

IPR2024-00505

U.S. Patent No. 6,917,986

CISCO SYSTEMS, INC. v. PORTSMOUTH NETWORK CORP.

Petitioner's Demonstrative Exhibit



May 5, 2025

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

1

Roadmap

- 1 Overview of the '986 Patent
- 2 Overview of the Grounds
- 3 Disputed Issues

Network With Redundant Links Between Access And Edge Switches

(54) FAST FAILURE PROTECTION USING REDUNDANT NETWORK EDGE PORTS

(12) **United States Patent**
Mor et al.

(10) Patent No.: **US 6,917,986 B2**
(45) Date of Patent: **Jul. 12, 2005**

(54) **FAST FAILURE PROTECTION USING REDUNDANT NETWORK EDGE PORTS**

(75) Inventors: Gal Mor, Rishon le Zion (IL); Shmuel Ilan, Ra'anana (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 734 days.

(21) Appl. No.: 10/036,518

(22) Filed: Jun. 7, 2002

(65) **Prior Publication Data**

US 2003/0208618 A1 Nov. 6, 2003

(51) Int. Cl. G06F 15/173

(52) U.S. Cl. 709/238; 709/208; 709/226;

709/209; 709/239; 707/104.1; 370/396;

370/252; 370/352; 370/389

(58) **Field of Search** 709/238, 239;

709/208, 209, 226; 707/104.1; 370/396,

252, 352, 389

(59) **References Cited**

U.S. PATENT DOCUMENTS

5,159,595 A 10/1992 Flanagan et al.

5,307,353 A 4/1994 Yamashita et al.

5,025,137 A 7/1999 Okamoto et al.

6,246,667 B1 6/2001 Ballantine et al.

OTHER PUBLICATIONS

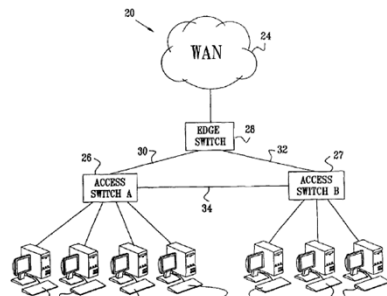
"IEEE Standard for Information Technology, Telecommunications and Information Exchange between Systems, Local and Metropolitan Area Network, Common Specifications, Part 3: Media Access Control (MAC) Bridges", Published as ANSI/IEEE Standard 802.1D (1998). Available at: standards.ieee.org/catalog/IEEE802.1.html.

Primary Examiner—William A. Cuchlinski, Jr.
Assistant Examiner—Thanh T. Nguyen
(74) Attorney, Agent, or Firm—Nixon & Vanderhye PC.

ABSTRACT

A method for fast protection in a fault-tolerant network includes coupling an edge switch in a network to one or more access switches via at least first and second redundant links, respectively connected to first and second ports of the edge switch. The first port is placed in an active state, while the second port is placed in a blocking state, so that communication traffic is conveyed over the first link, and each of the switches builds a respective database for use in forwarding the traffic. Responsive to a failure associated with the first link, the second port is placed in the active state and the first port is placed in the blocking state. Dummy traffic is then sent from the edge switch over the second link to the one or more access switches, so as to cause each of the one or more access switches to modify its respective database responsive to the second port being in the active state.

24 Claims, 4 Drawing Sheets



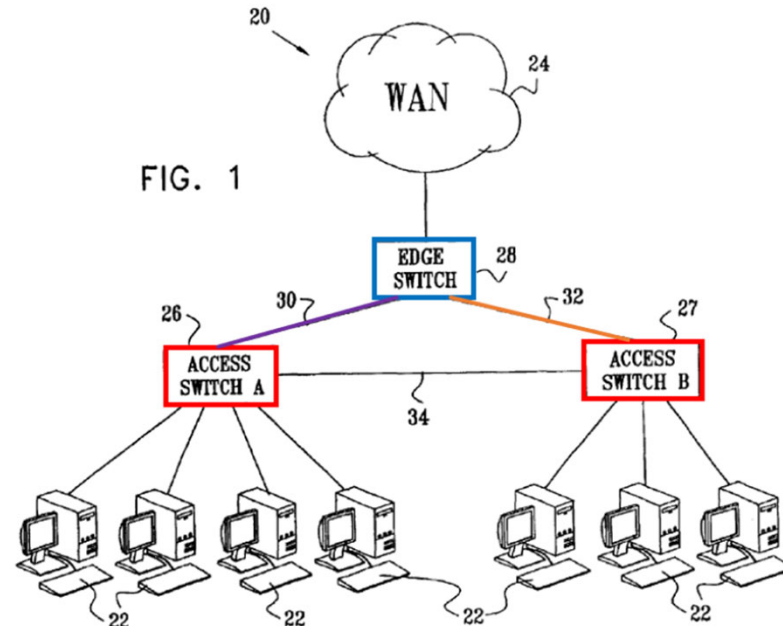
IPR2024-00505

Cisco Systems, Inc. v. Portsmouth Network Corp.

Cisco's Exhibit 1001

Ex. 1001, Page 1

FIG. 1



Petition at 30; EX1001 ('986 Patent) at Fig. 1 (annotated)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

The '986 Patent Describes Attributes Of Access, Core, And Edge Switches

Access Switch	switches. An access switch has ports that connect to LANs and/or to other network endpoints, such as user computer systems. Core switches interconnect the access switches into
Core Switch	systems. Core switches interconnect the access switches into a Wide Area Network (WAN), by direct connection between the core switch and access switches and/or by connection to other core switches. Core switches that are directly con-
Edge Switch	other core switches. Core switches that are directly connected to access switches are referred to herein as edge switches.

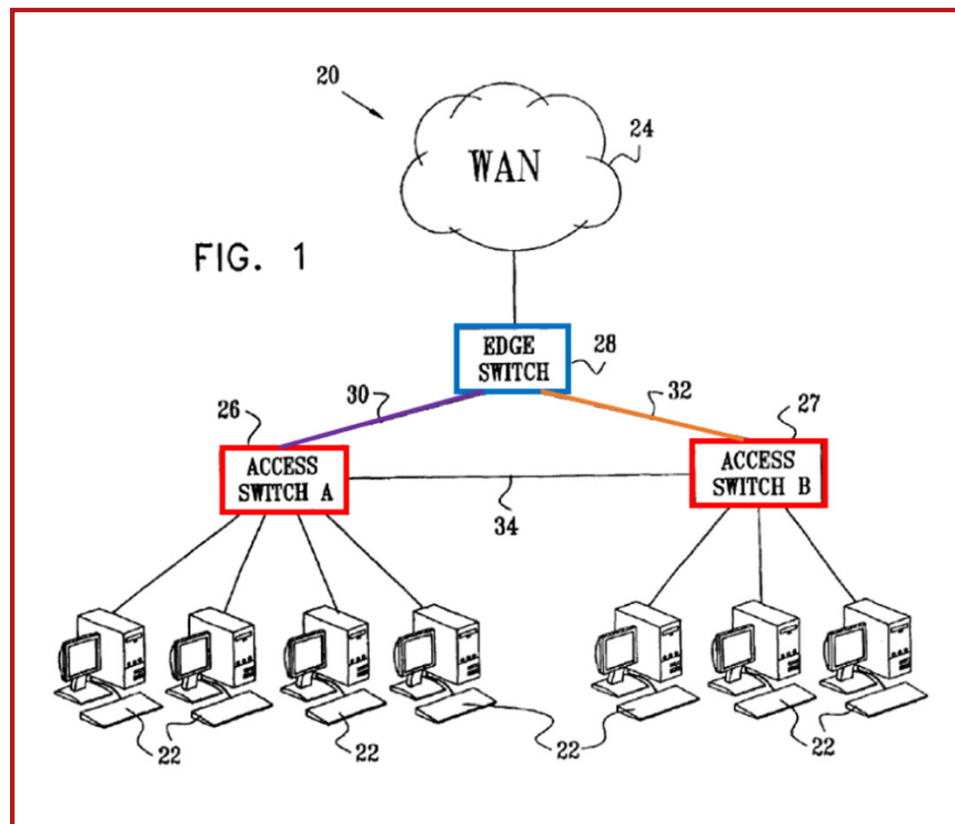
Reply at 20; EX1001 ('986 Patent) at 1:29-38

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Representative Claim 1 Of The '986 Patent

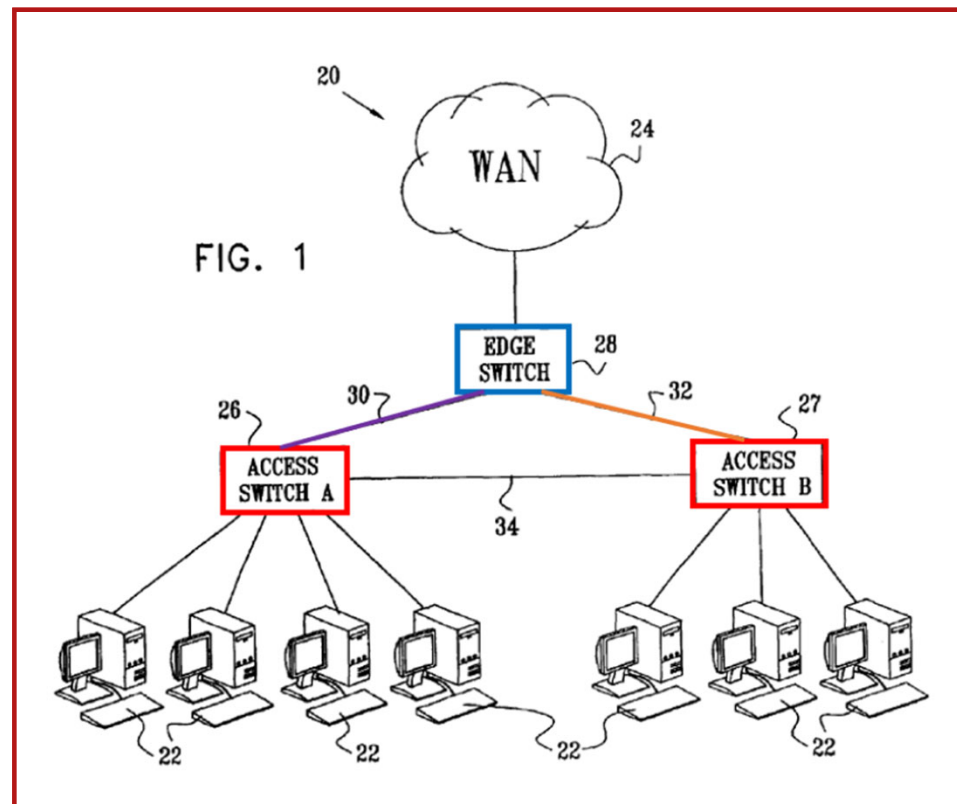
1. A method for network communication, comprising:
coupling an edge switch in a network to one or more access switches via at least first and second redundant links, respectively connected to first and second ports of the edge switch;
placing the first port in an active state, while placing the second port in a blocking state;
conveying communication traffic over the first link while the first port is in the active state, thereby causing each of the switches to build a respective database for use in forwarding the traffic;
responsive to a failure associated with the first link, placing the second port in the active state and the first port in the blocking state; and
sending dummy traffic from the edge switch over the second link to the one or more access switches, so as to cause each of the one or more access switches to modify its respective database responsive to the second port being in the active state.



Petition at 30; EX1001 ('986 Patent) at Claim 1, Fig. 1 (annotated)

Representative Claim 12 Of The '986 Patent

12. A method for network communication, comprising:
coupling a first bridge in a network to a second bridge located downstream of the first bridge, by connecting at least first and second redundant links to respective first and second ports of the first bridge so as to communicate with the second bridge;
placing the first port in an active state, while placing the second port in a blocking state;
conveying communication traffic over the first link while the first port is in the active state, thereby causing the bridges to build respective databases for use in forwarding the traffic;
responsive to a failure associated with the first link, placing the second port in the active state and the first port in the blocking state; and
sending dummy traffic from the first bridge over the second link downstream to the second bridge, so as to cause the second bridge to modify its database responsive to the second port being in the active state.



