as taught by LeMaire, using other units in the distributed router. EX1011, 9:12-19. A POSITA would have understood that a IGMP query is a “multicast status request,” asking for the multicast “group membership” of clients. EX1005, [0161]. *See also* EX1017, [0061]. EX1002, ¶¶259-261.

LeMaire's Bridge Initialization Technique Only Operates When Ports Of The New Processing Unit Are Activated

- There is no evidence supporting LeMaire's bridge initialization technique functioning when user ports are deactivated. In fact, Petitioner admits that the user ports are deactivated in its Reply:



Petitioner Fails To Explain How LeMaire's Bridge Initialization Technique Could Be Combined With Weyman/Jain When Ports Are Deactivated

new unit is added to the distributed router, the distributed router uses LeMaire's initialization technique to update its forwarding table while the new unit's user ports are disabled. For example, when a new unit is added to the distributed router, the

Petitioner's New Argument Raised For The First Time In The Reply Should Be Rejected

Initiating IGMP Packets

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

Ex. 1011 (LeMaire) at 9:12-15

EX1002 at ¶¶ 234–36. Again, LeMaire does not teach the concept of user ports or other user ports. Instead, *LeMaire* teaches that all ports that are not router ports begin transmitting on system reset.

Ex. 2001 (Dr. Olivier Decl.) at ¶ 74

Petitioner Fails To Meet Its Burden Of Showing That LeMaire Discloses Constructing A List By The New Processing Unit."

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

Summary

Ground 1

Weyman and Li

Independent Claims 1 & 11 (Dependent Claims 2, 4, 6, 7, 12, 14, 16, and 17)

- No motivation to combine Weyman and Li
- Cited art fails to teach limitations relating to limiting the number of multicast packet streams.
 - Claim 1 - **"Aggregating Ports By Setting An Upper Limit On A Number Of The Multicast Packet Streams That Are Permitted For Forwarding Over The High-Capacity Port."**
 - Claim 11 – **"An Upper Limit Is Set On A Number Of The Multicast Packet Streams That Are Permitted For Forwarding Over The High-Capacity Port."**

Ground 2

Weyman, Li, and Rooholamini

Dependent Claims 5 & 15

- No motivation to combine for the same reasons provided in Ground 1.
- Cited art fails to teach limitations relating to updating the list in each of the processing units.
 - Claim 5 - **"Updating The List In Each Of The At Least Two Processing Units Based On The Respective Local Copies."**
 - Claim 15 – **"At Least Two Processing Units Are Configured To Hold Respective Local Copies Of The Number Of The Multicast Packet Streams That Are Permitted For Forwarding Over The High-Capacity Port, To Update The Local Copies Based On The Distributed Request, And To Selectively Update Their Respective Lists Based On The Respective Local Copies"**

Summary

Ground 4

Dependent Claims 8 and 18

*Weyman, Jain and
LeMaire*

- Cited art fails to teach limitations relating to a new processing unit with deactivated ports sending multicast status requests, receiving reports in response to the requests, and constructing lists based on the received multicast reports.
- Claim 8 - **"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."**
- Claim 18: **"A New Processing Unit Added To The Network Element Is Configured To Initialize 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."**