

Cisco Systems, Inc., v. Portsmouth Network Corporation

PATENT OWNER *Portsmouth's* **PRESENTATION**

Inter Partes Review of
U.S. Patent No. 6,917,986

IPR2024-00505

1

Grounds

Ground	Claims	Basis
#1	1-2, 4-7, 9-14, 16-19, and 21-24	(§103) Gai

Roadmap

Ground 1A

Independent claims 1, 12, 13 & 24 (Dependent claims 2, 4-7, 9-11, 14, 16-19, 21-23)

Gai
(Downstream
Embodiment)

- Cited art is fundamentally different from the invention disclosed in the '986 Patent
- Cited art fails to teach limitations relating to sending dummy traffic "downstream" (1[e], 12[e], 13[f], 24[e])
- Cited art provides no support for Petitioner's proposed "downstream embodiment"

Ground 1B

Independent claims 1, 12, 13 & 24 (Dependent claims 2, 4-7, 9-11, 14, 16-19, 21-23)

Gai
(Upstream
Embodiment)

- Cited art is fundamentally different from the invention disclosed in the '986 Patent
- Cited art fails to teach limitations relating to sending dummy traffic "downstream" (1[e], 12[e], 13[f], 24[e])
- Cited art teaches away from Petitioner's proposed modifications

Roadmap

Ground 1A

Independent claims 1, 12, 13 & 24 (Dependent claims 2, 4-7, 9-11, 14, 16-19, 21-23)

Gai

***Gai* is Fundamentally Different from the
'986 Patent**

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

(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**

6,917,986 B2 1/2004 Nguyen

(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. (54(b)) by 734 days.

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

(22) Filed: **Jan. 7, 2002**

(65) **Prior Publication Data**

US 2003/008618 A1 Nov. 6, 2003

(51) Int. Cl. **G06F 15/173**

(52) U.S. Cl. **709/238, 709/206, 709/226,**

709/209, 709/259, 707/104, 370/396,

370/252, 370/352, 370/389

(58) Field of Search **709/238, 259,**

709/208, 209, 226; 707/104, 370/396,

252, 352, 389

(56) **References Cited**

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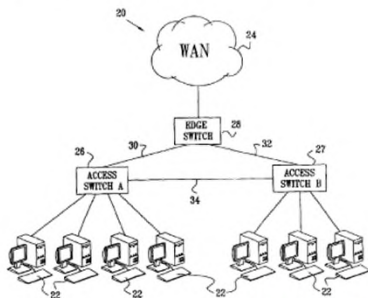
"IEEE Standard for Information Technology, Telecommu-
nications and Information Exchange between Systems,
Local and Metropolitan Area Network, Common Specifica-
tions, Part 3: Media Access Control (MAC) Bridges", Pub-
lished as ANSI/IEEE Standard 802.1D (1998). Available at:
standards.ieee.org/catalog/IEEE802.1.html.

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

(57) **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 data-
base 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

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

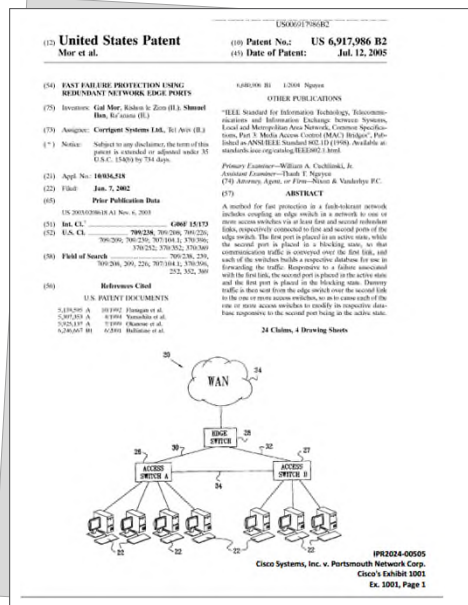
(10) Patent No.: **US 6,917,986 B2**
(45) Date of Patent: **Jul. 12, 2005**

(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)**

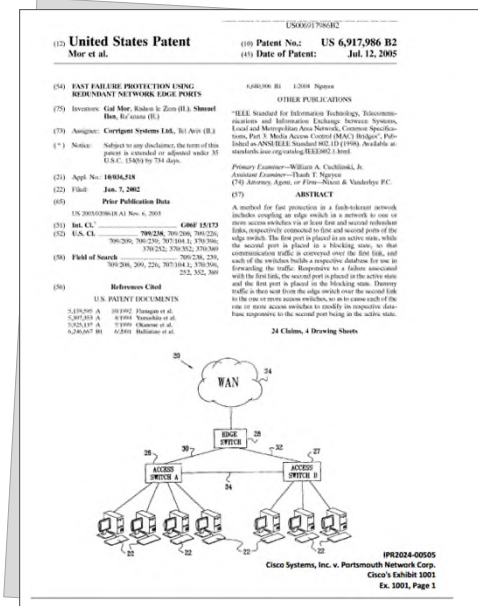
U.S. Patent No. 6,917,986 – Independent Claim 1



What is claimed is:

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.

U.S. Patent No. 6,917,986 – Independent Claim 12



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;

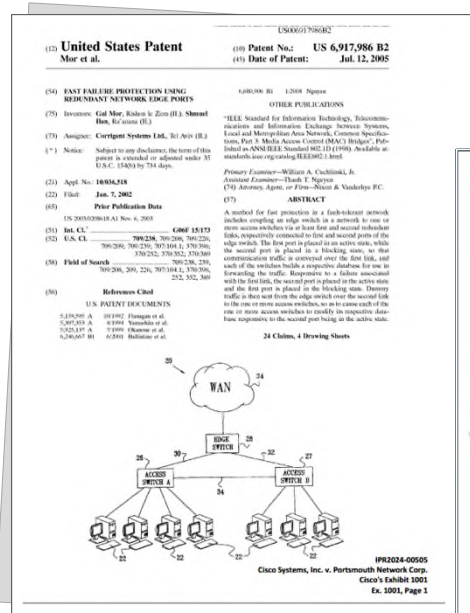
placing the first port in an active state, while placing the second port in a blocking state;