Petition at 30; EX1001 ('986 Patent) at Claim 12, Fig. 1 (annotated)

Claims 1 And 12 Use Different Terminology For Limitations 1(e) And 12(e)

Claim 1

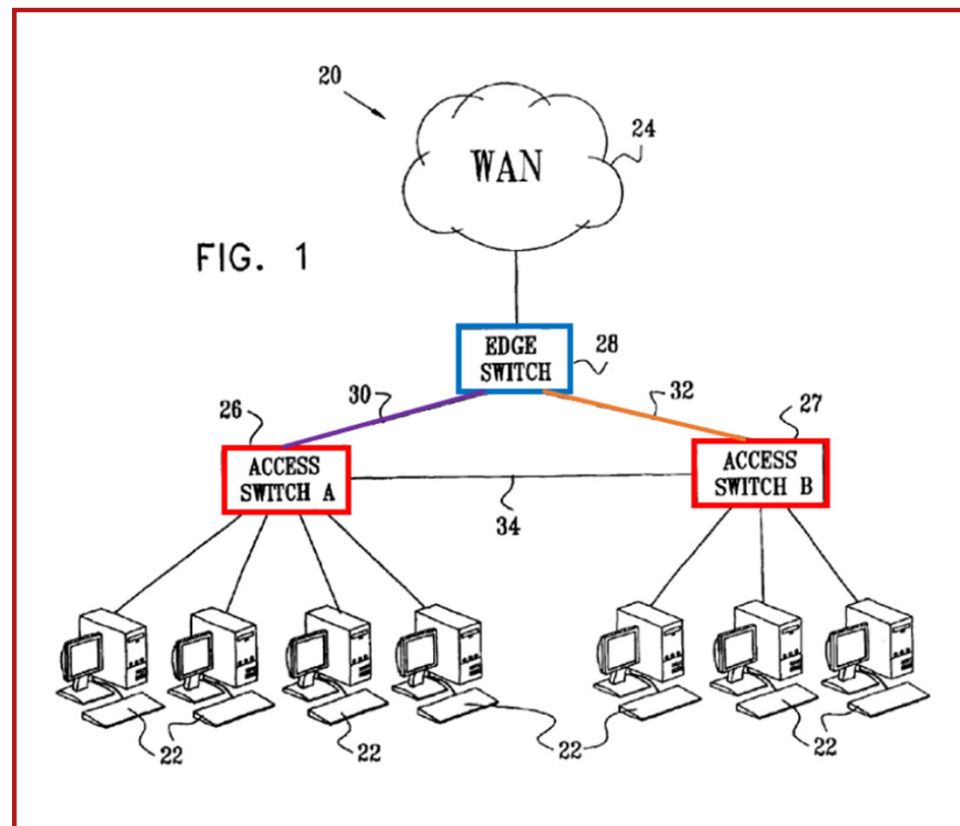
1(e)

sending dummy traffic from the edge switch over the second link to the one or more access switches, so as to cause each of the one or more access switches to modify its respective database responsive to the second port being in the active state.

Claim 12

12(e)

sending dummy traffic from the first bridge over the second link downstream to the second bridge, so as to cause the second bridge to modify its database responsive to the second port being in the active state.



Petition at 30; EX1001 ('986 Patent) at Claim 1, Claim 12, Fig. 1 (annotated)

Roadmap

- 1 Overview of the '986 Patent
- 2 Overview of the Grounds
- 3 Disputed Issues

Cisco's Grounds Are Based On U.S. Patent No. 6,032,194 To Gai

United States Patent [19] **Patent Number:** 6,032,194
Gai et al. [45] **Date of Patent:** Feb. 29, 2000

[54] METHOD AND APPARATUS FOR RAPIDLY RECONFIGURING COMPUTER NETWORKS

Inventors: **Silvano Gai**, Vigliano d'Asi, Italy;
Keith McGugherle, San Jose; **Dinesh G. Dutt**, Santa Clara, both of Calif.

Assignee: **Cisco Technology, Inc.**, San Jose, Calif.

[21] Appl. No.: 08/998,412

[22] Filed: Dec. 24, 1997

[51] Int. Cl. 7: G06F 15/18; G06F 13/00

[52] U.S. Cl. 709/239; 709/221; 709/224;

709/230; 709/238; 370/216; 370/351; 370/217;

370/252; 379/221; 379/273; 714/39; 714/47;

340/825.08; 340/825.03

[58] Field of Search: 709/224, 239;

709/221; 713/100; 340/825; 370/216, 351,

252, 408, 409, 402, 256; 379/221, 273;

714/39, 47

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US0006032194A
[11] Patent Number: 6,032,194
[45] Date of Patent: Feb. 29, 2000

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Fault-Tolerant Convergence Routing, Yener, B. Bhandari, L. Orek, Y., Yung, M. Apr. 1994.

Primary Examiner—Frank J. Asta

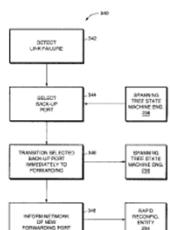
Assistant Examiner—Beatriz Prieto

Attorney, Agent, or Firm—Cesari and McKenna, LLP

ABSTRACT

A method that rapidly reconfigures a computer network having a plurality of devices executing the spanning tree algorithm. First, one or more devices are configured and arranged so that one port, providing connectivity to the root, is in the forwarding state and the remaining ports, providing connectivity to the root, are in the blocked state. Next, one or more of the blocked ports are designated as back-up ports. Upon detection of a failure at the active forwarding port, one of the back-up ports immediately transitions from blocked to forwarding, thereby becoming the new active port for the device. Following the transition to a new active port, dummy multicast messages are transmitted, each containing the source address of an entity directly coupled to the affected device or downstream thereof. By examining the dummy multicast messages, other devices in the network learn to use the new forwarding port of the affected device. Rapid reconfiguration of the network is also provided upon detection of a new or repaired link or device representing a better path toward the root. The method is also compatible with networks supporting virtual local area network (VLAN) designations and allows load balancing among different VLANs.

16 Claims, 8 Drawing Sheets



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Cisco's Exhibit 1005

Ex. 1005, Page 1

[54] METHOD AND APPARATUS FOR RAPIDLY RECONFIGURING COMPUTER NETWORKS

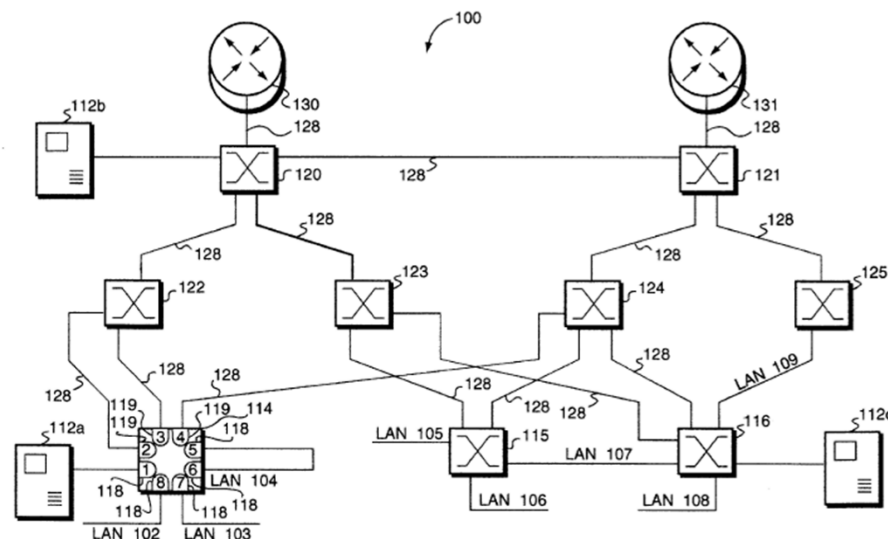


FIG. 1

Petition at 13; EX1005 (Gai) at Fig. 1

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Grounds

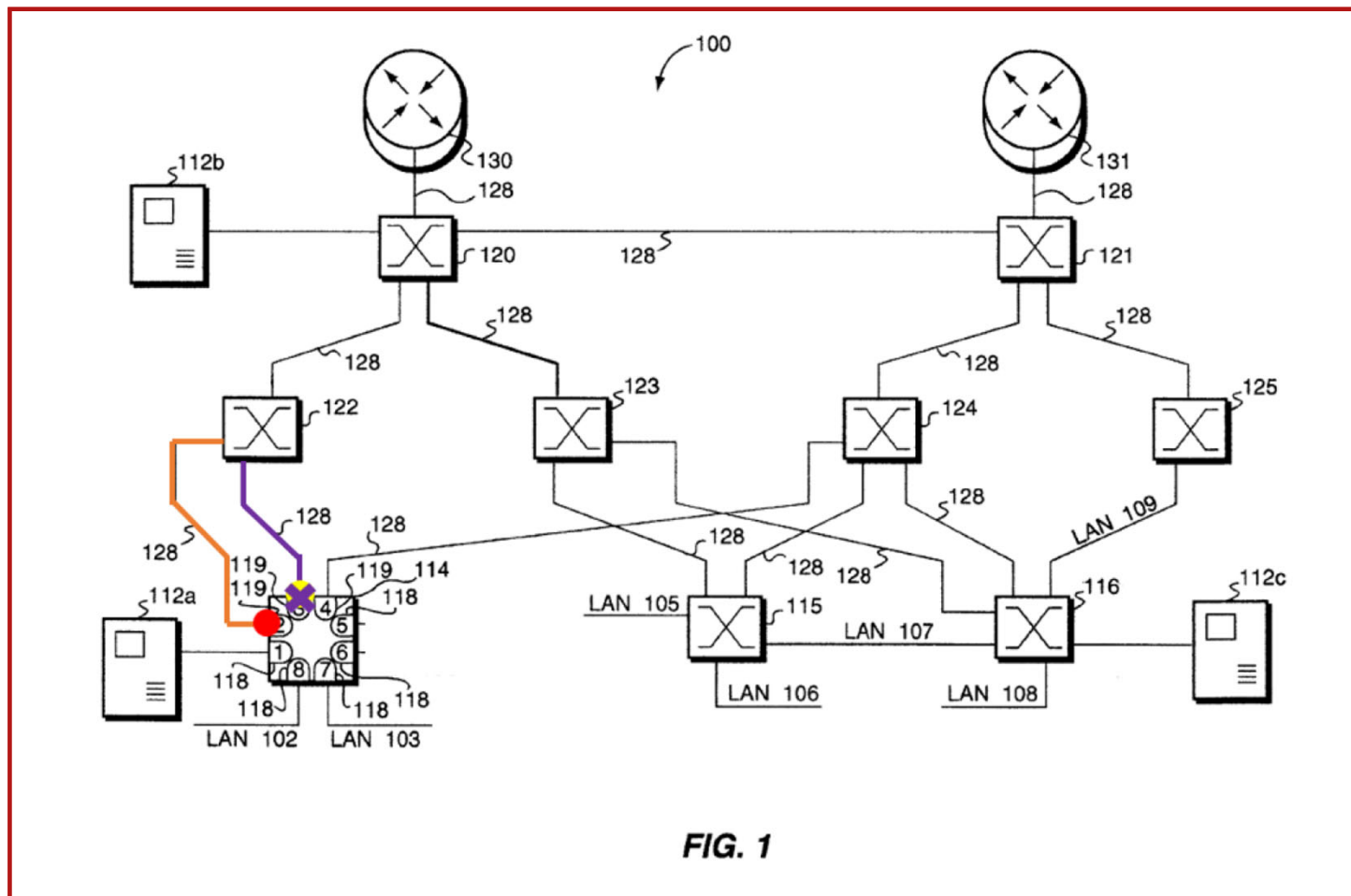
Ground	Claims	Basis
#1A (Switch 124 “Downstream”) / #1B (Switch 114 “Upstream”)	1-2, 4-7, 9-14, 16-19, and 21-24	§103 Gai

Petition at 12, 25, 68

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Gai Teaches Rapid Reconfiguration Using Redundant Links



Petition at 40; EX1005 (Gai) at Fig. 1 (annotated)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Gai's Switches Correlate To The '986 Patent's Switches

	'986 Patent	Gai
Access Switch	switches. An access switch has ports that connect to LANs and/or to other network endpoints, such as user computer systems. Core switches interconnect the access switches into	switches 114–116. <i>See id.</i> Switches 114–116 are access switches because they are directly connected to LANs 102–108 and/or servers 12a and 12c. <i>See id.</i> Note that switch 120, in addition to being a core and backbone
Core Switch	systems. Core switches interconnect the access switches into a Wide Area Network (WAN), by direct connection between the core switch and access switches and/or by connection to other core switches. Core switches that are directly con-	patent (discussed above) to the switches shown in Figure 1 of Gai. The backbone switches 120–125 in Gai are core switches because they directly connect to routers 130 and 131 (connecting to WANs), or connect switches 120 and 121 that are, in turn, directly connected to the routers. <i>See</i> Ex. 1005, Fig. 1, 7:3–52. Backbone switches 122–125 are also edge
Edge Switch	other core switches. Core switches that are directly connected to access switches are referred to herein as edge switches.	Ex. 1005, Fig. 1, 7:3–52. Backbone switches 122–125 are also edge switches because they are core switches that are directly connected to access switches 114–116. <i>See id.</i> Switches 114–116 are access switches because

Reply at 20; Institution Decision at 25, n.9
EX1001 ('986 Patent) at 1:29-38

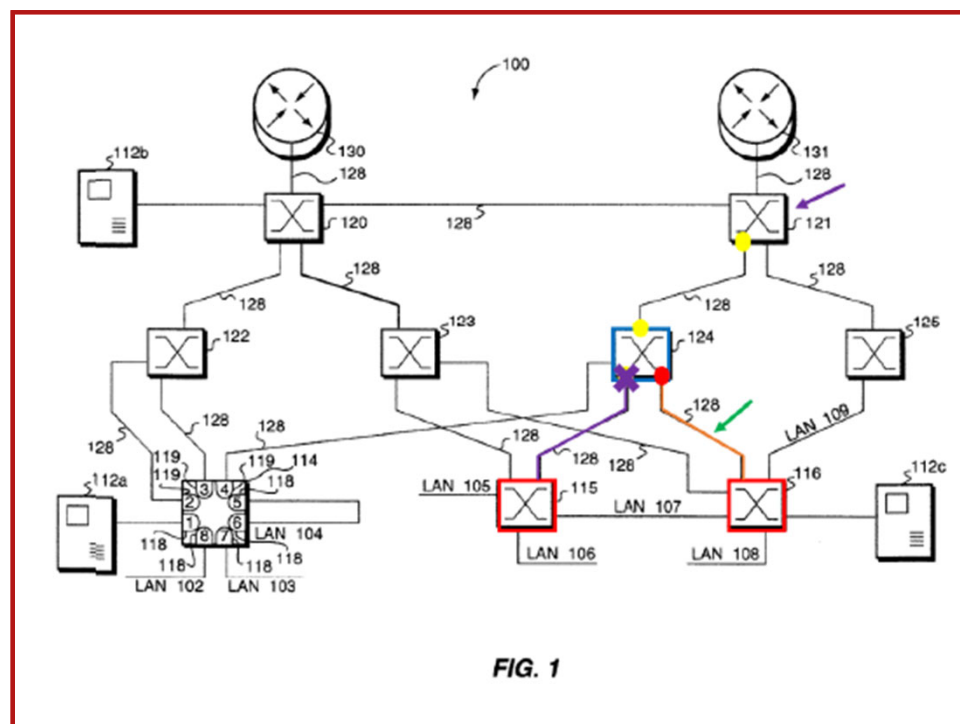
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Ground 1A Applies The Invention to Backbone Switch 124

for rapidly reconfiguring a computer network. The network preferably includes a plurality of devices executing the spanning tree algorithm so as to elect a root and place the ports of the devices in either a forwarding or blocked state. In accordance with the method, one or more devices are configured and arranged so that one trunk port is in the forwarding state and other trunk ports are in the blocked state. Additionally, one or more of the blocked ports are designated as back-up ports. Upon detection of a failure at the active forwarding port, the state of one of the back-up ports immediately transitions from blocked to forwarding, thereby becoming the new active port for the device.

