

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.,
Petitioner

IPR2025-01088
U.S. Patent No. 7,061,859

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

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PETITIONER’S EXHIBIT LIST

Ex.1001	U.S. Patent No. 7,061,859
Ex.1002	Prosecution History of U.S. Patent No. 7,061,859.
Ex.1003	Declaration of Dr. Paul Min under 37 C.F.R. § 1.68.
Ex.1004	<i>Curriculum Vitae</i> of Dr. Min
Ex.1005	Japanese Patent Publication No. JP2001053772A to Omichi (“Omichi”)
Ex.1006	The Authoritative Dictionary of IEEE Standards Terms: Seventh Edition (2000)
Ex.1007	U.S. Patent No. 7,500,016 to Kao (“Kao”)
Ex.1008	U.S. Patent No. 5,515,376 to Murthy (“Murthy”)
Ex.1009	U.S. Patent No. 5,768,526 to Fawcett (“Fawcett”)
Ex.1010	Japanese Patent Publication No. JP2001053772A (Japanese original), obtained from https://worldwide.espacenet.com/patent/search/family/016857525/publication/JP2001053772A

I. INTRODUCTION

The prior art presented in this Petition teaches the same fault protection technique for ring networks that is described and claimed in the '859 patent. The '859 patent relates to fault protection in a ring network having a plurality of nodes connected through network segments. Ex.1001, 3:52-55. The '859 patent describes using a first set of bits (a “*general mask*”) to represent which network segments are operational. *See* Ex.1001, 2:19-30. Additionally, a second set of bits (a “*specific mask*”) is used to represent a particular path through the ring network. To determine if data for that path should be rerouted in the opposite direction, the first set of bits is compared with the second set of bits using a Boolean AND operation. Ex.1001, 4:64-5:5.

Omichi describes the same concept. Omichi describes using a first set of bits (a “ring link failure table”) to represent which network segments are operational or have failed. Ex.1005, [0036]. Additionally, a second set of bits (a “used ring link table”) is used to represent the flow of data through the ring network. Ex.1005, [0037]. Omichi then describes comparing the two tables to determine whether traffic should be rerouted in an opposite direction through the ring network. Ex.1005, [0041].

Accordingly, pursuant to 35 U.S.C. §§ 311, 314(a), and 37 C.F.R. § 42.100, Cisco Systems, Inc. (“Petitioner”) respectfully requests that the Board review and

cancel as unpatentable under (pre-AIA) 35 U.S.C. §103(a) claims 1-12 (the “Challenged Claims”) of the ’859 patent.

II. GROUNDS FOR STANDING

Petitioner certifies that the ’859 Patent is eligible for IPR and that Petitioner is not barred or estopped from requesting IPR challenging the patent claims. 37 C.F.R. § 42.104(a).

III. NOTE

Petitioner cites to exhibits’ original page numbers. Emphasis in quoted material has been added.

IV. THE PETITION’S RELIANCE ON EXPERT TESTIMONY

A. Focused Expert Testimony

Dr. Min’s declaration provides focused expert testimony on the following topics: (i) the level of skill in the relevant art; (ii) technical background, (iii) overview of the ’859 patent, (iv) claim construction, and (v) key teachings of the prior art. Ex.1003, ¶¶24-50.

B. Detailed Expert Testimony

To the extent the Board requires more detailed analysis, Dr. Min’s declaration also includes a detailed claim-by-claim analysis of the prior art. Ex.1003, ¶¶51-140.

V. TECHNOLOGY BACKGROUND

A. Optical Communication

1. Ring Networks

A ring network is a type of computer network topology where each device (node) is connected to two other nodes, forming a circular pathway for data transmission. Data travels in one or both directions (i.e., clockwise or counterclockwise) around the ring until it reaches its destination. Ex.1003, ¶¶27-28.

2. Fault Protection

Fault protection in networks involves strategies and technologies to prevent, detect, and recover from failures. Fault protection thus facilitates reliable communication and minimal downtime. These protections promote stable and efficient network operations. Ex.1003, ¶¶29-31.

3. Boolean Logic

Boolean logic is widely used in digital circuits and computer programming. Bitwise Boolean logic operates at the binary level, manipulating individual bits within numbers. When Boolean logic is represented by binary numbers, a value of “true” is represented by a ‘1’ and a value of “false” is represented by a ‘0.’ Ex.1003, ¶32

Boolean logic involves logical operations such as AND, OR, and NOT to

manipulate and evaluate binary numbers. For example, when two bits are ANDed, the result is true ('1') only if both bits are also true ('1'), as shown in the following truth table. Ex.1003, ¶33.

<i>P</i>	<i>Q</i>	<i>P</i> ∧ <i>Q</i>
0	0	0
0	1	0
1	0	0
1	1	1

AND Truth Table

Ex.1006, 37.

As can be seen, the only case where the result of P AND Q is true (a '1') is where both P and Q are also true. Ex.1003, ¶34.