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

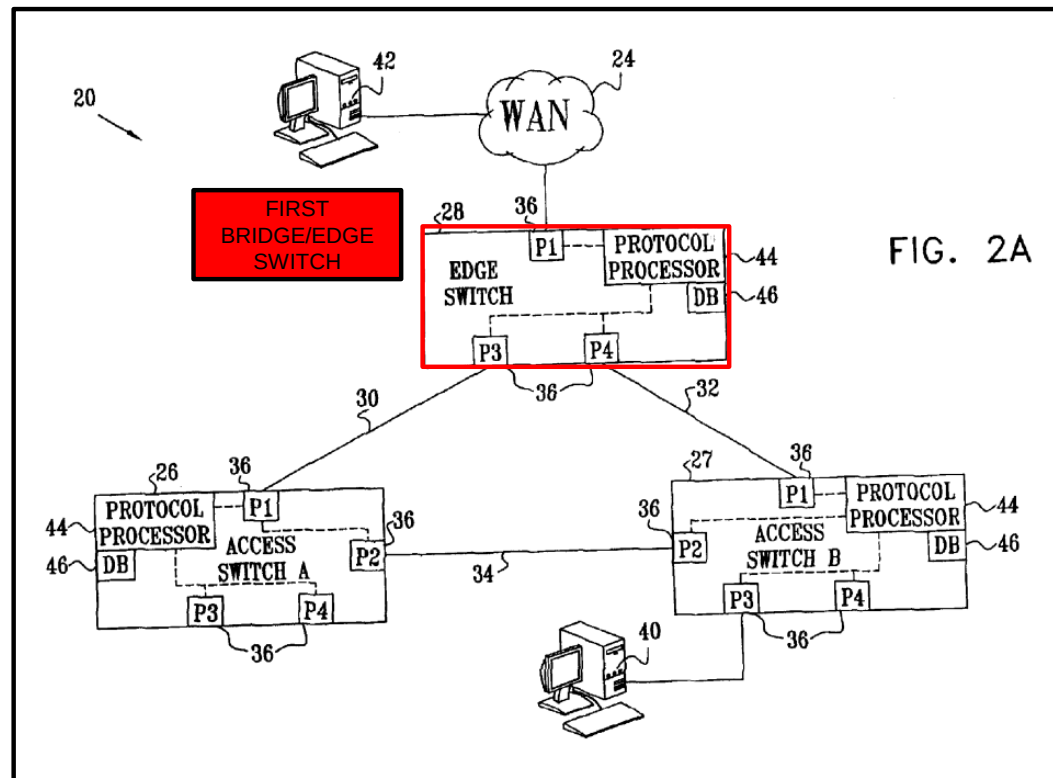
sending dummy traffic from the first bridge over the second link downstream to the second bridge, so as to cause the second bridge to modify its database responsive to the second port being in the active state.

The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover

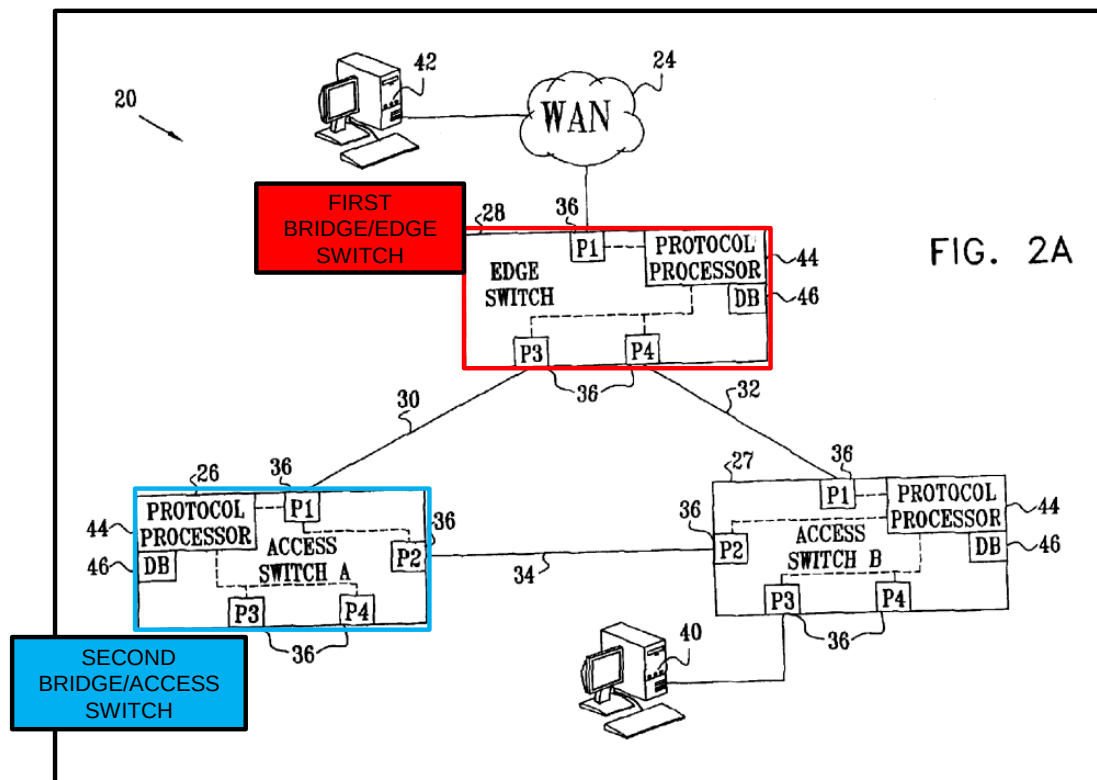


Thus, preferred embodiments of the present invention provide a method for fast changeover between redundant network links that can be implemented by modifying a single MAC bridge, without the need for reprogramming or replacing other items of equipment in the network. The bridge is modified, as described above, so as to manage its redundant downstream ports in a novel way. This modifi-