In the illustrated embodiment, the method and apparatus manifests, in part, as a series of novel commands that may be entered at the devices. The devices, moreover, may be classified as either access switches or backbone switches.



EX1005 (Gai) at Fig. 1 (annotated)

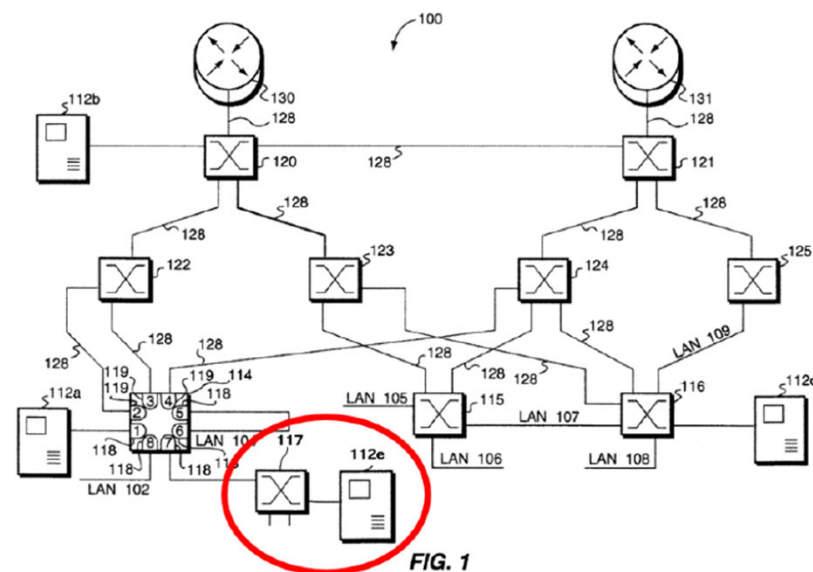
Petition at 16-17, Reply at 15; EX1005 (Gai) at 5:36-47, 6:6-9

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Ground 1B Is Based On Gai's Proposed Example Adding Switch 117

Gai's teachings apply to variations of the network of Figure 1. EX1005, 7:41-44 ("[T]he network 100 of FIG. 1 is meant for illustrative purposes only and that the present invention will operate with other network designs having possibly far more complex topologies."). Gai's upstream embodiment is discussed in connection with a modified Figure 1. For example, Gai discloses that port seven of switch 114 can be coupled to another switch. EX1005, 13:60-63 ("[I]f port number seven at switch 114 were coupled to another access switch, entity 234 would transmit multicast messages 400 carrying the source address of *entities directly coupled to this additional access switch* as well."). Such network is illustrated below:

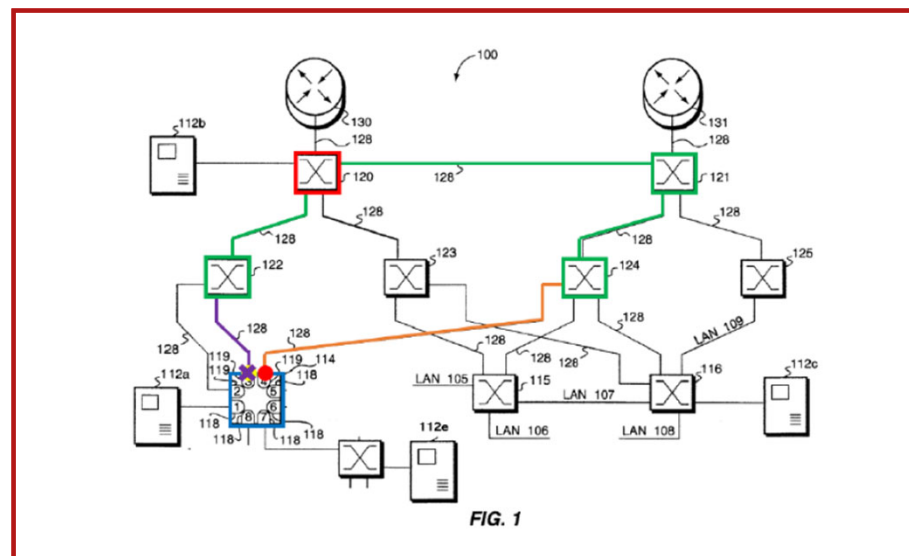


Petition at 69; EX1005 (Gai) at Fig. 1 (annotated)

Ground 1B Depicts Gai's Example Of A Failure At Switch 114's Port 3

tional operation of the spanning tree algorithm. With reference to switch **114**, for example, assume that port number three, which is coupled to backbone switch **122**, is the root port for switch **114** and thus in the forwarding state. Pursuant to the Enable_Uplinkfast command **330**, port numbers two and four, which also connect switch **114** to the backbone switches (i.e., backbone switches **122** and **124**), are in the blocked state. If the link **128** coupled to the port number three at switch **114** fails, either one of these two other ports (i.e., port numbers two or four) will immediately transition to the forwarding state and begin receiving and sending messages.

Petition at 39-40, 82; EX1005 (Gai) at 11:41-52



Petition at 84; EX1005 (Gai) at Fig. 1 (annotated)

Roadmap

- 1 Overview of the '904 Patent
- 2 Overview of the Grounds
- 3 Disputed Issues

Disputed Issues

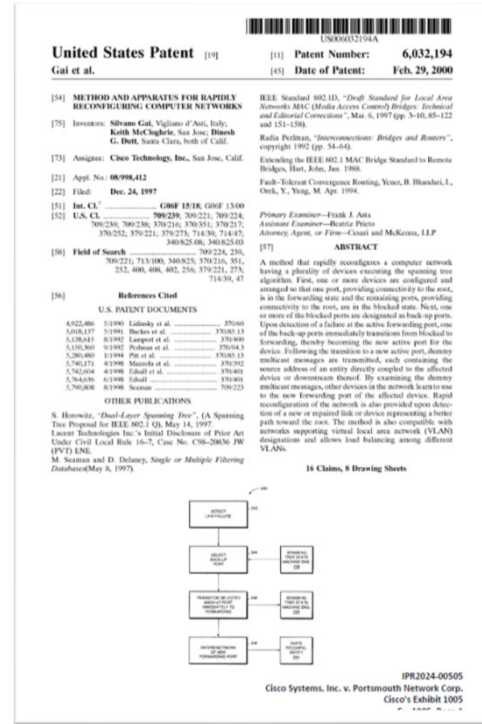
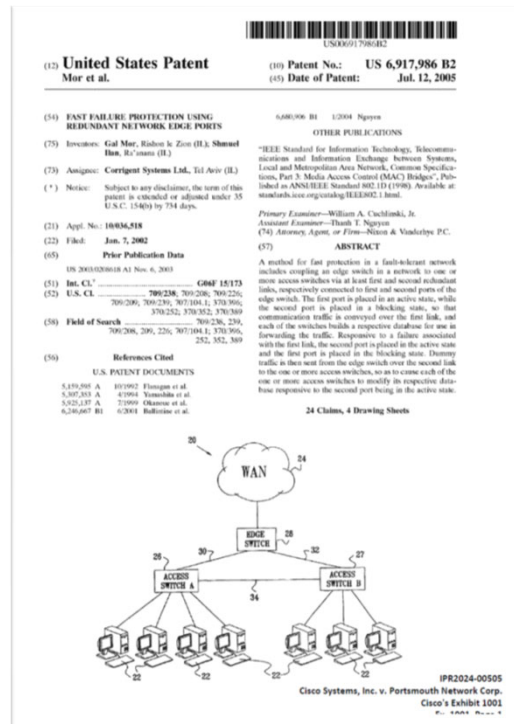
- 1) All Claims: Whether The '986 Patent And Gai Are “Fundamentally Different”
- 2) All Claims: Whether Grounds 1A And 1B “Modify” Gai
- 3) Claims 1, 11-13, 23-24: Whether Cisco’s Ground 1A Invalidates Claims 1, 11-13, and 23-24
- 4) Claims 1, 11-13, 23-24: Whether Cisco’s Ground 1B Invalidates Claims 1, 11-13, and 23-24
- 5) Claims 6 And 18: Whether Data Frames Contain Source Addresses Of Other Entities
- 6) Claims 5 And 17: Whether Switch Databases Are Updated Before Sending Communication Traffic

Disputed Issue #1

All Claims: Whether The '986 Patent And Gai Are “Fundamentally Different”

Patent Owner Asserts That The '986 Patent And Gai Are "Fundamentally Different"

A. *Gai* and the Inventions of the '986 Patent Are Fundamentally Different



POR at 8

EX1001 ('986 Patent) at Cover DEMONSTRATIVE EXHIBIT – NOT EVIDENCE EX1005 (Gai) at Cover

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The '986 Patent Incorporates Gai By Reference



US0691798B2

(12) **United States Patent**
Mor et al.

(10) Patent No.: **US 6,917,986 B2**
(45) Date of Patent: **Jul. 12, 2005**

(54) **FAST FAILURE PROTECTION USING REDUNDANT NETWORK EDGE PORTS**

(75) Inventors: Gal Mor, Rishon le Zion (IL); Shmuel Ilan, Ra'anana (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 734 days.

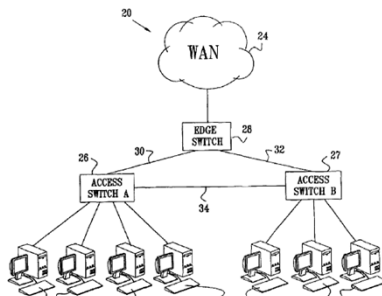
(21) Appl. No.: 10/036,518
(22) Filed: Jun. 7, 2002
(65) Prior Publication Data
US 2003/0208618 A1 Nov. 6, 2003

(51) Int. Cl. G06F 15/173
(52) U.S. Cl. 709/238; 709/208; 709/226; 709/209; 709/239; 707/104.1; 370/396; 370/252; 370/352; 370/389

(58) Field of Search 709/238, 239, 709/208, 209, 226; 707/104.1; 370/396, 252, 352, 389

(59) References Cited
U.S. PATENT DOCUMENTS
5,159,595 A 10/1992 Flanagan et al.
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5,025,137 A 7/1999 Okamoto et al.
6,246,667 B1 6/2001 Ballantine et al.

24 Claims, 4 Drawing Sheets



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Cisco Systems, Inc. v. Portsmouth Network Corp.
Cisco's Exhibit 1001
Ex. 1001, Page 1

U.S. Pat. No. 6,032,194, whose disclosure is incorporated herein by reference, describes a method for rapidly reconfiguring a computer network, based on certain modifications to the standard STP. The method assumes that the switches in the network, including both core and access switches, have multiple trunk ports providing connectivity to the STP root via trunk switches. (These trunk switches are comparable to the core switches and edge switches defined above, and the trunk ports are on the upstream side of each switch, i.e., the side leading toward the root.) One of the trunk ports of each switch is placed in the forwarding state, while the others are designated as back-up ports. Upon detection of a failure at the active forwarding port, the switch immediately places one of the back-up trunk ports in the forwarding state, so that it becomes the new active port. The switch then transmits dummy multicast messages toward the root (upstream) through the newly-active trunk port, each containing the source address of a network entity that is coupled to the switch itself or is downstream of the switch. Upon receiving these messages, other devices in the network learn to use the new active port. In order to implement this rapid reconfiguration method, special commands, not a part of the 802.1D standard, are used to modify the STP parameters of both the core switches and the access switches in the network. The patent also suggests modifications to these special commands for operating in a Virtual LAN (VLAN) environment.