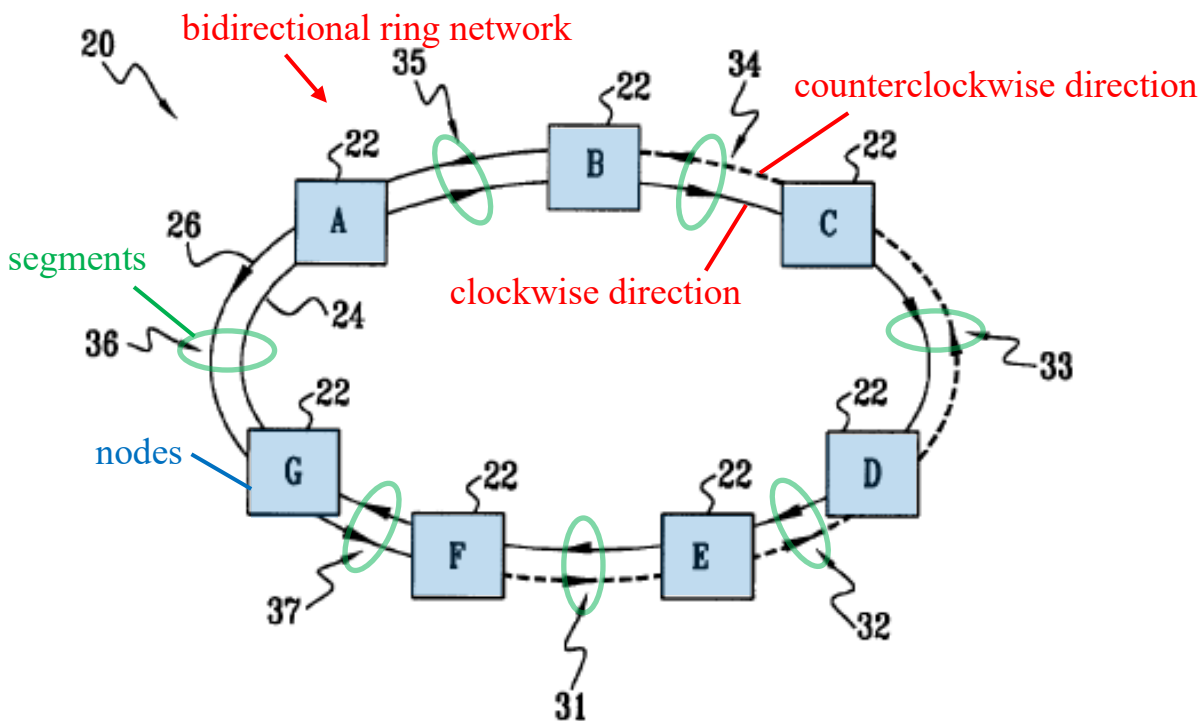
Boolean logic would have been within the background knowledge of a POSITA. The '859 patent refers to Boolean logic operations, but does not explain those operations—thus confirming they would have been understood by a POSITA. *See also* Ex.1008, 8:49-50 (information can be “combined according to the well-known rules of Boolean logic”); Ex.1009, 7:37 (“[B]oolean logic, well known to those skilled in the art”). Ex.1003, ¶35.

VI. OVERVIEW OF THE '859 PATENT

A. Summary of the '859 Patent

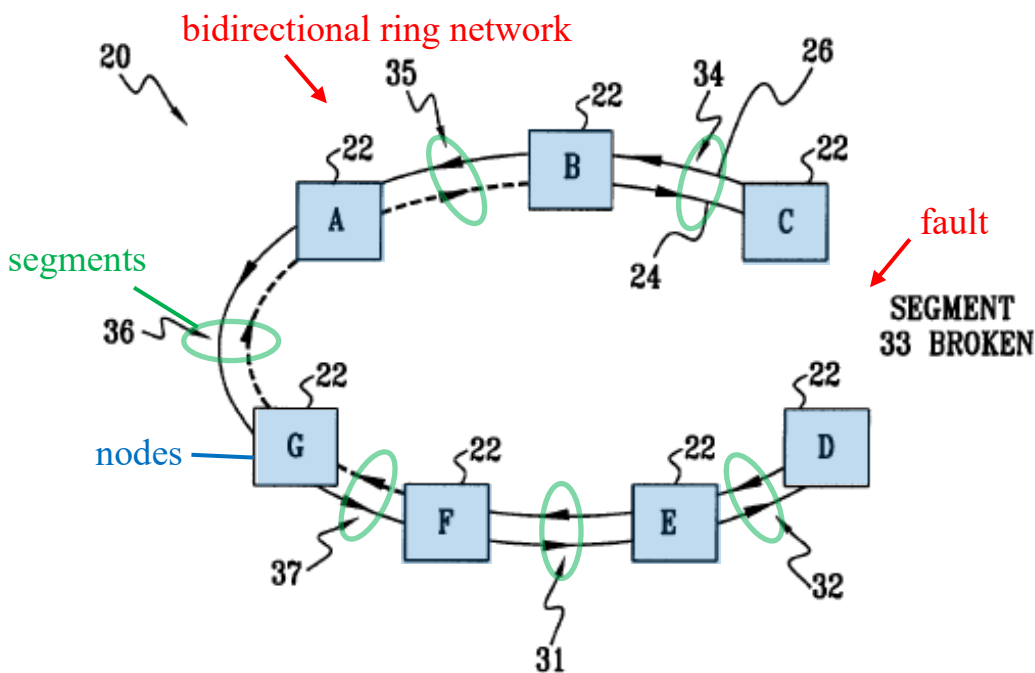
The '859 patent “relates generally to communication networks, and

specifically to high-speed packet rings.” Ex.1001, 1:5-6. The ’859 patent describes a “bidirectional ring network 20” that “comprises a plurality of nodes 22, labeled A through G, which are mutually connected by network segments 31, 32, 33, 34, 35, 36, and 37.” Ex.1001, 3:52-55. “The network segments comprise a bidirectional communication medium, such as optical fibers or conductive wires.” Ex.1001, 3:57-59. “The communication medium is configured to define an inner ring 24, over which packets are conveyed between the nodes in a clockwise direction, and an outer ring 26, over which the packets are conveyed in a counterclockwise direction.” Ex.1001, 3:59-63. The bidirectional ring network is shown in Fig. 1 below.