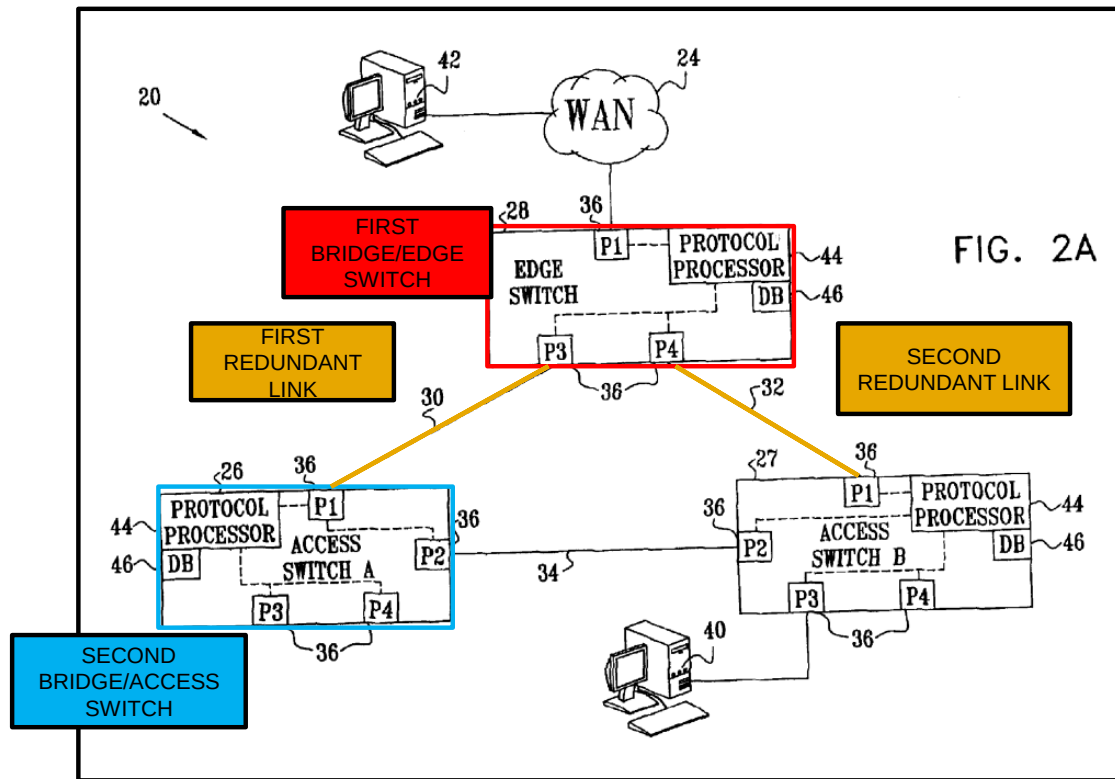
The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



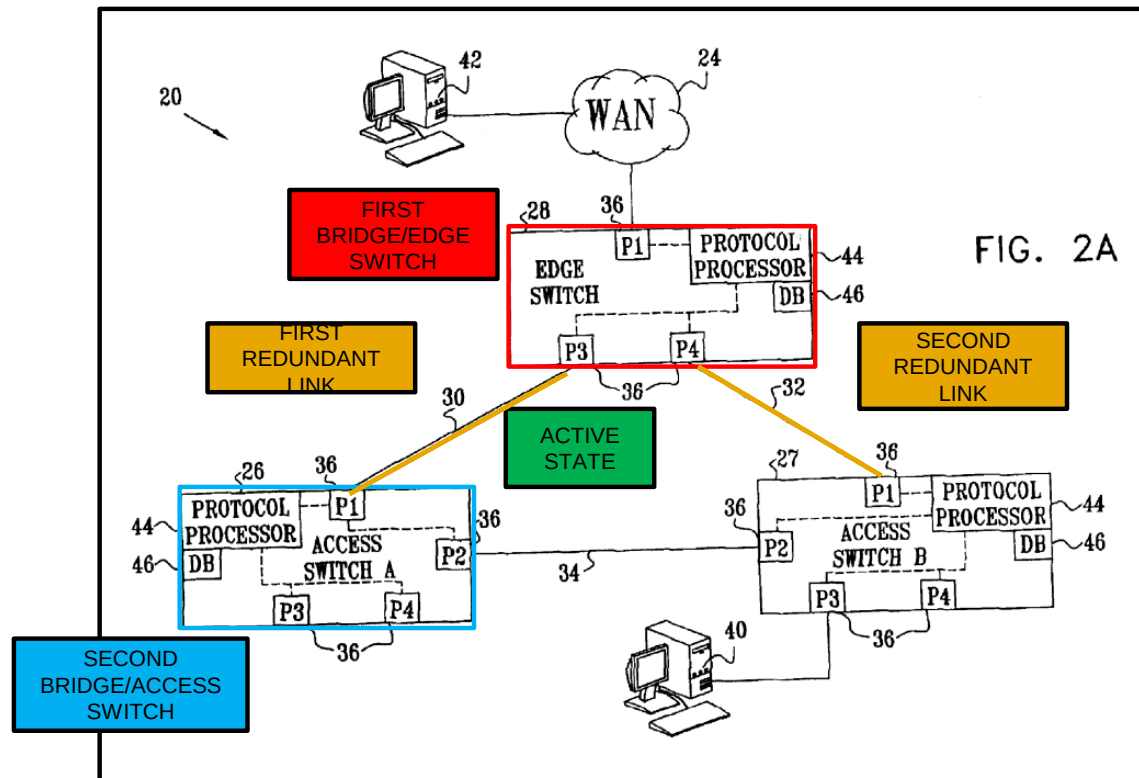
The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