The '986 Patent And Gai Address The Same Problem In The Same Way

	<u>'986 Patent</u>	<u>Gai</u>
Same Problem	It is an object of some aspects of the present invention to provide methods and devices enabling rapid reconfiguration in response to network topology changes.	The present invention relates generally to computer networks, and more specifically, to a method and apparatus for rapidly reconfiguring a computer network following a network change.
Redundant Links	To protect against failures of network equipment and communication media, it is common to provide multiple, redundant paths between switches in the network. For	Additionally, most computer networks include redundant communications paths so that a failure of any given link does not isolate any portion of the network. Such networks
STP	In order to avoid these problems, the 802.1D standard defines a communication protocol, known as the spanning tree protocol (STP), for managing the creation and updating of the network topology. STP ensures that all data paths in a network of bridges are free of loops by disabling forwarding of packets through certain interfaces. The spanning tree	To avoid the formation of loops, devices, such as switches or bridges, execute a spanning tree algorithm. This algorithm effectively “severs” the redundant links within the network. Specifically, switches exchange special messages
Dummy Traffic	failed port. In order to inform the access switches and other downstream equipment that they should now transmit their upstream traffic through the new active link, the edge switch sends dummy frames through the new active link to the access switches. Preferably, the dummy frames have source	Upon transition to the new forwarding port, the device begins transmitting “dummy” multicast messages through the new port. These dummy multicast messages carry the

Patent Owner's Expert Admitted It Was Known At The Time Of The '986 Patent That Network Traffic Could Be Sent Upstream And Downstream

Q And it was known at the time of the '986 patent that network traffic could be sent downstream, right?

A Sure. It's known that you can send network traffic in any direction.

Q So you would agree that it was also known that network traffic could be sent upstream, right?

A True. We're talking about particular types of network traffic, the dummy multicast messages, but you can send network traffic upstream and downstream. Yes, that was well known at the time.

Reply at 12; EX1018 (Olivier Dep. Tr.) at 37:11-22

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Gai's Continuation Application Confirms That Downstream Transmission Of Dummy Messages Is Covered By Gai

US007848264B1

(12) United States Patent
Gai et al.

(10) Patent No.: US 7,848,264 B1
(45) Date of Patent: Dec. 7, 2010

(54) METHOD AND APPARATUS FOR RAPIDLY RECONFIGURING COMPUTER NETWORKS

(75) Inventors: Silvano Gai, Vigliano d'Asi (IT); Keith McCloghrie, San Jose, CA (US); Dinesh G. Dutt, Santa Clara, CA (US)

(73) Assignee: Cisco Technology, Inc., San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1110 days.

(21) Appl. No.: 11/113,600
(22) Filed: Apr. 25, 2005

Related U.S. Application Data
(60) Continuation of application No. 10/259,959, filed on Sep. 27, 2002, now Pat. No. 6,976,088, which is a continuation of application No. 09/450,891, filed on Nov. 29, 1999, now Pat. No. 6,535,491, which is a division of application No. 08/998,412, filed on Dec. 24, 1997, now Pat. No. 6,032,194.

(51) Int. Cl. H04L 12/28 (2006.01)
(52) U.S. Cl. 370/256; 370/401
(58) Field of Classification Search 370/256, 370/390, 432, 401, 254, 255, 428; 709/239, 709/242
See application file for complete search history.

(56) References Cited
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14 Claims, 8 Drawing Sheets

IPR2024-0050/
Cisco Systems, Inc. v. Portsmouth Network Corp
Cisco's Exhibit 100i

1. A method for operating a router, comprising:
 executing a spanning tree protocol to select a first port as a root port and to select a second port as a designated port and to place both the root port and the designated port in a forwarding state, the root port for communication with a root router and the designated port to communicate with at least one router in a lower leaf of a spanning tree established by executing the spanning tree protocol;
 selecting a third port as a back-up designated port and placing the back-up designated port in a blocked state;
 detecting a link failure;
 transitioning by the spanning tree protocol, in response to detecting the failure, the designated port into the blocked state and the back-up designated port into the forwarding state, without the spanning tree protocol transitioning the back-up designated port through any intermediary states in moving from the blocked state to the forwarding state; and
transmitting, by the back-up designated port, one or more messages, the messages to tell devices downstream in the spanning tree that the router has a new designated port.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Petition at 43, 102; EX1006 at Claim 1, 18:8-11

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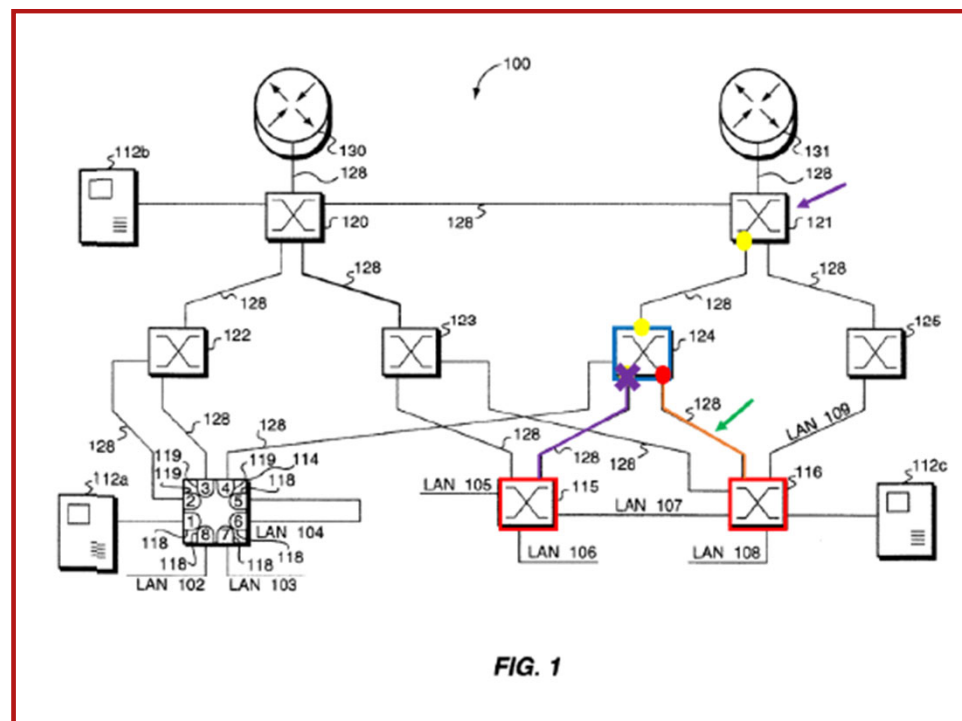
Disputed Issue #2

All Claims: Whether Grounds 1A And 1B “Modify” Gai

Ground 1A Is Based On Gai's Teachings

for rapidly reconfiguring a computer network. The network preferably includes a plurality of devices executing the spanning tree algorithm so as to elect a root and place the ports of the devices in either a forwarding or blocked state. In accordance with the method, one or more devices are configured and arranged so that one trunk port is in the forwarding state and other trunk ports are in the blocked state. Additionally, one or more of the blocked ports are designated as back-up ports. Upon detection of a failure at the active forwarding port, the state of one of the back-up ports immediately transitions from blocked to forwarding, thereby becoming the new active port for the device.

In the illustrated embodiment, the method and apparatus manifests, in part, as a series of novel commands that may be entered at the devices. The devices, moreover, may be classified as either access switches or backbone switches.

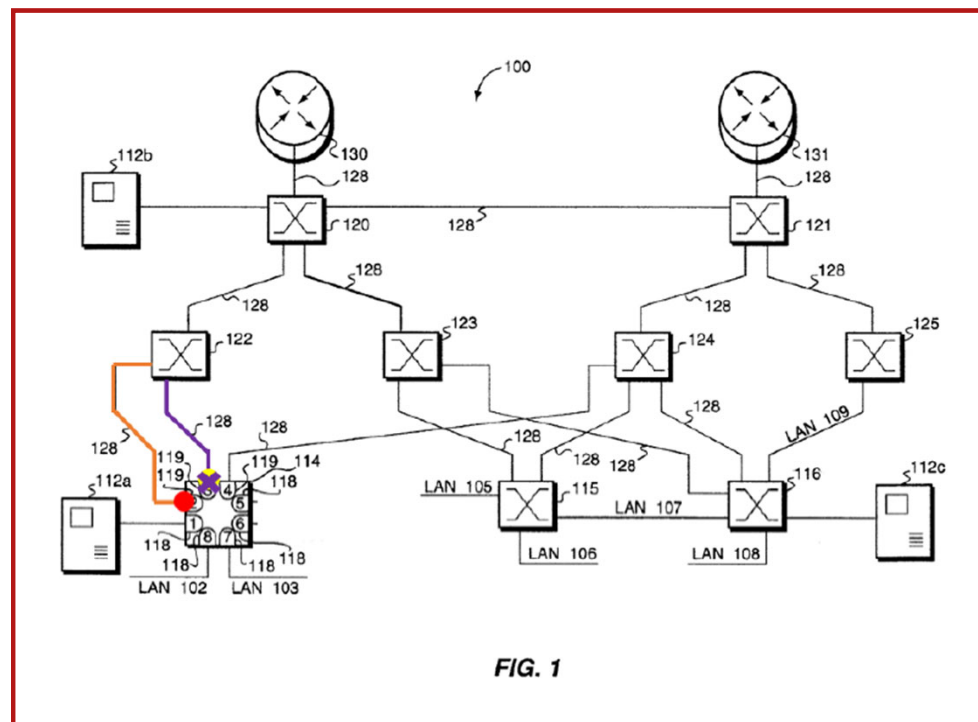


Petition at 42; EX1005 (Gai) at Fig. 1 (annotated)

Petition at 16-17, Reply at 15; EX1005 (Gai) at 5:36-47, 6:6-9

Gai's Example Of A Failure In Port 3 Of Switch 114 Is Not Limiting

Should a change occur in the network 100, such as a failure disabling the link coupled to a root port of an access switch, the affected access switch will be able to rapidly reconfigure the network 100 without the significant interruption or message flooding experienced through conventional operation of the spanning tree algorithm. With reference to switch 114, for example, assume that port number three, which is coupled to backbone switch 122, is the root port for switch 114 and thus in the forwarding state. Pursuant to the Enable_Uplinkfast command 330, port numbers two and four, which also connect switch 114 to the backbone switches (i.e., backbone switches 122 and 124), are in the blocked state. If the link 128 coupled to the port number three at switch 114 fails, either one of these two other ports (i.e., port numbers two or four) will immediately transition to the forwarding state and begin receiving and sending messages.

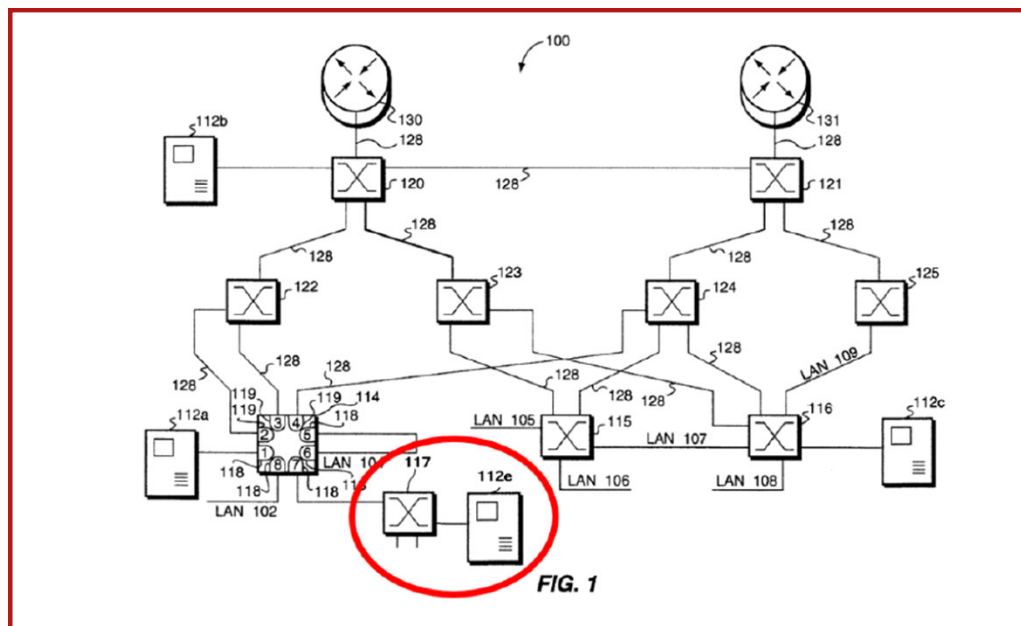


Petition at 15-17, 20; EX1005 (Gai) at 11:36-52

Petition at 40; EX1005 (Gai) at Fig. 1 (annotated)

Ground 1B Is Based On Gai's Teachings

through switch 114 on ports other than its root port. For example, if port number seven at switch 114 were coupled to another access switch, entity 234 would transmit multi-cast messages 400 carrying the source address of entities directly coupled to this additional access switch as well.