Ex.1001, Fig. 1 (annotated); Ex.1003, ¶36.

The '859 patent describes a “mechanism for rapid fault protection in a ring network.” Ex.1001, 2:16-18. For example, if there is a fault in the network, data that was using the clockwise ring may need to switch to using the counterclockwise ring. “FIG. 3 is a block diagram showing an alternative route taken by the data flow from node F to node B ... following occurrence of a fault in segment 33.” Ex.1001, 4:24-27.



Ex.1001, Fig. 3 (annotated); Ex.1003, ¶37.

The purported novelty of the '859 patent is to use a first set of bits to represent the state of each of the segments in the network. This first set of bits is referred to in the '859 patent as a “*general mask*.” Ex.1001, 2:61-64 (“constructing the general mask includes assigning a respective general mask bit to each of the

segments, indicating whether the segment can be reached following occurrence of the fault”). For example, a “general mask in the absence of any fault in network 20 has the form 0000000.” Ex.1001, 4:54-55. However, “[i]n the situation shown in FIG. 3, the general mask ... would have the form 0000100, wherein the bits run in a counterclockwise direction from segment 31 (least significant [right-most] bit) to segment 37 (most significant [left-most] bit). The third bit is set to ‘1’ to indicate that segment 33 is broken.” Ex.1001, 4:48-52.

In addition to the general mask, the nodes use a second set of bits “to represent each of its data flows.” Ex.1001, 4:56-57. This second set of bits is referred to as a “*specific mask*.” Ex.1001, 2:64-67 (“the specific mask includes assigning a respective specific mask bit to each of the segments, indicating whether the flow was to be conveyed over the segment had the fault not occurred”). As an example, the “specific mask” for a data flow between node F and node B “has the form 0001111, to indicate that the flow passes through segments 31, 32, 33 and 34.” Ex.1001, 4:61-63.

Both the general mask and the specific mask are used together to determine if a data flow should be rerouted. “In order to determine how to handle the data flow following the fault, node F mathematically superimposes the applicable general and specific masks, preferably by taking the Boolean conjunction (AND) of the masks.” Ex.1001, 4:64-67. “If the conjunction is 0000000, the node can

conclude that there is no overlap between this data flow and the failed segments in network 20, and therefore determines that no steering of this flow is required.”

Ex.1001, 5:1-4. “In the situation shown in FIG. 3, however, the conjunction of the masks is 0000100 ... In this case, the node concludes that the current data flow overlaps all of the unreachable segments, and therefore steers the data flow around the ring in the opposite direction.” Ex.1001, 5:8-13.

However, as will be explained in detail below, it was already known to compare a first set of bits representing working segments with a second set of bits representing data flows, as taught by Omichi. Ex.1003, ¶¶36-41.

B. Prosecution History of the '859 Patent.

The '859 patent was filed on August 30, 2001. In a first Office Action, all claims were rejected as being anticipated by U.S. Patent No. 6,366,556 to Ballintine et al. Ex.1002, 81-84. In response, the Applicant amended the claims to recite additional details about the “general mask” and “specific mask” concepts.

1. (Currently amended) In a bidirectional ring network, in which nodes are mutually connected by network segments, a method of fault protection, comprising:

constructing a general mask indicating which of the segments can be reached in the event of a fault in the network by assigning a respective general mask bit to each segment, indicating whether the segment can be reached following occurrence of the fault;

for a given data flow to be conveyed through the network from a source node to a destination node, constructing a specific mask indicating the segments on a desired path of the flow by assigning a respective specific mask bit to each of the segments, indicating whether the flow was to be conveyed over the segment had the fault not occurred; and

superimposing the general and specific masks in order to determine a disposition of the flow.

The Office then issued an additional rejection under 35 U.S.C. 112 (enablement) and maintained the anticipation rejection of Ballantine. Ex.1002, 108-113. The Applicant then made some minor amendments to “clarify the meaning of the claim.” Ex.1002, 127-138.

The Office then issued a notice of allowance. However, again, it was already known to compare a first set of bits representing working segments with a second set of bits representing data flows, as taught by Omichi.

VII. LEVEL OF ORDINARY SKILL IN THE ART

A Person of Ordinary Skill in The Art (“POSITA”) on August 30, 2001 would have been someone knowledgeable and familiar with networking

technologies including ring networks and fault protection. That person would have a bachelor's degree in electrical engineering, computer science, or equivalent training, and approximately two years of experience working in the field of networking systems. Lack of work experience can be remedied by additional education, and vice versa. Ex.1003, ¶¶24-26.

VIII. CLAIM CONSTRUCTION

Claim terms in IPR are construed according to their “ordinary and customary meaning” to those of skill in the art. 37 C.F.R. § 42.100(b). *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc). Petitioner submits that, for the purposes of this proceeding and the grounds presented herein, no claim term requires express construction. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Ex.1003, ¶45.

While no term requires express construction, Dr. Min has provided an explanation of how a POSITA would have understood certain terms, which are identified below.

A. “mask”

In the context of computers, a mask includes “a pattern of characters that is used to control the retention or elimination of portions of another pattern of characters.” Ex.1006, 668. In other words, a mask may be “a pattern of bits” that is logically combined with another item to “retain or suppress” portions of that data

item. Ex.1006, 668. For example, consider the following eight-bit mask:

00000011. If one were to combine (e.g., logically AND) this mask with another data item, the result of that combination (e.g., AND operation) would potentially retain a 1 in only the last two bits. The first six bits would be set to 0. In particular, if the mask 00000011 is combined with the value 10101010, the result would be 00000010. Ex.1003, ¶46.