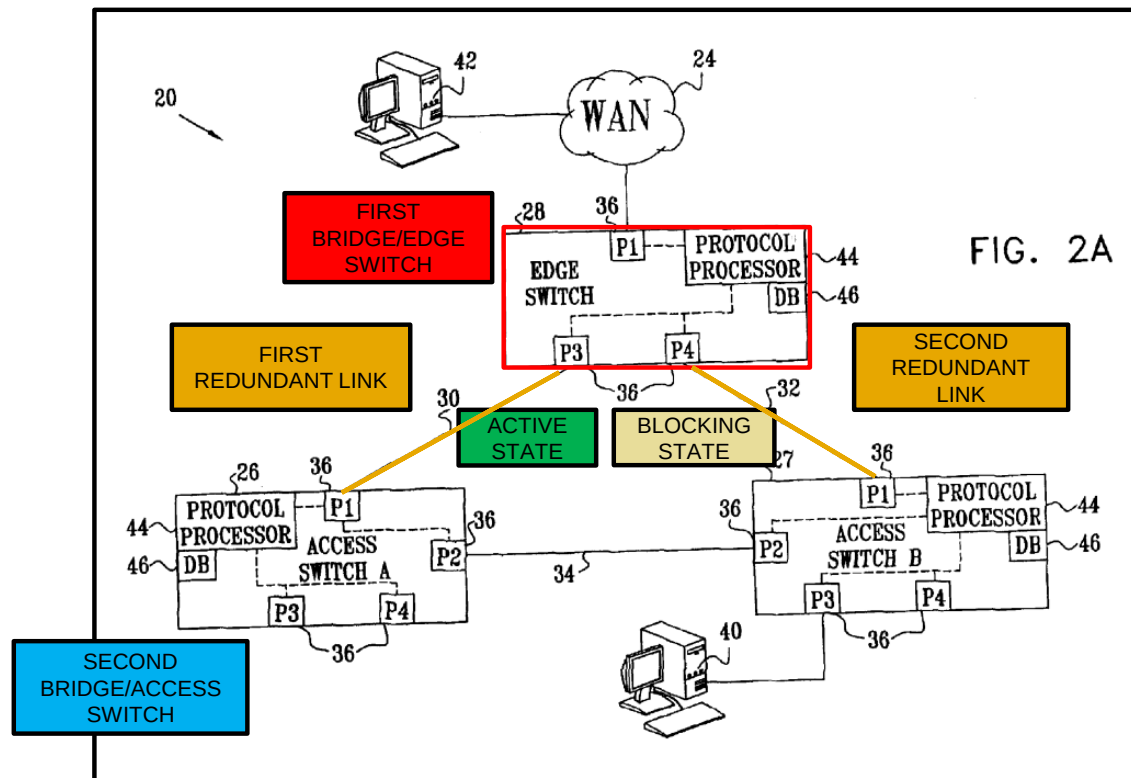
The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



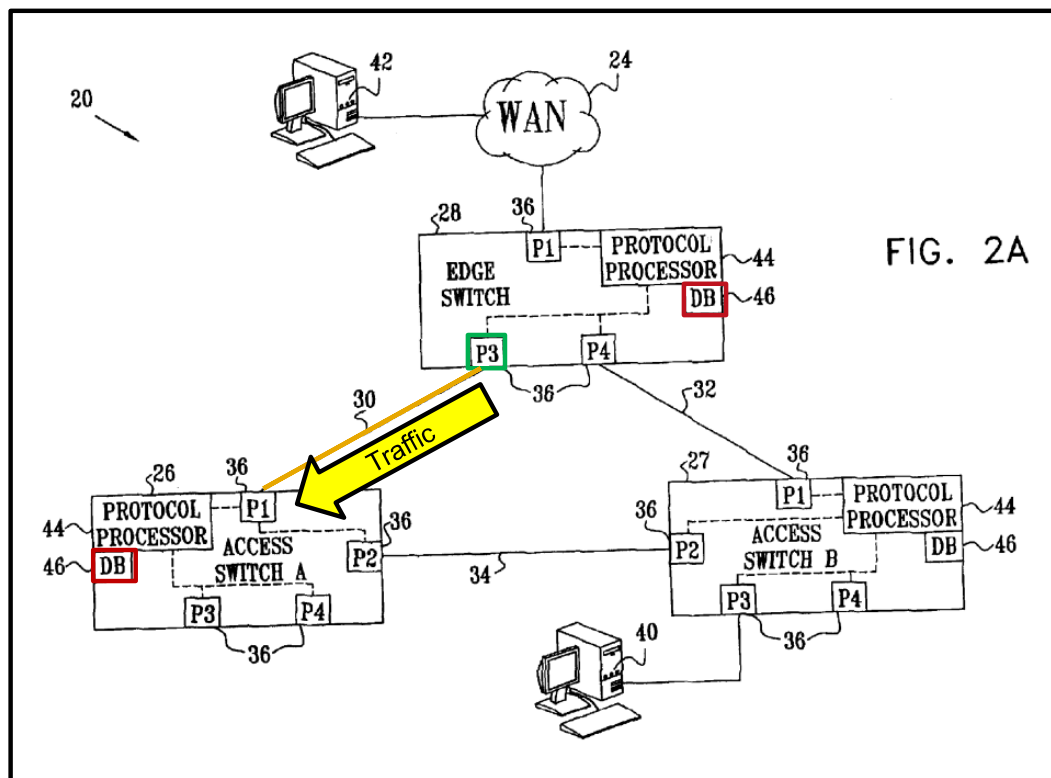
The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



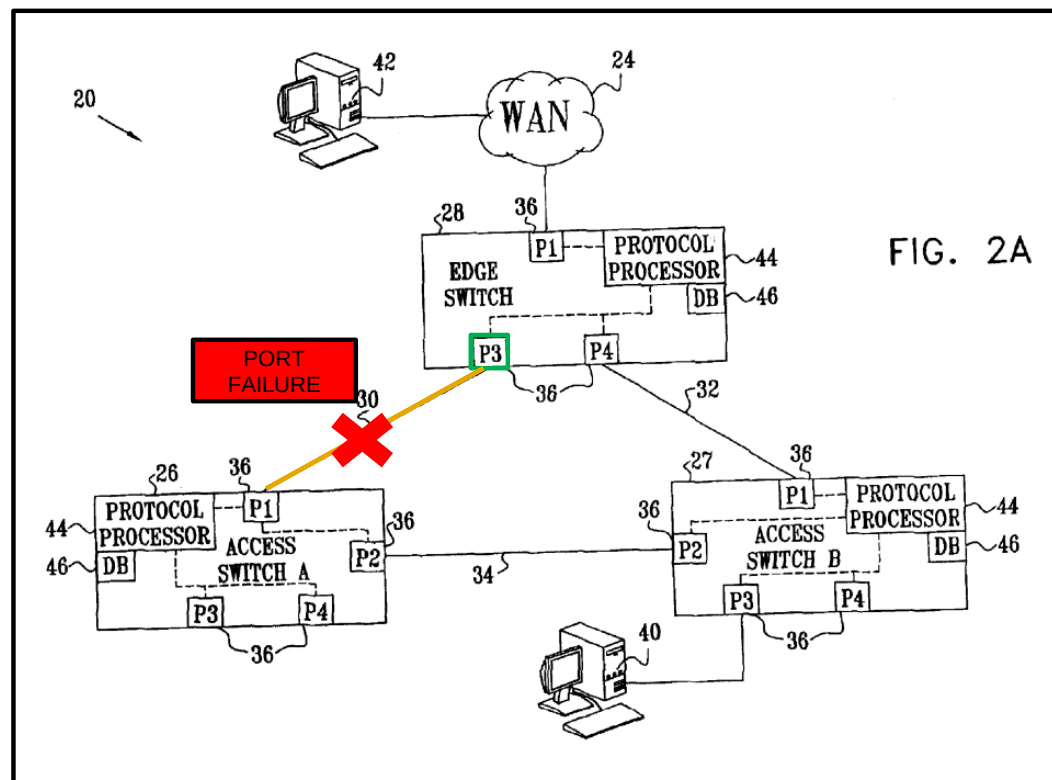
The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