Petition at 69; Reply at 16-17; EX1005 (Gai) at 13:59-63, Fig. 1 (annotated)
DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Even If Gai Is Modified, It Would Have Been Obvious To Send Dummy Network Traffic Downstream

When a signalling link or port fails, a signalling link layer which provides the functionality of order and flow control at each end of the failed link will detect that the link is no longer functioning. Pursuant to typical signalling protocols, this causes the signalling entities adjacent to the link failure to tear down or release all switched connections which utilize the failed signalling link or port. In both the upstream and downstream directions of a signalling link failure, all virtual connections which utilize the signalling link are typically released along the end-to-end path towards the end users. In the case of SVC type connections, these connec-

Reply at 12; EX1012 (Burns) at 2:64-3:7

When the switching network entity **140** detects a failure of a signalling link, it begins sending release messages to the sources or destinations of the connections that had been using the failed signalling link. A similar procedure is

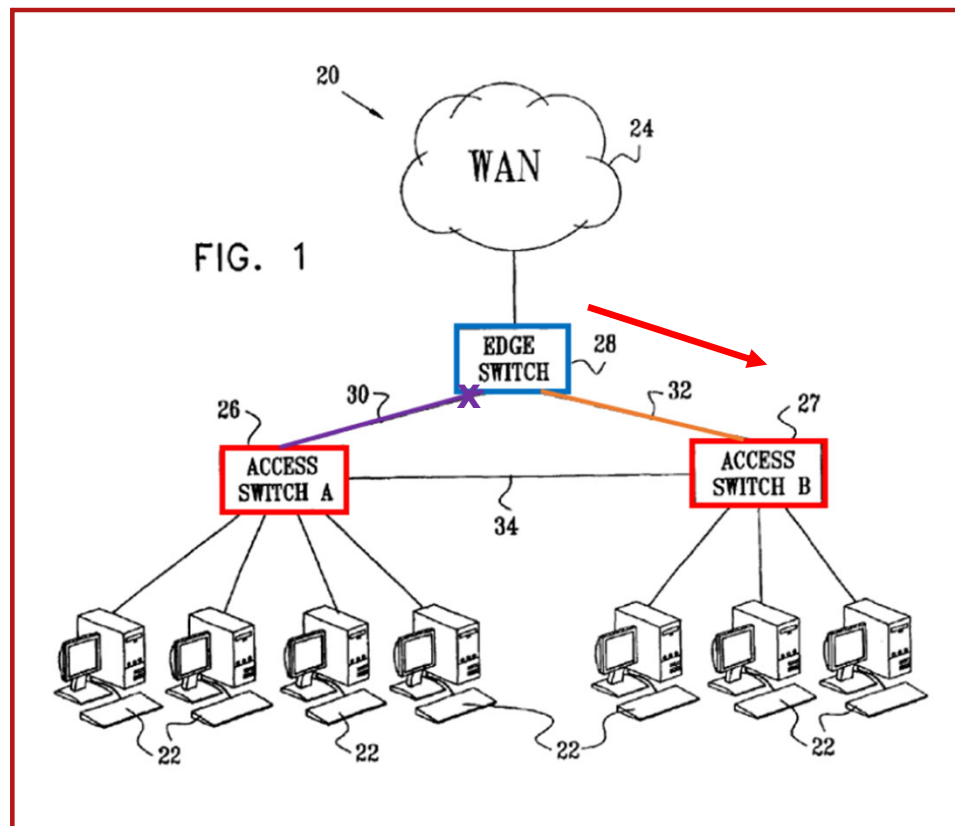
Reply at 12; EX1012 (Burns) at 12:40-43

Disputed Issue #3

Claims 1, 11-13, 23-24: Whether Cisco's Ground 1A Invalidates
Claims 1, 11-13, 23-24

Claims 1 And 13 Of The '986 Patent Require Sending Dummy Traffic From An Edge Switch To Access Switches

1. A method for network communication, comprising:
coupling an edge switch in a network to one or more access switches via at least first and second redundant links, respectively connected to first and second ports of the edge switch;
placing the first port in an active state, while placing the second port in a blocking state;
conveying communication traffic over the first link while the first port is in the active state, thereby causing each of the switches to build a respective database for use in forwarding the traffic;
responsive to a failure associated with the first link, placing the second port in the active state and the first port in the blocking state; and
sending dummy traffic from the edge switch over the second link to the one or more access switches, so as to cause each of the one or more access switches to modify its respective database responsive to the second port being in the active state.



Petition at 30; EX1001 ('986 Patent) at Claim 1, Fig. 1 (annotated)

Gai's Novel Commands Can Be Entered At Access Or Backbone Switches

In the illustrated embodiment, the method and apparatus manifests, in part, as a series of novel commands that may be entered at the devices. The devices, moreover, may be classified as either access switches or backbone switches.

Reply at 10; EX1005 (Gai) at 6:6-9

Gai's Method Can Also be Implemented on Edge Switches

First, Gai discusses how to implement fast network recovery generally and says it can be accomplished using commands on both the access switches and edge switches¹⁰:

Institution Decision at 34

Patent Owner's Expert Conceded That A POSITA Would Understand That A Failure In Gai Could Occur In Switch 124

Q And so a person of ordinary skill in the art could have understood that a failure could be detected at switches 114 through 116 or 120 through 125 in Gai, right?

A Yes.

Q And so one possible example is that it's possible that a failure could occur at switch 124, for example, right?

A It's possible that a failure could occur at switch 124, yes.

* * *

Q And so earlier we discussed how failures could occur at other devices in a network and we discussed that one example of a device that could have a failure at a link or a port is switch 124, right?

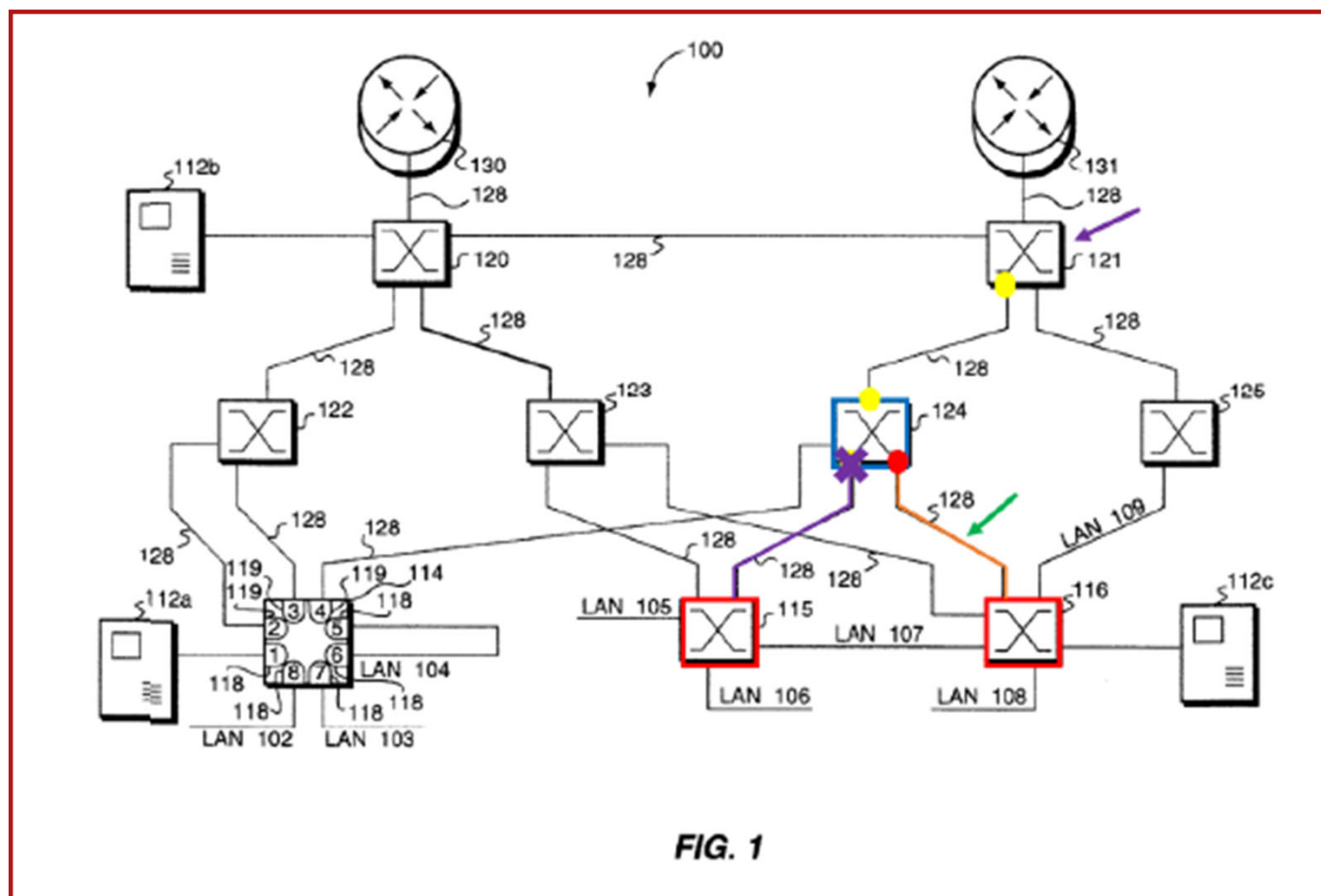
A Correct.

Reply at 6; EX1018 (Olivier Dep. Tr.) at 61:14-62:1, 67:9-14

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Applying Gai's Teachings To Edge Switch 124 Demonstrates Invalidity



Petition at 41-42; EX1005 (Gai) at Fig. 1 (annotated)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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The Institution Decision Rejected Both Of Patent Owner's Arguments

Switch 124 is not an edge switch.

Id. Therefore, after a failure and switchover, edge switch 124 transmits dummy traffic to access switch 116 over the second link. *Id.* Based on the current record, we agree that this example is at least suggested by Gai's teaching that "the method and apparatus manifests, in part, as a series of novel commands that may be entered at the devices. The devices, moreover, may be classified as either access switches or backbone switches."

Ex. 1005, 6:6–9. Switch 124 is a backbone switch because it interconnects at least access switches 114–116, and, according to Gai, the invention can be implemented on that switch by entering the corresponding commands on it.

Id. The rest of the example, whereby ports are switched based on a failure and dummy traffic that is transmitted to the access switches updates their filtering databases, also follows Gai's teaching. Pet. 39–46; Ex. 1005, 5:35–6:12.

Gai's disclosure is limited to only switch 114.

switch 124." *Id.* at 11. Patent Owner appears to be trying to limit Gai's teaching to the preferred embodiment that describes the failure occurring at switch 114, which we do not find warranted in view of the general teaching from Gai discussed above saying the invention can also be implemented on backbone switches. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1076 (Fed. Cir. 2015) ("A reference must be considered for everything it teaches.").

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Institution Decision at 36-37 34

Claims 11-12 And 23-24 Of The '986 Patent Require Sending Dummy Traffic Downstream

11. A method according to claim 1, wherein sending the dummy traffic comprises sending data frames downstream from the edge switch toward the access switches.

12. A method for network communication, comprising:
coupling a first bridge in a network to a second bridge located downstream of the first bridge, by connecting at least first and second redundant links to respective first and second ports of the first bridge so as to communicate with the second bridge;
placing the first port in an active state, while placing the second port in a blocking state;
conveying communication traffic over the first link while the first port is in the active state, thereby causing the bridges to build respective databases for use in forwarding the traffic;
responsive to a failure associated with the first link, placing the second port in the active state and the first port in the blocking state; and
sending dummy traffic from the first bridge over the second link downstream to the second bridge, so as to cause the second bridge to modify its database responsive to the second port being in the active state.

23. A device according to claim 13, wherein the dummy traffic comprises data frames sent downstream from the edge switch toward the access switches.

24. A bridge device for use in a communication network having a spanning tree root, the device comprising:
a designated port, adapted to be coupled over an upstream link in the network so as to communicate with the root;
first and second downstream ports, adapted to be coupled via first and second redundant links to a further bridge device located downstream in the network relative to the spanning tree root; and
a protocol processor, which is adapted to place the first downstream port in an active state, while placing the second downstream port in a blocking state, so that communication traffic is conveyed over the first downstream link while the first port is in the active state, thereby causing the bridge devices to build respective databases for use in forwarding the traffic, the protocol processor being further adapted, responsive to a failure associated with the first link, to place the second downstream port in the active state and to send dummy traffic over the second link downstream to the further bridge device, so as to cause the further bridge device to modify its database responsive to the second downstream port being in the active state.