B. “null”

A null value includes the value zero. For example, an eight-bit value that is null would be comprised of eight ‘0’s: 00000000. *See* Ex.1006, 748. Ex.1003, ¶47.

IX. RELIEF REQUESTED AND THE REASONS FOR THE REQUESTED RELIEF

Petitioner asks that the Board institute a trial for *inter partes* review and cancel the Challenged Claims in view of the analysis below.

X. DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE

This patent is involved in the following district court proceeding: *Quicker Connections LLC v. Cisco Systems, Inc.* 2-24-cv-01074 (EDTX). As will be addressed in further detail in any discretionary briefing—the relevant considerations favor institution.

To that end, Petitioner stipulates, consistent with the stipulation made by the Petitioner in *Sotera* that, if the PTAB institutes this IPR, Petitioner will not pursue

in this litigation against the claims challenged in this IPR, (i) the specific grounds raised, or (ii) any other grounds that could have reasonably been raised before the PTAB in that instituted proceeding (*i.e.*, any ground that could have reasonably been raised under §§ 102 or 103 on the basis of prior art patents or printed publications).

XI. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE

A. Challenged Claims and Statutory Grounds for Challenge

Grounds	Claims	Basis
#1	1-12	35 U.S.C. § 103 (Pre-AIA) over Omichi

Japanese Patent Publication No. JP2001053772 to Omichi was filed on August 11, 1999 and published on February 23, 2001. Ex.1005, title page; Ex.1010 (Japanese original). Omichi is thus prior art to the '859 patent under (pre-AIA) 35 U.S.C. 102(a). Ex.1005 (“Omichi”) is a certified translation of the original Japanese patent publication. The Japanese publication is available from the European Patent Office’s Espacenet service at <https://worldwide.espacenet.com/patent/search/family/016857525/publication/JP2001053772A?q=pn%3DJP2001053772A>.

Petitioner also cites below to additional prior art as evidence of the background knowledge of a POSITA and to provide contemporaneous context to support Petitioner’s assertions regarding what a POSITA would have understood

from the prior art in the grounds. *See Yeda Research v. Mylan Pharm. Inc.*, 906 F.3d 1031, 1041-1042 (Fed. Cir. 2018) (affirming the use of “supporting evidence relied upon to support the challenge”); 37 C.F.R. § 42.104(b); *see also K/S HIMPP v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1365-66 (Fed. Cir. 2014); *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1363 (Fed. Cir. 2016)).

B. Statement of Material Facts

- 1) As of the earliest 2001 filing date, the use of a “ring” topology was well-known in computer networking. Ex.1003, ¶¶27-28; Ex.1005, [0001]-[0023].
- 2) As of the earliest 2001 filing date, techniques for providing fault protection in ring networks were well known. Ex.1003, ¶¶29-31; Ex.1005, [0001]-[0023].
- 3) For any two distinct points on a single-ring network, there are two possible paths—a clockwise path and a counterclockwise path. Ex.1003, ¶¶27-28; Ex.1005, [0024]-[0027].
- 4) In a single-ring network, if a segment fails in the clockwise path between two points, and a segment fails in the counterclockwise path between the same two points, it is not possible to convey data between the two points on that single-ring network. Ex.1003, ¶¶99-101; Ex.1005, [0024]-[0032].
- 5) As of the earliest 2001 filing date, Boolean logic was well known.

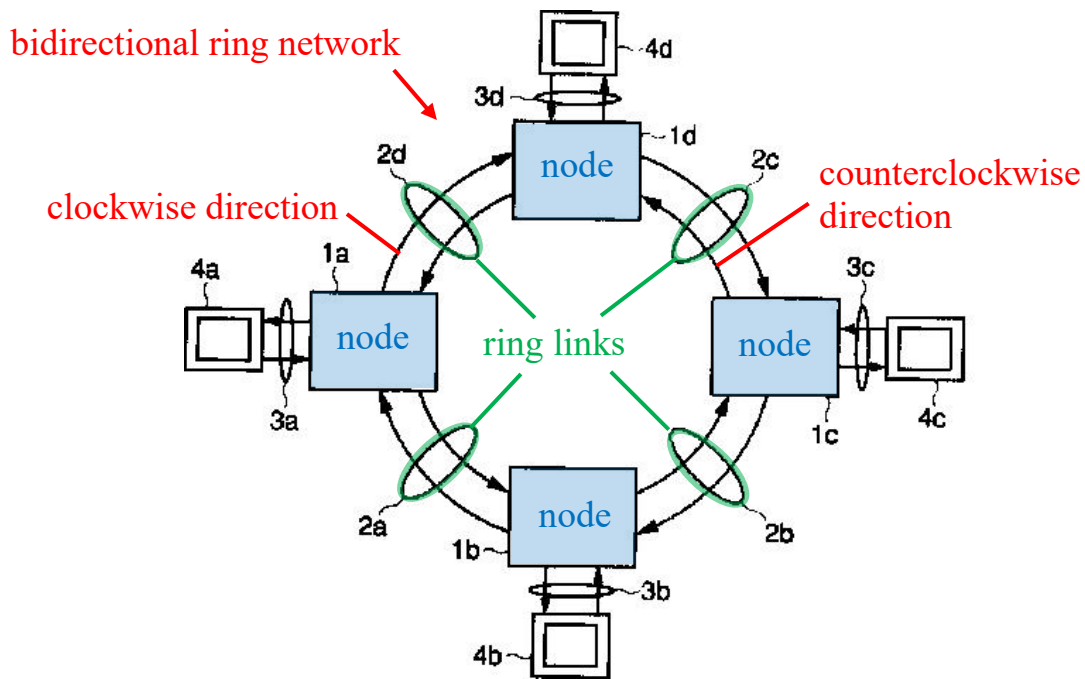
Ex.1003, ¶¶32-35; Ex.1006, 37; Ex.1008, 8:49-50; Ex.1009, 7:37.