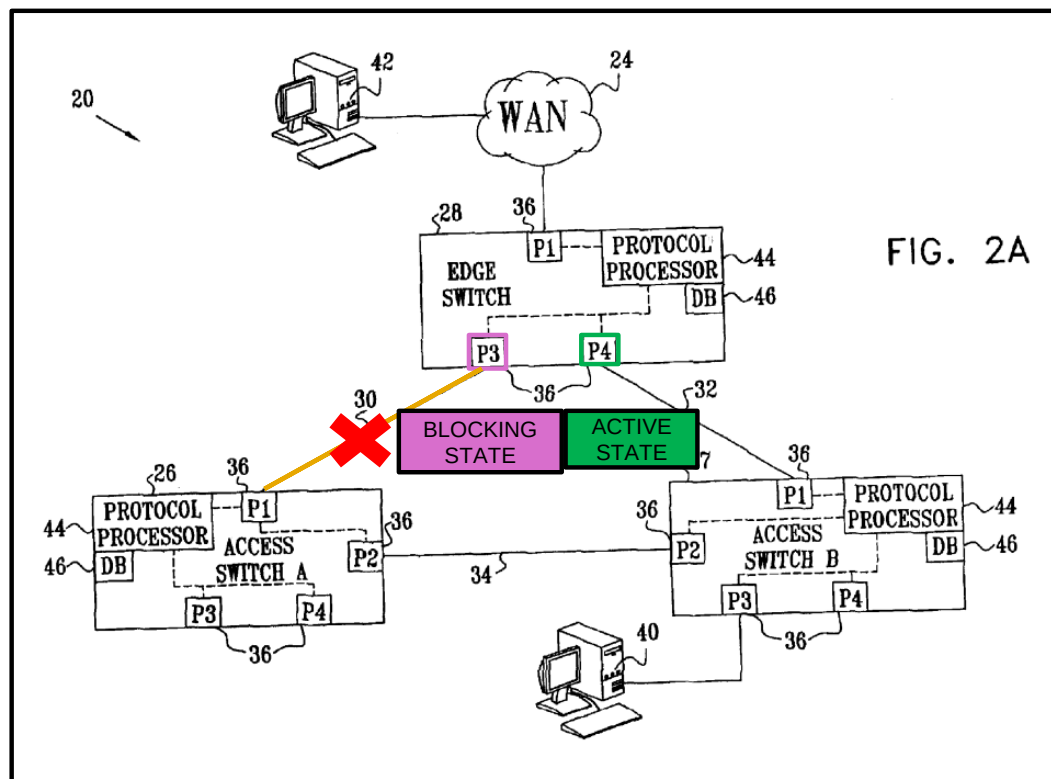
The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



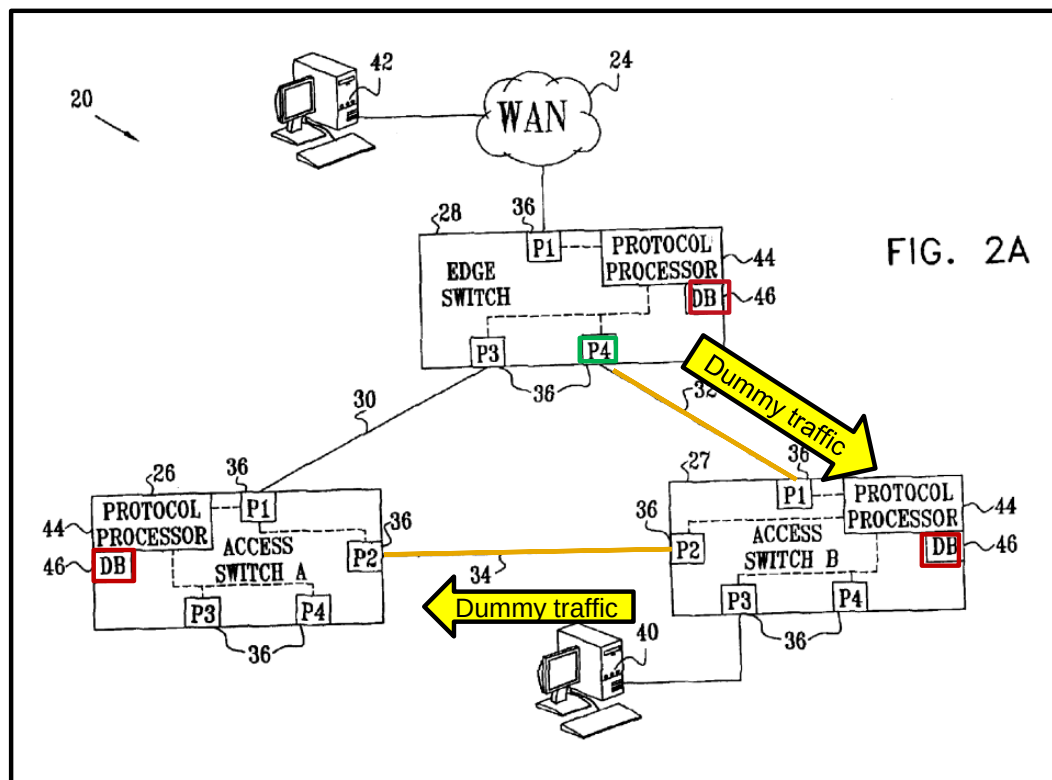
The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