Sending Traffic Downstream Means Away From The Root

For any network that implements an STP (such as the networks in the '986 patent and Gai) a switch must be designated as root switch for the STP algorithm to work correctly. Ex. 1005, 2:42–44 (“[E]xecution of the spanning tree algorithm causes the switches to elect a single switch, among all of the switches within each network, to be the ‘root’ switch.”). Network traffic that is going towards, or getting closer to, the root switch is going upstream, and network traffic that is going away from the root is going downstream. *Id.* at 5:54–60. In the preferred embodiment in Gai shown

Institution Decision at 43–44

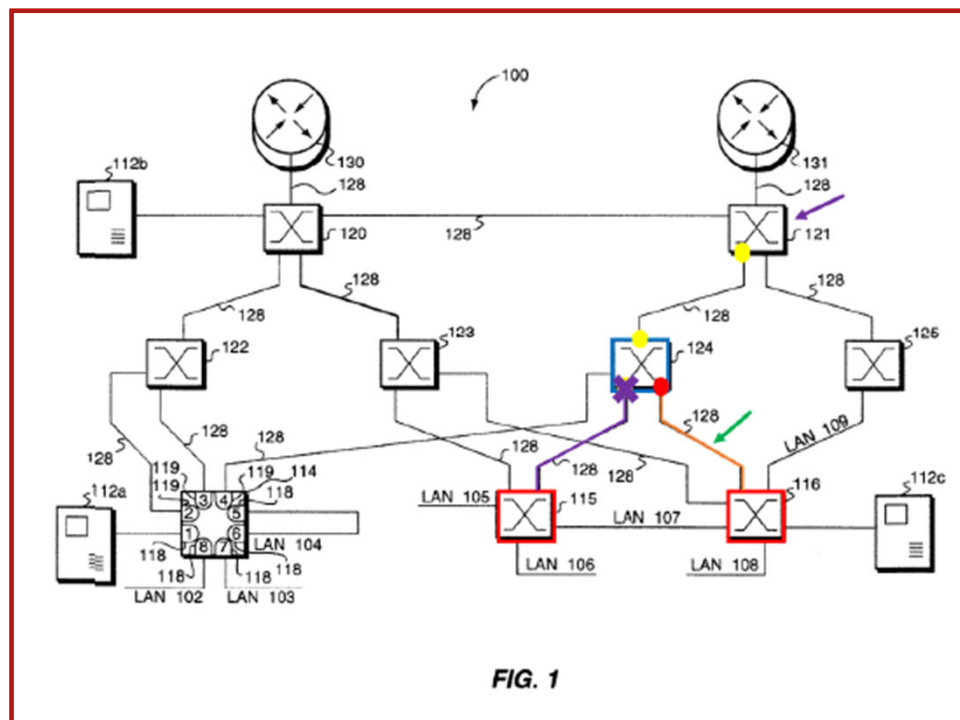
Dummy Messages Are Sent Downstream From Root Switch 121

accordance with the present invention. For example, assume that backbone switch 121 (FIG. 1) is the root and that port number three at access switch 114 is the root port, since the link 128 coupled to port number four (which represents a better path cost to root 121) is failed. If the link 128 coupled

Petition at 41; EX1005 (Gai) at 14:16-17

downstream. *Id.* at 5:54–60. In the preferred embodiment in Gai shown with respect to Figure 1, either switch 120 or switch 121 is selected as the root (in different discussions in the specification) and therefore sending dummy traffic from switch 114 port 4 to switch 124 over the second link as shown in the preferred embodiment after a failure, is sending the dummy traffic upstream. *Id.* at Fig. 1, 7:3–61, 8:57–62, 11:35–52. In view of this,

Institution Decision at 44



Petition at 42; EX1005 (Gai) at Fig. 1 (annotated)

Gai's Continuation Application Further Confirms That Downstream Transmission Of Dummy Messages Is Disclosed By Gai

US007848264B1

(12) **United States Patent**
Gai et al.

(10) Patent No.: **US 7,848,264 B1**
(45) Date of Patent: **Dec. 7, 2010**

(54) **METHOD AND APPARATUS FOR RAPIDLY RECONFIGURING COMPUTER NETWORKS**

(75) Inventors: **Silvano Gai**, Vigliano d'Asi (IT); **Keith McCloghrie**, San Jose, CA (US); **Dinesh G. Dutt**, Santa Clara, CA (US)

(73) Assignee: **Cisco Technology, Inc.**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1110 days.

(21) Appl. No.: 11/113,600
(22) Filed: **Apr. 25, 2005**

Related U.S. Application Data
(60) Continuation of application No. 10/259,959, filed on Sep. 27, 2002, now Pat. No. 6,976,088, which is a continuation of application No. 09/450,891, filed on Nov. 29, 1999, now Pat. No. 6,535,491, which is a division of application No. 08/998,412, filed on Dec. 24, 1997, now Pat. No. 6,032,194.

(51) Int. Cl. **H04L 12/28** (2006.01)
(52) U.S. Cl. **370/256; 370/401**
(58) **Field of Classification Search** **370/256, 370/390, 432, 401, 254, 255, 428; 709/239, 709/242**
See application file for complete search history.

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(Continued)

Primary Examiner—Salman Ahmed
(74) **Attorney, Agent, or Firm**—Cesari and McKenna, LLP

(57) **ABSTRACT**
A method for operating a computer network includes: a become_root_primary command is issued to a first router to set an ID so that a spanning tree protocol (STP) selects the first router as a primary root router; a become_root_secondary command is issued to a second router to set an ID so that STP selects the second router as a secondary root router; transitioning, in response to failure of the first router, the second router to become the root router. An enable_uplinkfast command is issued to a router, and the router selects a backup designated port for a designated port, and selects a backup root port for a root port. Ports transmit BPDU messages as heartbeat messages, and a failure to detect the BPDU messages results in a backup port assuming the role of a port not detecting the BPDU messages.

14 Claims, 8 Drawing Sheets

IPR2024-0050/
Cisco Systems, Inc. v. Portsmouth Network Corp
Cisco's Exhibit 100i

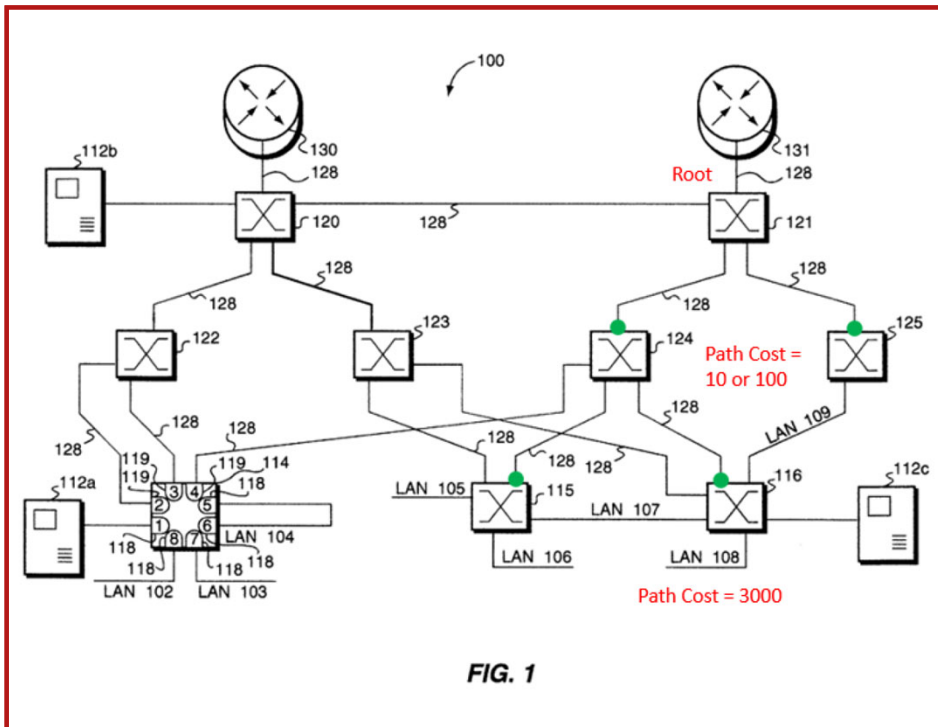
1. A method for operating a router, comprising:
 executing a spanning tree protocol to select a first port as a root port and to select a second port as a designated port and to place both the root port and the designated port in a forwarding state, the root port for communication with a root router and the designated port to communicate with at least one router in a lower leaf of a spanning tree established by executing the spanning tree protocol;
 selecting a third port as a back-up designated port and placing the back-up designated port in a blocked state;
 detecting a link failure;
 transitioning by the spanning tree protocol, in response to detecting the failure, the designated port into the blocked state and the back-up designated port into the forwarding state, without the spanning tree protocol transitioning the back-up designated port through any intermediary states in moving from the blocked state to the forwarding state; and
transmitting, by the back-up designated port, one or more messages, the messages to tell devices downstream in the spanning tree that the router has a new designated port.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Petition at 43, 102; EX1006 at Claim 1

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Patent Owner Claims That Switch 121 Cannot Be The Root Switch Because Gai Purportedly Teaches Away From This Configuration



accordance with the present invention. For example, assume that backbone switch 121 (FIG. 1) is the root and that port number three at access switch 114 is the root port, since the link 128 coupled to port number four (which represents a better path cost to root 121) is failed. If the link 128 coupled

Petition at 41; EX1005 (Gai) at 14:16-17

POR at 22-25; EX1005 (Gai) at Fig. 1 (annotated)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Patent Owner's Path Cost Examples Are Non-Limiting

where switch 121 is the root and switch 124 is the edge switch/first bridge. *Id.* But a POSITA would understand that the path costs Patent Owner relies on are examples and could be different values in different networks, and that selecting a root port with the lowest-cost path to the root is not a required implementation. Further, the Board already recognized that Gai's invention could be applied to edge switch/first bridge 124 in Petitioner's annotated Figure 1, and that "the transmission of the dummy message after activating the red port is downstream over the second link because it is getting further away from the root switches (either switch 120 or switch 121)." Decision, 45-46.

Reply at 16

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

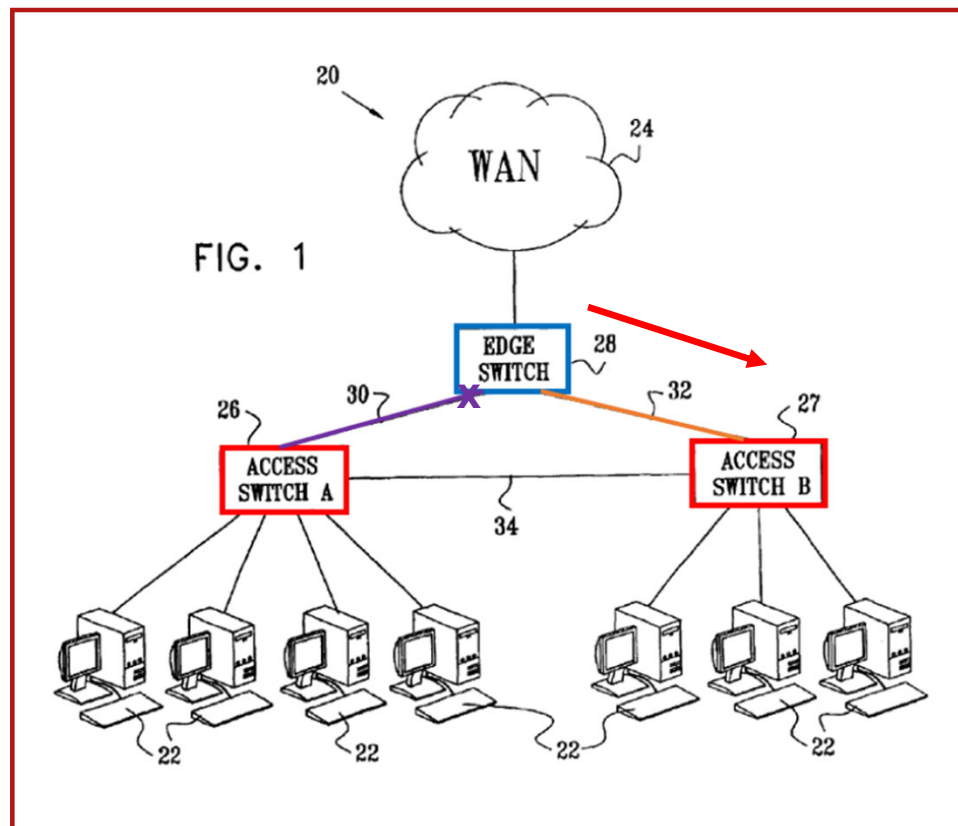
40

Disputed Issue #4

Claims 1, 11-13, 23-24: Whether Cisco's Ground 1B Invalidates
Claims 1, 11-13, and 23-24

Claims 1 And 13 Of The '986 Patent Require Sending Dummy Traffic From An Edge Switch To Access Switches

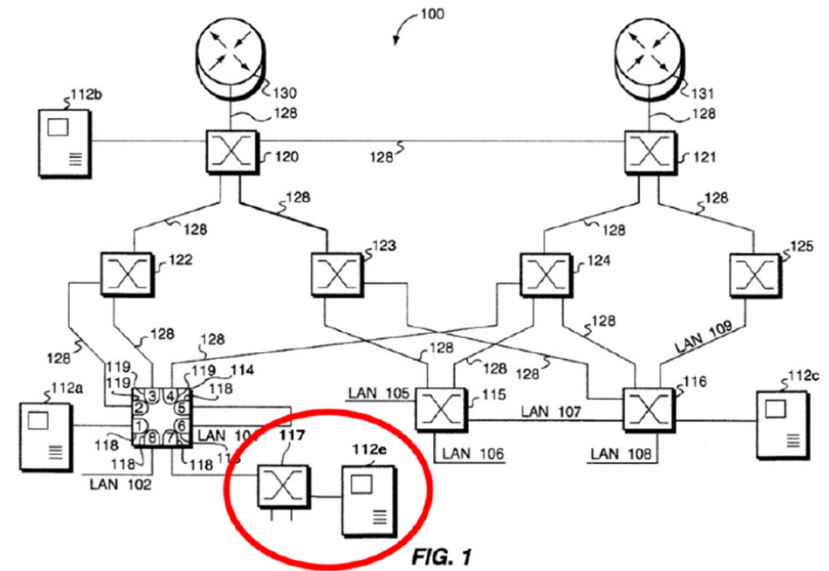
1. A method for network communication, comprising:
coupling an edge switch in a network to one or more access switches via at least first and second redundant links, respectively connected to first and second ports of the edge switch;
placing the first port in an active state, while placing the second port in a blocking state;
conveying communication traffic over the first link while the first port is in the active state, thereby causing each of the switches to build a respective database for use in forwarding the traffic;
responsive to a failure associated with the first link, placing the second port in the active state and the first port in the blocking state; and
sending dummy traffic from the edge switch over the second link to the one or more access switches, so as to cause each of the one or more access switches to modify its respective database responsive to the second port being in the active state.