- 6) A Boolean AND operation compares two bits to determine if they are both a ‘1’. Ex.1003, ¶¶33, 82; Ex.1006, 37.

C. Ground 1: Claims 1-12 are rendered obvious by Omichi.

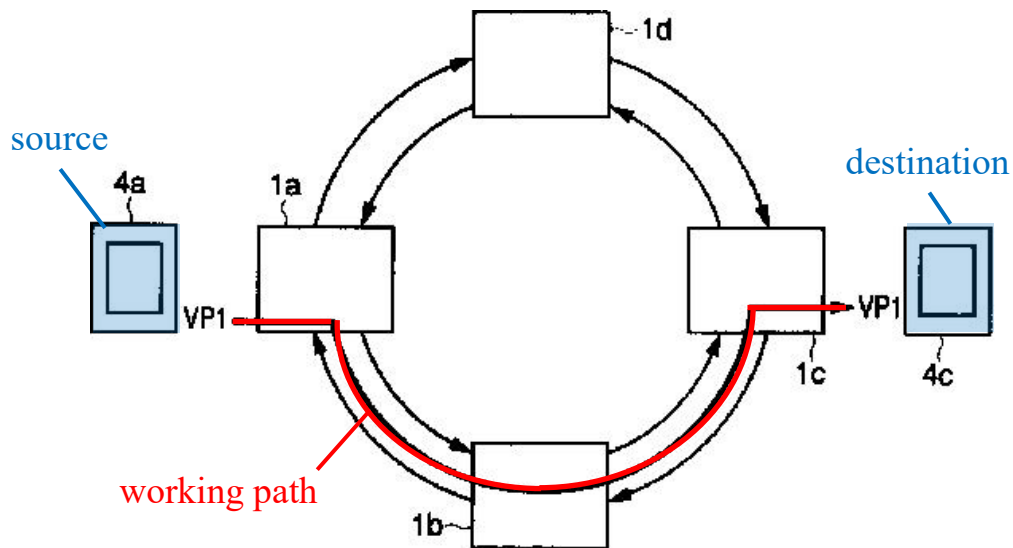
1. Summary of Omichi

Like the ’859 patent, Omichi relates to a “ring network comprising a plurality of branch insertion nodes and method of failure recovery of ring network.” Ex.1005, title. Omichi describes a bidirectional “ring network [that] comprises a plurality of branch insertion nodes 1a through 1d that are arranged in a ring shape.” Ex.1005, [0024]. The nodes are connected to each other through segments referred to as ring links: “Ring links 2a through 2d that respectively connect adjacent branch insertion nodes 1a through 1d as shown in FIG. 1 are bidirectional physical transmission paths and constitute clockwise ring transmission paths and counterclockwise ring transmission paths.” Ex.1005, [0025]. The bidirectional ring network is shown in Fig. 1 below.



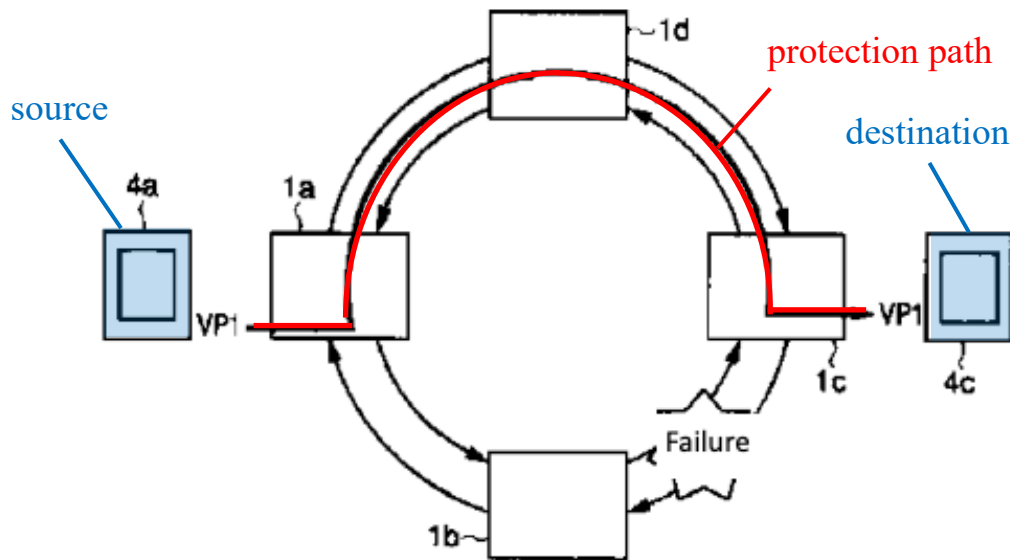
Ex.1005, Fig. 1 (annotated); Ex.1003, ¶54.

Omichi describes an example in which data is routed along a “working path,” as shown in Fig. 3 below. “FIG. 3 describes the working path of a virtual path. A working path is a virtual path that is normally used.” Ex.1005, [0030].



Ex.1005, Fig. 3 (annotated); Ex.1003, ¶55.