The '986 Patent Sends Dummy Traffic *Downstream* to Notify of a Port Changeover



U.S. Patent No. 6,032,194 – Gai

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

[54] METHOD AND APPARATUS FOR RAPIDLY RECONFIGURING COMPUTER NETWORKS
[75] Inventors: Silvano Gai, Vigliano d'Asti, Italy; Keith McCloghrie, San Jose; Dinesh G. Dutt, Santa Clara, both of Calif.
[73] 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; 370/221; 370/273; 714/30; 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, 400, 408, 402, 256; 379/221, 273; 714/39, 47

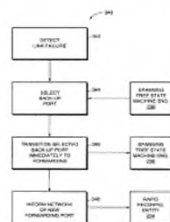
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M. Scamato and D. Delaney, *Single or Multiple Filtering Databases* (May 8, 1997).

16 Claims, 8 Drawing Sheets



IPR2024-00505
Cisco Systems, Inc. v. Portsmouth Network Corp.
Cisco's Exhibit 1005

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

[54] METHOD AND APPARATUS FOR RAPIDLY RECONFIGURING COMPUTER NETWORKS

[75] Inventors: Silvano Gai, Vigliano d'Asti, Italy; Keith McCloghrie, San Jose; Dinesh G. Dutt, Santa Clara, both of Calif.

[73] Assignee: Cisco Technology, Inc., San Jose, Calif.

***Gai* Teaches Transmitting Dummy Traffic *Upstream* Towards the Root**

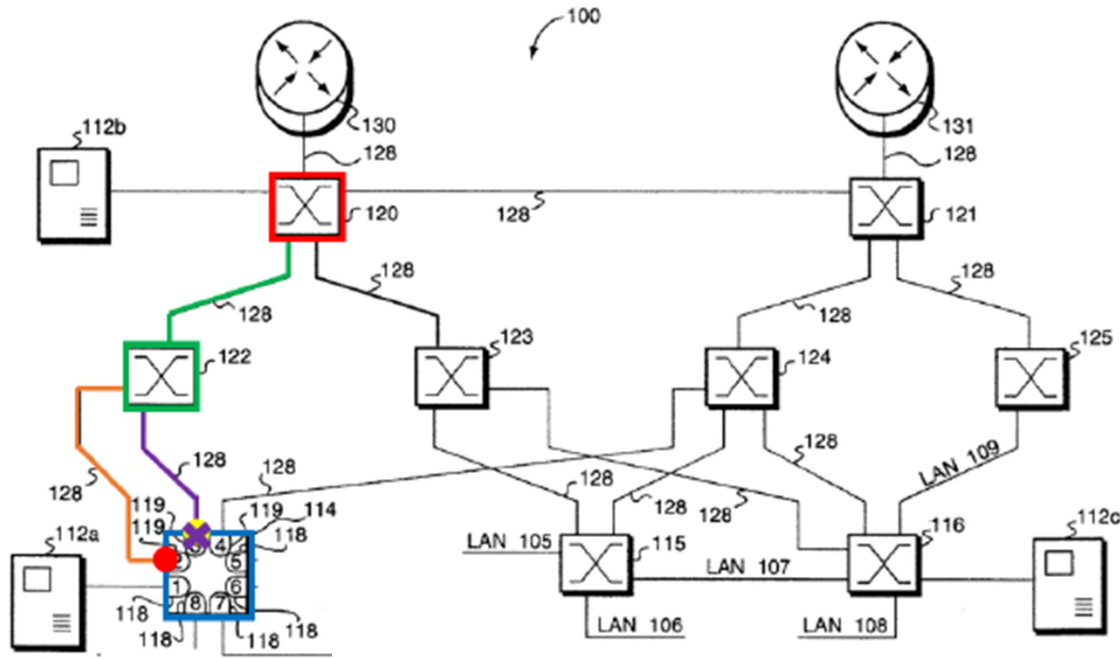
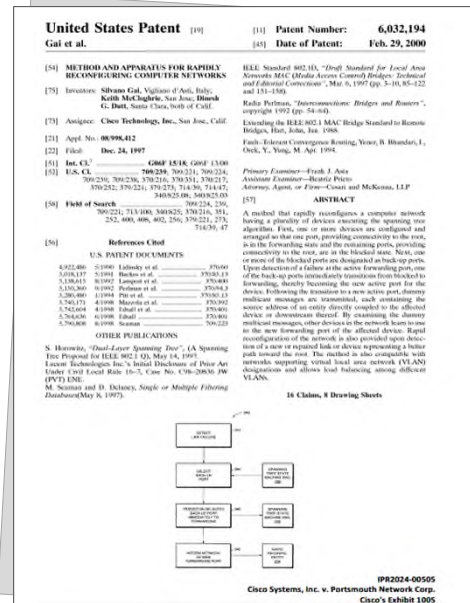


FIG. 1

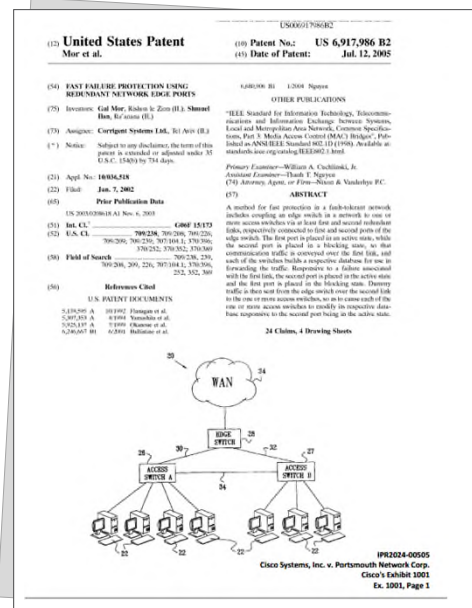
***Gai* Teaches Transmitting Dummy Traffic *Upstream* Towards the Root**



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.