Petition at 30; EX1001 ('986 Patent) at Claim 1, Fig. 1 (annotated)

Gai Explicitly Discloses Adding An Extra Access Switch 117 To Switch 114

Gai's teachings apply to variations of the network of Figure 1. EX1005, 7:41-44 ("[T]he network 100 of FIG. 1 is meant for illustrative purposes only and that the present invention will operate with other network designs having possibly far more complex topologies."). Gai's upstream embodiment is discussed in connection with a modified Figure 1. For example, Gai discloses that port seven of switch 114 can be coupled to another switch. EX1005, 13:60-63 ("[I]f port number seven at switch 114 were *coupled to another access switch*, entity 234 would transmit multicast messages 400 carrying the source address of *entities directly coupled to this additional access switch* as well."). Such network is illustrated below:



Petition at 69; EX1005 (Gai) at Fig. 1 (annotated)

Gai Discloses Sending Messages From Ports 2 Or 4, After Port 3 Fails

tional operation of the spanning tree algorithm. With reference to switch **114**, for example, assume that port number three, which is coupled to backbone switch **122**, is the root port for switch **114** and thus in the forwarding state. Pursuant to the Enable_Uplinkfast command **330**, port numbers two and four, which also connect switch **114** to the backbone switches (i.e., backbone switches **122** and **124**), are in the blocked state. If the link **128** coupled to the port number three at switch **114** fails, either one of these two other ports (i.e., port numbers two or four) will immediately transition to the forwarding state and begin receiving and sending messages.

Petition at 39-40; EX1005 (Gai) at 11:41-52

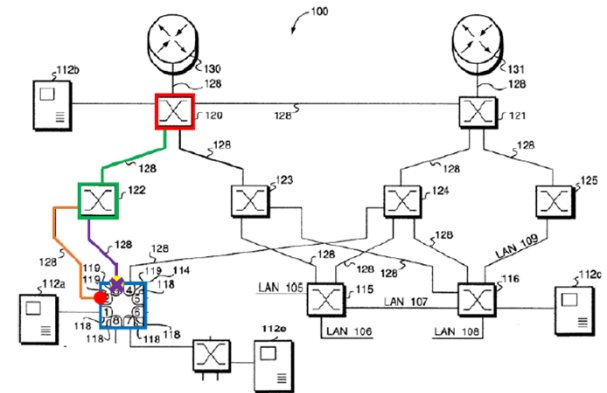


FIG. 1

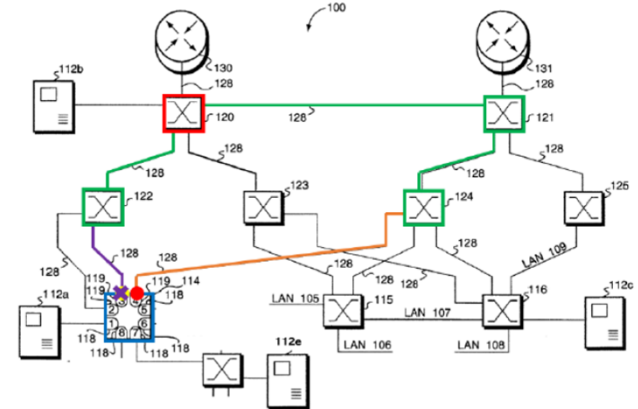


FIG. 1

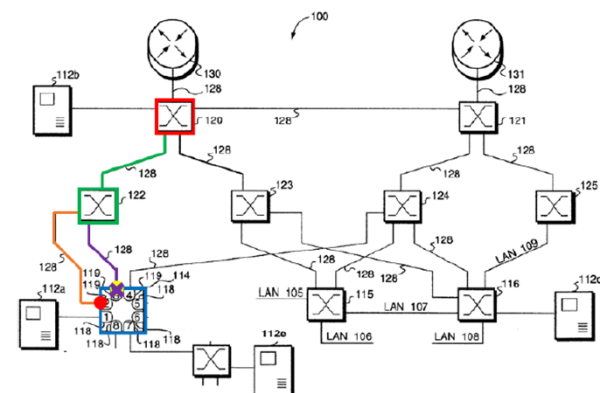
Petition at 86; EX1005 (Gai) at Fig. 1 (annotated)

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

44

Thus, The Addition Of Switch 117 Turns Switch 114 Into An Edge Switch

Petition, 83-84 (EX1005, Figure 1 (annotated)). But Petitioner's annotations reflect Gai's disclosure that "if port number seven at switch 114 were *coupled to another access switch*, entity 234 would transmit multicast messages 400 carrying the source address of *entities directly coupled to this additional access switch* as well," *i.e.*, the addition of another switch connected to port 7 of switch 114 would transform access switch 114 into edge switch 114. See EX1005, 13:60-63. And the Board already agreed, finding that access switch 114 became edge switch 114 under the '986 patent's characterizations upon the addition of another access switch, and that "*edge switch 114* sends dummy traffic over the second link, which is to edge switch 124, and then the dummy traffic is further transmitted to multiple switches, including switch 121, and then to *access switch 120*, causing that switch to update its filtering database." Decision, 38-39.



Switch 120 Is An Access Switch Pursuant To The '986 Patent's Definition

Further, Patent Owner's argument that switch 120 cannot be considered an access switch because it is described as a backbone switch in one embodiment of Gai is wrong. Pursuant to the '986 patent's definition of "access switch," which was adopted by the Board, "[s]witch 120 is an access switch, since it has a port that is connected to server 112b, and thus has 'ports that connect to LANs and/or other network endpoints, such as user computer systems.' Ex. 1001, 1:31-33; Ex. 1005, 7:19-22[.]" Decision, 39; *see also id.*, 25, n.9. Even Dr. Olivier agrees switch 120 is an access switch. EX1018, 85:10-86:7.

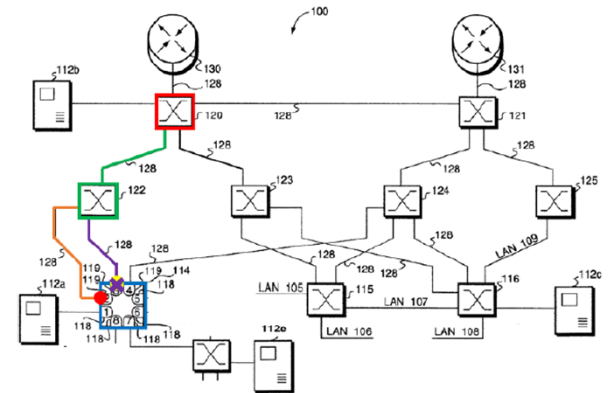


FIG. 1

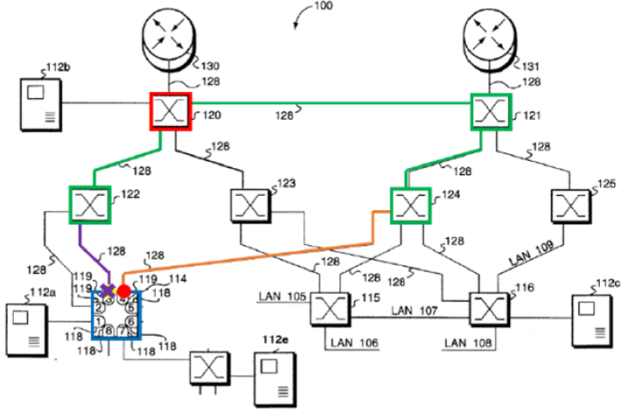


FIG. 1

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Reply at 21-22; EX1005 (Gai) at Fig. 1 (annotated) 46

This Is Consistent With The Board's Preliminary Finding

This modified Figure 1 shows network 100 with a link from port 7 of switch 114 to a newly added access switch 117 and server 112e, shown in a red circle. *Id.* According to Petitioner, in this example switch 114 is now an edge switch because it “is a core switch (a switch that interconnects access switches 115–117, 120, and 125 into a WAN, e.g., by direct connection between core switch 114 and access switch 117) that is directly connected to access switch (switch 117).” *Id.* at 70. Based on the current record, we are persuaded that applying this modification to the preferred embodiment constitutes “sending dummy traffic from the edge switch over the second link to the one or more access switches,” because edge switch 114 sends dummy traffic over the second link, which is to edge switch 124, and then the dummy traffic is further transmitted to multiple switches, including switch 121, and then to access switch 120, causing that switch to update its filtering database.¹¹ *Id.* at 81.

Institution Decision at 38

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Claims 11-12 And 23-24 Of The '986 Patent Require Sending Dummy Traffic Downstream

11. A method according to claim 1, wherein sending the dummy traffic comprises sending data frames downstream from the edge switch toward the access switches.

12. A method for network communication, comprising:
coupling a first bridge in a network to a second bridge located downstream of the first bridge, by connecting at least first and second redundant links to respective first and second ports of the first bridge so as to communicate with the second bridge;
placing the first port in an active state, while placing the second port in a blocking state;
conveying communication traffic over the first link while the first port is in the active state, thereby causing the bridges to build respective databases for use in forwarding the traffic;
responsive to a failure associated with the first link, placing the second port in the active state and the first port in the blocking state; and
sending dummy traffic from the first bridge over the second link downstream to the second bridge, so as to cause the second bridge to modify its database responsive to the second port being in the active state.

23. A device according to claim 13, wherein the dummy traffic comprises data frames sent downstream from the edge switch toward the access switches.

24. A bridge device for use in a communication network having a spanning tree root, the device comprising:
a designated port, adapted to be coupled over an upstream link in the network so as to communicate with the root;
first and second downstream ports, adapted to be coupled via first and second redundant links to a further bridge device located downstream in the network relative to the spanning tree root; and
a protocol processor, which is adapted to place the first downstream port in an active state, while placing the second downstream port in a blocking state, so that communication traffic is conveyed over the first downstream link while the first port is in the active state, thereby causing the bridge devices to build respective databases for use in forwarding the traffic, the protocol processor being further adapted, responsive to a failure associated with the first link, to place the second downstream port in the active state and to send dummy traffic over the second link downstream to the further bridge device, so as to cause the further bridge device to modify its database responsive to the second downstream port being in the active state.

Patent Owner's Expert Agrees Access Switches (Like 117) Can Be Roots

Q Correct. So under the '986 patent's definition switch 117 would be considered an access switch?

A Yes.

* * *

Q Outside the teachings of Gai an access switch can be selected as the root, correct?

* * *

A Hypothetically depending on the network a switch connected directly to a user could be the root, especially in very simple networks. I'm thinking like the ones we teach in class where every switch is connected to a user in addition to other switches and we have redundant switches. So in that situation we'd select one root switch out of all what you would call access switches.

Reply at 17-18; EX1018 (Olivier Dep. Tr.) at 85:6-9, 98:1-11

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

49

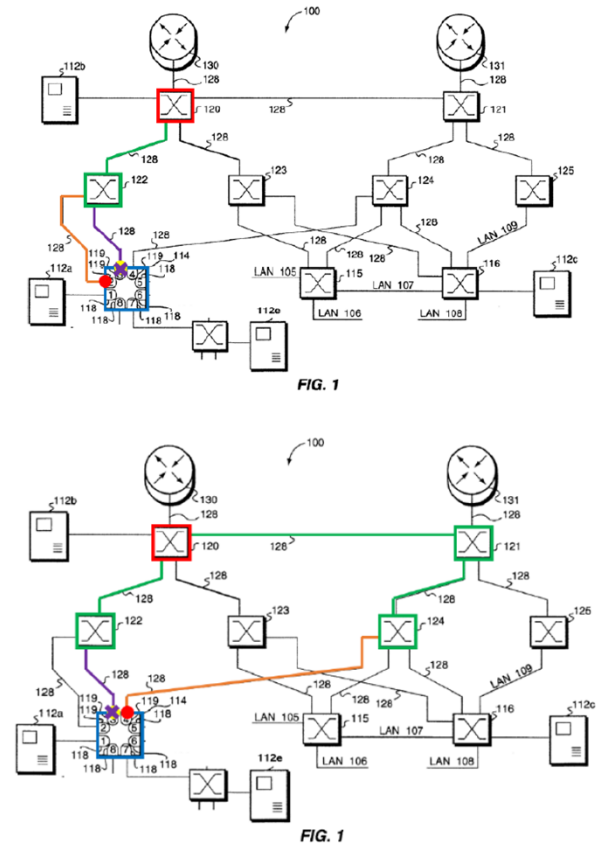
Gai Teaches That One Way To Select The Root Would Be Choosing The Switch With The Lowest ID

Based on the current record, we are not persuaded by Patent Owner's argument. Gai teaches that it is possible that any switch can be designated as the root switch, but cautions that designating an access switch as root may be inefficient "[d]epending on the configuration" and gives reasons why that may be the case. Ex. 1005, 3:17–19, 10:29–34 ("The conventional spanning tree algorithm, however, simply selects the switch having the lowest ID to become the root, regardless of where in the network 100 this switch is located. As a result, an access switch is often elected to be the root.").