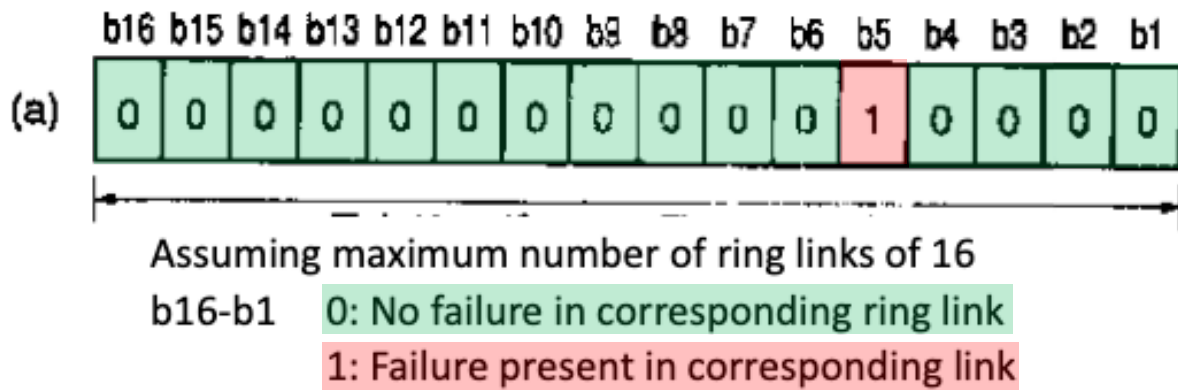
However, when there is a fault in the working path, Omichi's system reroutes the data flow to a "protection path." "FIG. 4 is used to describe a protection path for a virtual path. A protection path is a virtual path that is used to circumvent a failure when a failure occurs on a ring network." Ex.1005, [0031].



Ex.1005, Fig. 4 (annotated); Ex.1003, ¶56.

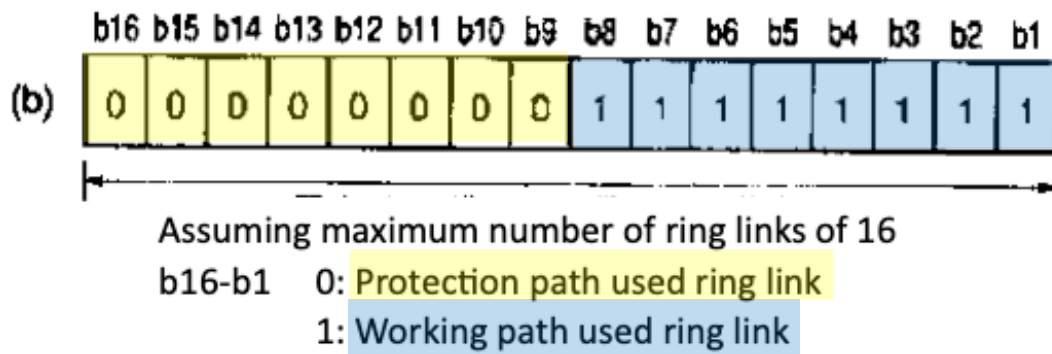
To make the decision to reroute a data flow, Omichi uses the same technique described in the '859 patent—comparing a first set of bits representing the available ring links with a second set of bits representing the desired path.

Omichi describes using a first set of bits in the form of a ring link failure table, as illustrated in Fig. 6a below. “The ring link failure table shown in FIG. 6(a) is used to hold information that indicates whether or not a failure has occurred in a ring link.” “The ring link failure table has a bit width equal to the maximum number of ring links in the ring network, and the bit number corresponds to the ring link number. A particular bit with a value of “0” indicates that there is no failure in the corresponding ring link. A value of “1” indicates a failure in the corresponding ring link.” Ex.1005, [0036].



Ex.1005, Fig. 6a (annotated); Ex.1003, ¶58.

Omichi further describes using a second set of bits in the form of a used ring table as shown in Fig. 6b below. “The used ring link table shown in FIG. 6(b) is provided for each virtual path and identifies the ring link that is used as a working path. The used ring link table has a bit width that corresponds to the maximum number of ring links in the ring network, and the bit number corresponds to the ring link number. A value of “0” for a bit shows that the corresponding ring link is used as a protection path. A value of “1” shows that the corresponding ring link is used as a working path.” Ex.1005, [0037].



Ex.1005, Fig. 6a (annotated); Ex.1003, ¶59.

Omichi then describes comparing the ring link table with the used ring link table. For a given ring link, if the bits from both tables are “1,” this means that the working path flows over a fault, and traffic should be re-routed on the opposite ring (i.e., the protection path). “If there are bits having the same bit number and whose contents are both “1” (S4, Yes), because this means that the working path includes a ring link where a failure has occurred.” Ex.1005, [0041]. Accordingly, “frame 5 or ATM-cell 6 is transmitted using the protection path (S6).” Ex.1005, [0041].

If, however, there are no ring links for which the bits in both table are a “1,” then no re-route need be taken. “If there are no bits having the same bit number and whose contents are both ‘1’ (S4, No), this means either that no failure has occurred in the ring network or that even if a failure has occurred, the working path does not include a ring link where a failure has occurred.” Ex.1005, [0040].