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

The '986 Patent Confirms *Gai* is Limited to Sending Dummy Traffic Upstream



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 computers 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

Roadmap

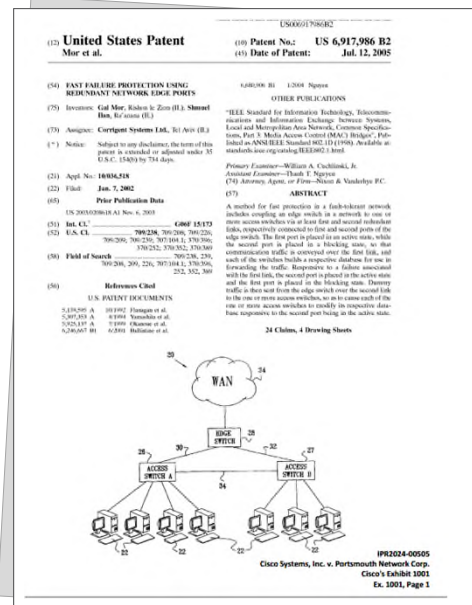
Ground 1

Independent claims 1, 12, 13 & 24 (Dependent claims 2, 4-7, 9-11, 14, 16-19, 21-23)

Gai

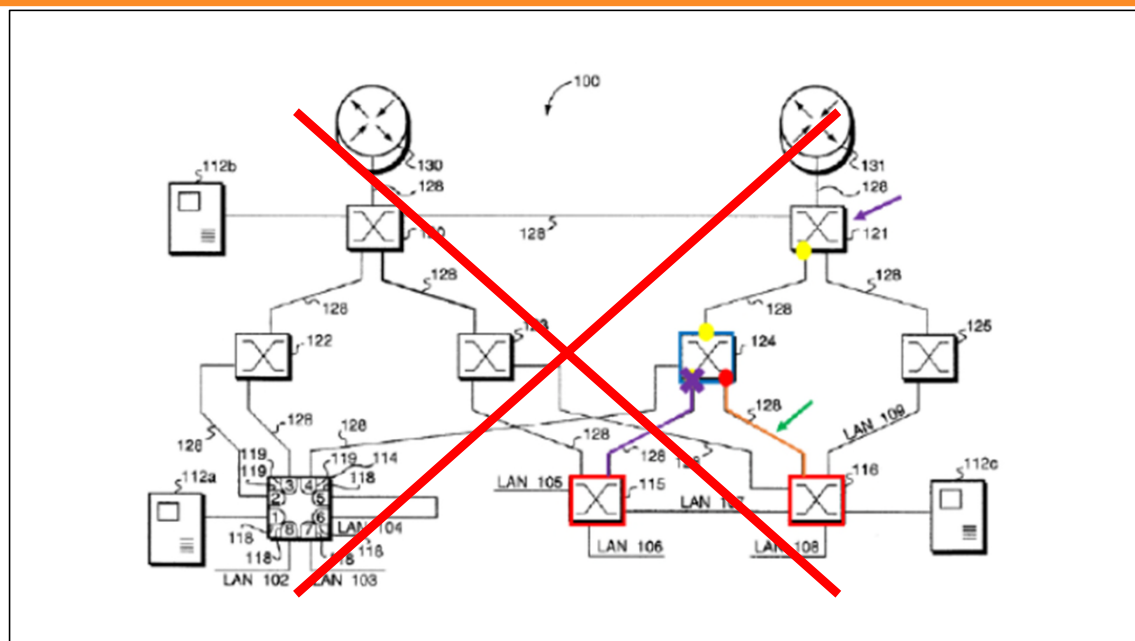
***Gai* does not teach or render obvious
sending dummy traffic *downstream/from*
an edge switch to an access switch
(claims 12[e], 1[e])**

U.S. Patent No. 6,917,986 – Independent Claim 12



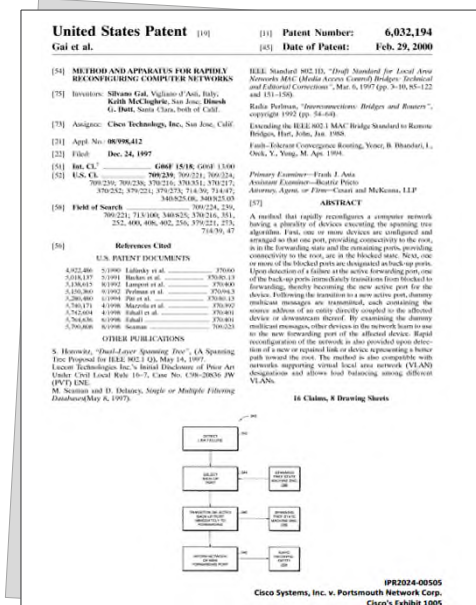
12. A method for network communication, comprising:
coupling a first bridge in a network to a second bridge located downstream of the first bridge, by connecting at least first and second redundant links to respective first and second ports of the first bridge so as to communicate with the second bridge;
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.

No Support in *Gai* for Sending Traffic Downstream



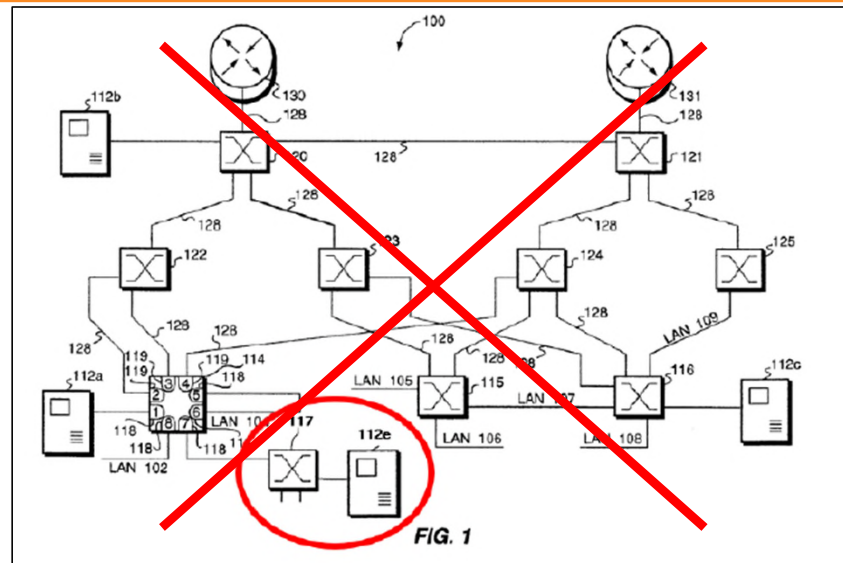
Petitioner provides no citations to *Gai* to support the modified figure presented as the basis of its argument in Ground 1A, and thus, Petitioner fails to show that its modified figure is disclosed in *Gai*.