Institution Decision at 48

First Bridge 114 Sends Dummy Traffic Away From Root Switch 117, *i.e.*, Downstream

Limitation 12e adds that the “dummy traffic” is sent downstream (away from the root switch). See EX1001, 3:30-31. Gai renders obvious this additional limitation. For example, Figure 1 “assume[s] that backbone *switch 121*...is the root...” EX1005, 14:16-17. But, as discussed in Section III.A.2, any switch in the network can be the root, e.g., the switch with the lowest switch identifier. EX1005, 2:42-47; 10:29-33; 3:17-39. Accordingly, it would have been obvious that *first bridge 114* would send dummy traffic downstream through the new active ports (indicated by the red dot) over *link 128*, away from the root switch and towards *second bridge 120*, if switch 117 was the root, because, e.g., it was the switch with the lowest switch identifier.



Patent Owner's Expert Agrees First Bridge 114 Sends Dummy Traffic Away From Root Switch 117 *i.e.*, Downstream

Q So let's take the example where the new forwarding port is port number 4. You would agree that switch 114 would then send dummy messages out of port number towards switch 124, right?

A Correct.

Q And sending some traffic from switch 114 to switch 124 would be sending dummy traffic away from switch 117, right?

A Yes. It is sending traffic away from switch 117.

Reply at 19; EX1018 (Olivier Dep. Tr.) at 97:1-10

Disputed Issue #5

Claims 6 And 18: Whether Data Frames Contain Source Addresses
Of Other Entities

Claims 6 And 18 Of The '986 Patent Require Data Frames With Source Addresses Of Other Accessible Entities In The Network

6. A method according to claim **1**, wherein sending the dummy traffic comprises sending data frames originating at the edge switch while having source addresses corresponding to network addresses of other entities in the network that are accessible to the access switches via the edge switch.

18. A device according to claim **13**, wherein the dummy traffic comprises data frames originating at the edge switch while having source addresses corresponding to network addresses of other entities in the network that are accessible to the access switches via the edge switch.

Patent Owner Does Not Contest This Disclosure; Instead, Patent Owner Reiterates Its Argument Regarding Gai's Preferred Embodiment

E. Defendant Claims 6 and 18

Petitioner incorrectly argues that “Patent Owner’s claim that Gai only teaches dummy traffic originating at access switch 114 is rebutted by Gai’s disclosures.” Reply, 24. In fact, Petitioner points to no disclosure from *Gai*, but rather relies on its own manufactured embodiment based on what it purports are *Gai*’s teachings. *Id.* Moreover, Patent Owner is not relying on “Gai’s preferred embodiment,” but is instead relying on Gai’s express disclosure that switch 114 is an access switch and not an edge switch. POR, 39. Thus, for the same reasons as discussed above, Petitioner fails to render obvious claims 6 and 18.

Gai Teaches Dummy Multicast Messages Carrying Source Addresses

Upon transition to the new forwarding port, the device begins transmitting “dummy” multicast messages through the new port. These dummy multicast messages carry the source address of each entity that is directly coupled to the device with the new active port or downstream thereof (relative to the root) and are received by other devices in the computer network. Upon receipt, the other devices examine

Petition at 59; EX1005 (Gai) at 5:54-60

Disputed Issue #6

Claims 5 And 17: Whether Switch Databases Are Updated Before Sending Communication Traffic

Claims 5 And 17 Of The '986 Patent Require Updating The Edge Switch Database Before Receiving Communication Traffic From Access Switches

5. A method according to claim **4**, wherein updating the database comprises changing the entries in the database to point to the second port before receiving the communication traffic from the one or more access switches on the second port.

17. A device according to claim **16**, wherein the protocol processor is adapted to update the entries in the database to point to the second access port before receiving the communication traffic from the one or more access switches on the second port.

Claims 5 And 17 Depend On Claims 4 And 16, Respectively

4. A method according to claim 1, and comprising, responsive to placing the second port in the active state, updating the database of the edge switch so that entries in the database point to the second port instead of the first port.

16. A device according to claim 13, and comprising a memory, wherein the protocol processor is adapted to build an edge switch database in the memory responsive to the communication traffic prior to the failure associated with the first link and, responsive to placing the second access port in the active state, to update the edge switch database so that entries in the edge switch database point to the second access port instead of the first access port.

As Petitioner Showed In Claim 4, Gai Discloses That The Edge Switch Updates Its Database To Send Dummy Traffic Through The New Port

Gai discloses and/or renders obvious this limitation. For example, Gai discloses that a switch, e.g., the edge switch, discards old information in their databases after a port transitions to an active state. EX1005, 4:30-34. (“As ports transition between the blocked and forwarding states...To prevent switches from distributing messages based upon incorrect information, *switches* quickly age-out and *discard the ‘old’ information in their filtering databases.*”). EX1003, ¶133.

Gai also discloses that “[s]witch 114...informs the other devices of its new forwarding port by transmitting dummy multicast packets *through the new port...*” EX1005, 12:62-65. A POSITA would have understood that the contents, e.g., the port information, of the edge switch database would be updated to identify the new port for a particular entity, such that the dummy message(s) and/or communication messages would be transmitted from the appropriate port. EX1003, ¶135.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Petition at 55-56 60

As Petitioner Showed In Claims 1 and 12, Access Switches Update Their Databases In Response To Receiving Dummy Traffic

Gai discloses that the switch that receives the dummy message from the new port enters this information in its filtering database such that this new port information is used when the switch sends a message to the newly activated port.
For example, in connection with the example of a failure at port 3 of switch 114, Gai discloses:

Since the multicast message 400 having the source address of server 112a was received by backbone switch 124 at *a new source port, this new location information is entered by backbone switch 124 into its filtering database*, replacing the previous information that was stored therein. Thereafter, if backbone switch 124 receives a message intended for server 112a, *it will use this new destination port* and the message will be received at port number four of switch 114, which is now capable of receiving and forwarding messages...Backbone switch 124 distributes the multicast message 400 through all of its forwarding ports *so that other devices, as necessary, may learn of the new forwarding port....*

EX1005, 13:34-49; *see also*, 12:66-13:33; 13:66-14:3. EX1003, ¶110.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Petition at 45 61

Patent Owner's Expert Confirmed Access Switches Update Their Databases In Response To Receiving Dummy Traffic In Order To Send Regular Network Traffic Towards The New Forwarding Port

Q The switches that receive the dummy multicast messages use them to update their own databases to reflect the new forwarding port, right?

A Correct.

Q And then once the databases are updated to reflect the new forwarding port, switches can then send regular network traffic towards the new forwarding port, right?

A Yeah. It's not remembering forwarding ports as it is remembering what the source addresses it received on that particular port and how to send if he [sic] has a destination packet with the destination address equal to that source address to send it out that port.

Reply at 28; EX1018 (Olivier Dep. Tr.) at 110:15-111:6

Without Updating The Access Switch Database From The Dummy Traffic, Communication Traffic Would Be Lost Or Misdirected

A POSITA would have also understood that the edge switch's database entries must be updated "before receiving the communication traffic from one or more access switches on the second port." Without updating the edge switch's database to point to the second port—which then allows the edge switch to send the dummy multicast messages to the access switches to inform them to update their own databases (*see id.*)—the access switches would not know how to send communication traffic to the second port on the edge switch. At bottom, the access switches must update their own databases in response to receiving the dummy multicast messages before sending communication traffic over the new active port to prevent message loss. *See* EX1005, 12:59-62 ("Thus, the identity of the new root port (e.g., port number four) must be propagated to the other devices, such as access switches 115-116 and backbone switches 120-125 to prevent messages from being lost or misdirected."). Dr. Olivier confirmed these facts. EX1018, 110:15-111:6, 120:6-16.

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Reply at 27-28 63

Patent Owner's Expert Admitted To Reading Gai's Disclosures Relating To How Databases Are Updated Before Sending Traffic

Q So a switch that is then sending dummy multicast messages out of its new forwarding port would first need to update its database to reflect the new forwarding port, right?

A Well, it needs to update the information to use it. The -- I don't recall in the '914 patent [sic] how they described how that works, where that database or how that's kept. I think it's in there, though. I remember reading it.

* * *

Q Just to tie this up, some information storage needs to know that the new forwarding port has been selected in order to begin transmitting the dummy multicast messages out of that port, right?

A Correct.

Reply at 27; EX1018 (Olivier Dep. Tr.) at 107:19-108:5, 109:22-110:4

Patent Owner Forfeited Any Argument About Claims 5 And 17 By Failing To Raise Them In Its Response

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Paper 8
Date: August 6, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner,

v.

PORTSMOUTH NETWORK CORP.,
Patent Owner.

IPR2024-00505
Patent 6,917,986 B2

Before JUSTIN T. ARBES, CHARLES J. BOUDREAU, and
PETER D. SHAPIRO, *Administrative Patent Judges*.

SHAPIRO, *Administrative Patent Judge*.

SCHEDULING ORDER

IPR2024-00505
Cisco Systems, Inc. v. Portsmouth Network Corp.
Cisco's Exhibit 1017

1. DUE DATE 1

Patent Owner may file a response to the petition (37 C.F.R. § 42.120). If Patent Owner elects not to file a response, Patent Owner must arrange a conference call with the parties and the Board. Patent Owner is cautioned that any arguments not raised in the response may be deemed forfeited.

Reply at 25; EX1017 (Paper 8 – Scheduling Order) at 7

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Dr. Houh's Reliance On Only An "Upstream" Embodiment In Juniper's IPR2024-00893, Does Not Negate Cisco's "Downstream" Embodiment

¹ In fact, in a separate IPR challenging the '986 Patent, the Petitioner's expert recognized that *Gai* does not disclose downstream transmissions. *See, Juniper Networks, Inc. v. Portsmouth Network Corp.*, IPR2024-00893, Exhibit 2004 at 34:12-17. In fact, the Petition recognized that *Gai* did not disclose "downstream directionality" for dummy multicast messages, and suggested a motivation to modify using other references. IPR2024-00893, Pet., 45.

Sur-Reply at 4, n. 1

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

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Dr. Houh's Reliance On Only An "Upstream" Embodiment In Juniper's IPR2024-00893, Does Not Negate Cisco's "Downstream" Embodiment

With reference to downstream directionality, it would have been obvious to POSAs to send dummy multicast messages both upstream, as explained above, as well as downstream, for the benefit of reducing the total link failure recovery time because the link failure can be addressed by upstream and downstream switches in parallel. As explained above in §VII.A.3, POSAs would have been motivated, by IEEE 1999, to modify Gai to send dummy traffic downstream as well as upstream to achieve this benefit, and would have enjoyed a reasonable expectation of success in doing so. McNair, ¶173.

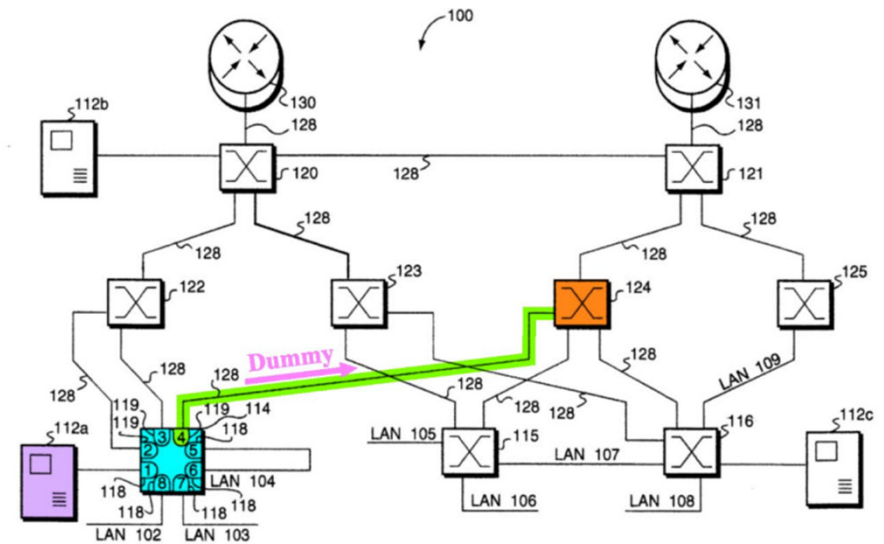


FIG. 1