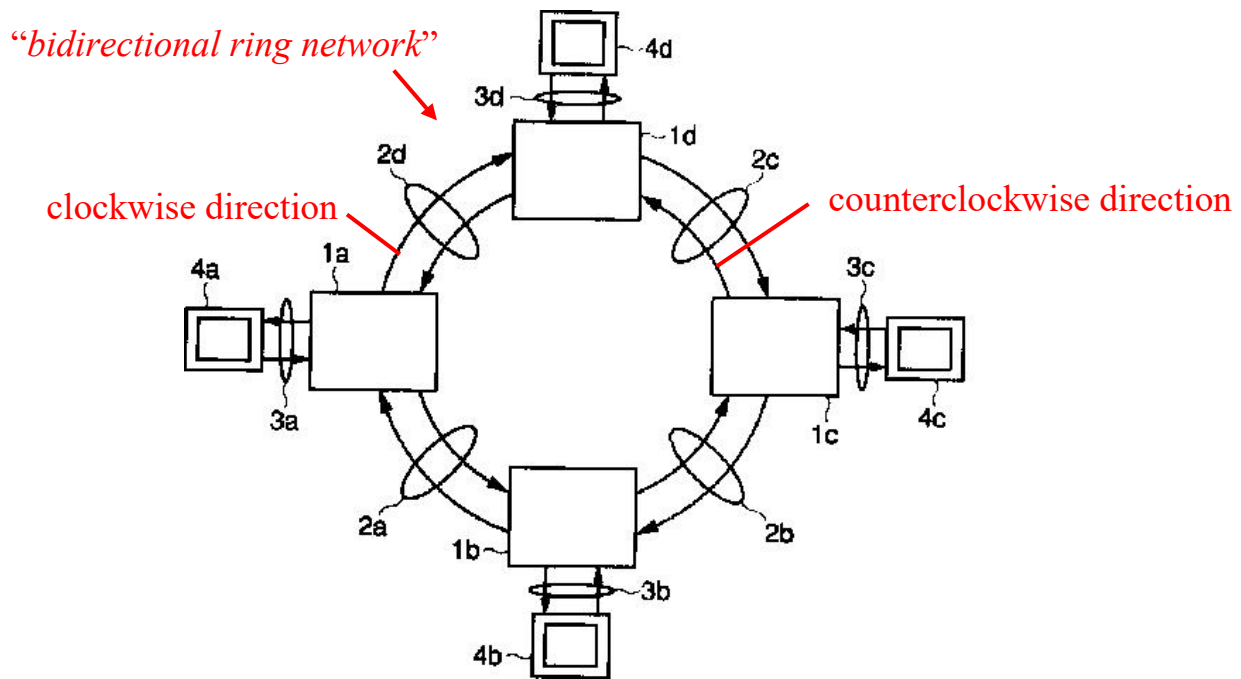
Thus, Omichi provides evidence that it was known to make decisions on

how to route data flows by comparing a set of bits representing faults with a set of bits representing the data flow path. Ex.1003, ¶¶54-62.

2. Claim 1

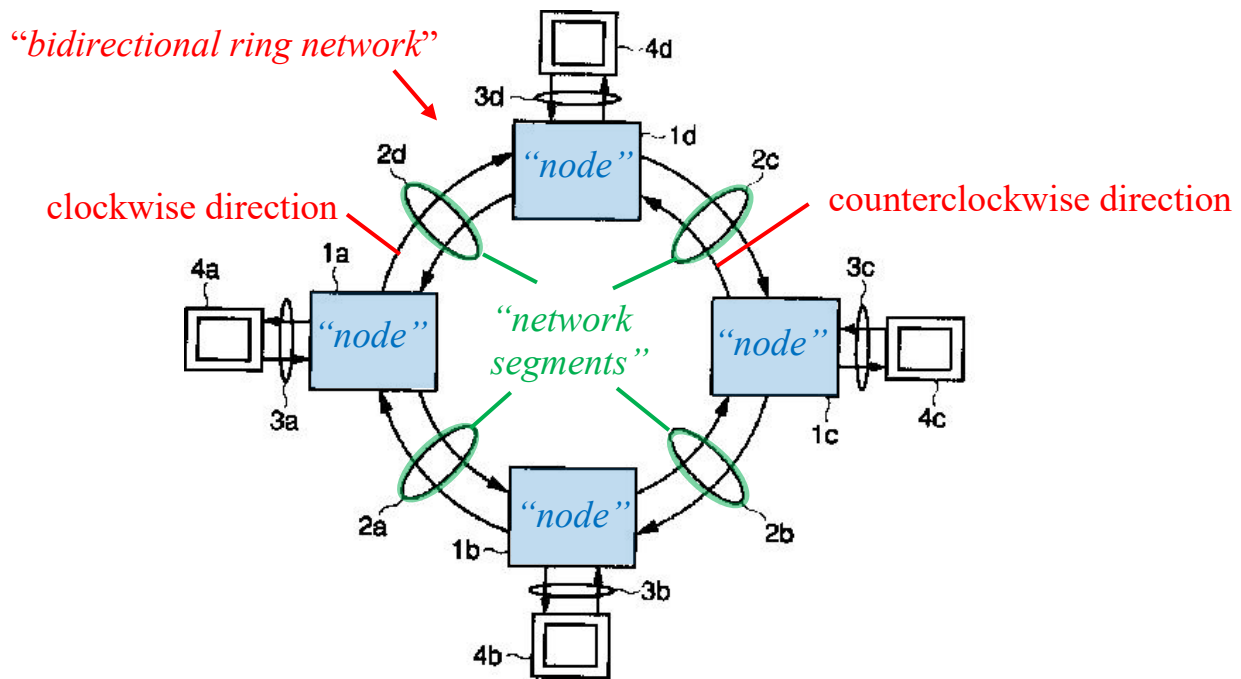
[1.0] *In a bidirectional ring network, in which nodes are mutually connected by network segments, a method of fault protection, comprising:*

First, Omichi describes a ring network with bidirectional transmission paths (“*a bidirectional ring network*”). “FIG. 1 shows a schematic view of the configuration of Embodiment 1 of a ring network according to the present invention.” Ex.1005, [0024]. Omichi’s ring network includes “a plurality of branch insertion nodes 1a through 1d that are arranged in a ring shape” and “ring links 2a through 2d that respectively connect adjacent branch insertion nodes 1a through 1d.” Ex.1005, [0024]. The ring links “are bidirectional physical transmission paths and constitute clockwise ring transmission paths and counterclockwise ring transmission paths.” Ex.1005, [0025]; Ex.1003, ¶63.