***Gai* Discloses Sending Dummy Traffic Towards the Root Port**



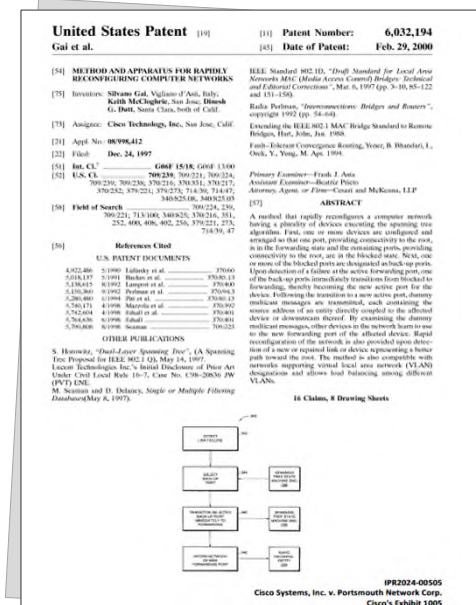
Upon failure of the current root port, this command additionally configures the access switch to immediately transition one of its blocked trunk ports to the forwarding state and to also begin transmitting dummy multicast messages through the new port, as mentioned above. Upon detection of a new or repaired link or device representing a better path toward the root, this command additionally configures the access switch to transition to the new path without suffering a loss of connectivity. Reconfiguration of the network may

Petitioner's Modified *Upstream Embodiment* is Not Supported by *Gai*



Petitioner pushes its hindsight driven embodiment even further by arguing that access switch 117 can be a root switch. Reply, 17-18. This is in stark contrast to the teaching in *Gai*, which discloses that “[t]o reduce the average distance and avoid partitioning of the backbone switches, it is desirable to locate the root at a backbone switch.” Ex. 1005, 3:29-31. In fact, *Gai* teaches away from using an access switch

***Gai* Discloses that an Access Switch Cannot be a Root Switch**



various access switches. If the root is located at an access switch and the principal server utilized by the end stations (i.e., clients) is coupled to a backbone switch, the average distance between end stations and the primary server may be quite high, resulting in inefficient network operation. In addition, the backbone switches may become partitioned as ports between them are blocked. To reduce the average distance and avoid partitioning of the backbone switches, it is desirable to locate the root at a backbone switch. Switch

Roadmap

Ground 1

Dependent claims 6 and 18

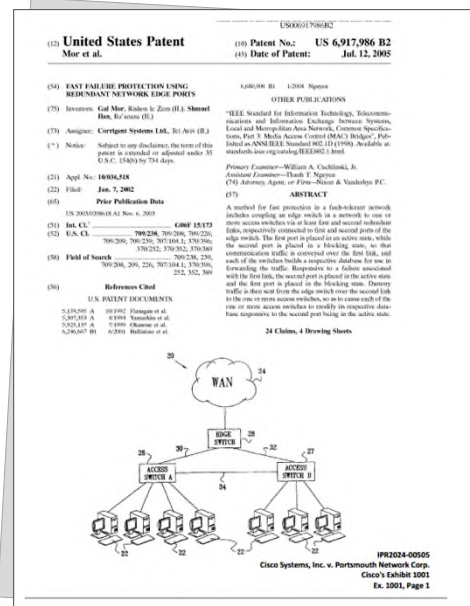
Gai

***Gai* does not teach sending data frames originating from an edge switch (claims 6 and 18)**

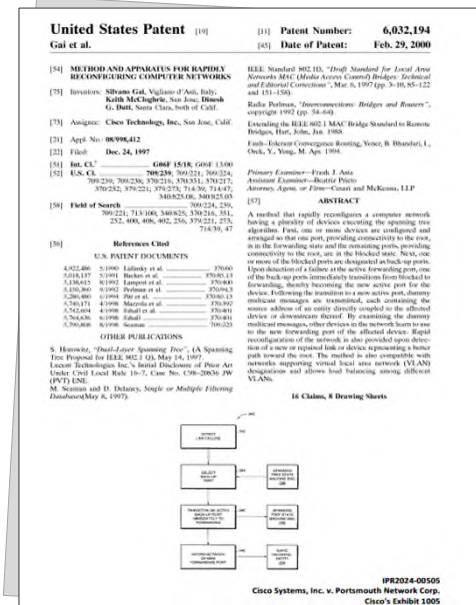
U.S. Patent No. 6,917,986 – Dependent Claims 6 and 18

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.



***Gai* Discloses Transmitting Traffic from Access Switches NOT Edge Switches**



Rapid reconfiguration entity 234 similarly generates one or more separate multicast messages 400 for each remaining entity directly coupled to access switch 114 (i.e., entities or end stations on LANs 102–104). In each message 400, entity 234 loads SA field 414 with the address of the corresponding entity. Each of these messages are similarly forwarded by access switch 114 through the new forwarding port (i.e., port number four). In addition, entity 234 generates and transmits

Roadmap

Ground 1A

Independent claims 1, 12, 13 & 24 (Dependent claims 2, 4-7, 9-11, 14, 16-19, 21-23)

Gai
(Downstream
Embodiment)

- Cited art is fundamentally different from the invention disclosed in the '986 Patent
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Ground 1B

Independent claims 1, 12, 13 & 24 (Dependent claims 2, 4-7, 9-11, 14, 16-19, 21-23)

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(Upstream
Embodiment)

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- Cited art fails to teach limitations relating to sending dummy traffic "downstream" (1[e], 12[e], 13[f], 24[e])
- Cited art teaches away from Petitioner's proposed modifications