Ex.1005, Fig. 1 (annotated); Ex.1003, ¶63.

Second, Omichi's ring network includes several branch insertion nodes 1a-1d ("nodes") that are connected to each other using ring links 2a-2d ("network segments"). "Branch insertion nodes 1a through 1d determine the transmission destination of the information received via connected ring links 2a through 2d." Ex.1005, [0026]. "Ring links 2a through 2d that respectively connect adjacent branch insertion nodes 1a through 1d as shown in FIG. 1 ... These ring links 2a through 2d are used as information transmission paths between branch insertion nodes 1a through 1d." Ex.1005, [0025]; Ex.1003, ¶64.



Ex.1005, Fig. 1 (annotated); Ex.1003, ¶64.

Accordingly, because each ring link (“network segment”) connects two adjacent nodes together with both a clockwise link and a counterclockwise link, the nodes are “mutually connected” as claimed. Ex.1003, ¶65.

Third, Omichi states that “a first object of the present invention is to provide a branch insertion node that is capable of quickly recovering from failures that occur in a ring network” (Ex.1005, [0008]), which teaches “a method of fault protection” as claimed. Omichi seeks to “provide a branch insertion node that can quickly perform failure recovery when a failure occurs in a ring network.”

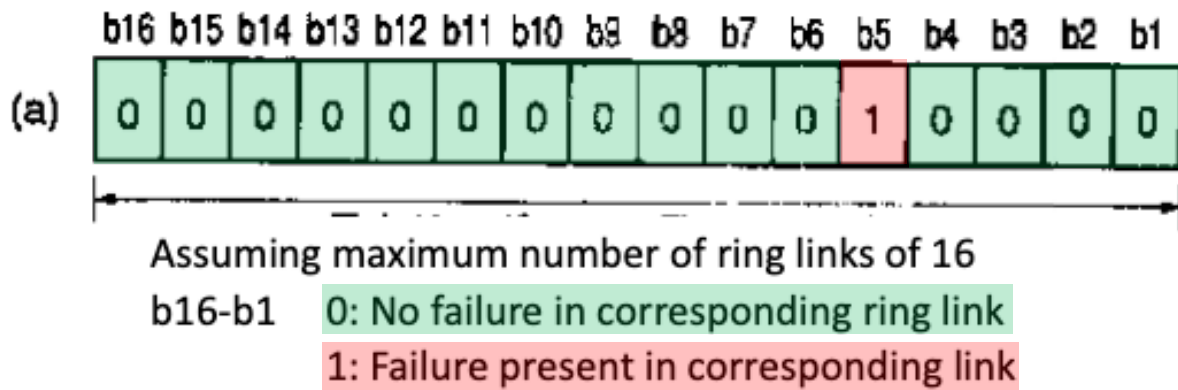
Ex.1005, abstract. Omichi’s system “causes ring link transmission part 10 to transmit information in the opposite direction to the virtual paths that are affected by the failure in a ring link, a rapid recovery from failure becomes possible.”

Ex.1005, abstract; *see also* Ex.1005, [0008], [0013], [0031]-[0032]. Ex.1003, ¶66.

Thus, because Omichi describes circumventing failures in a ring network having a plurality of nodes interconnected through ring links, Omichi renders obvious “[i]n a bidirectional ring network, in which nodes are mutually connected by network segments, a method of fault protection.” Ex.1003, ¶¶63-67.

[1.1] constructing a general mask indicating which of the segments are reachable in the event of a fault in the network by assigning a respective general mask bit to each segment, indicating whether the segment is reachable following occurrence of the fault;

First, Omichi describes a ring link failure table (“*general mask*”) that indicates whether a failure has occurred in a ring link (“*indicating which of the segments are reachable in the event of a fault in the network*”). “The ring link failure table shown in FIG. 6(a) is used to hold information that indicates whether or not a failure has occurred in a ring link.” Ex.1005, [0036]. Omichi’s ring link failure table is shown in Fig. 6a below. Ex.1003, ¶68.



Ex.1005, Fig. 6a (annotated); Ex.1003, ¶68.

Second, the ring link table assigns one bit to each ring link (“*by assigning a respective general mask bit to each segment*”). “The ring link failure table has a bit width equal to the maximum number of ring links in the ring network, and the bit number corresponds to the ring link number.” Ex.1005, [0036]; Ex.1003, ¶69.

Third, each bit indicates whether the corresponding ring link (“*segment*”) has failed (“*indicating whether the segment is reachable following occurrence of the fault*”). “A particular bit with a value of ‘0’ indicates that there is no failure in the corresponding ring link. A value of ‘1’ indicates a failure in the corresponding ring link. Thus, there is no failure anywhere, and all bits in the ring link failure table are ‘0.’” Ex.1005, [0036]. If a fault in any link is detected, then “a branch insertion node 1a through 1d that receives the failure notification sets the value to “1” for the bit number corresponding to the ring link number where a failure has occurred.” Ex.1005, [0036]; Ex.1003, ¶70.

Omichi's ring link failure table is similar to the general mask as described in the '859 patent: "The general mask in the absence of any fault in network 20 has the form 0000000." Ex.1001, 4:54-55. "At a general mask building step 50, the node builds a general mask indicating which of the segments cannot be reached as a result of the fault. In the situation shown in FIG. 3, the general mask constructed by node F would have the form 0000100." Ex.1001, 4:45-49; Ex.1003, ¶71.

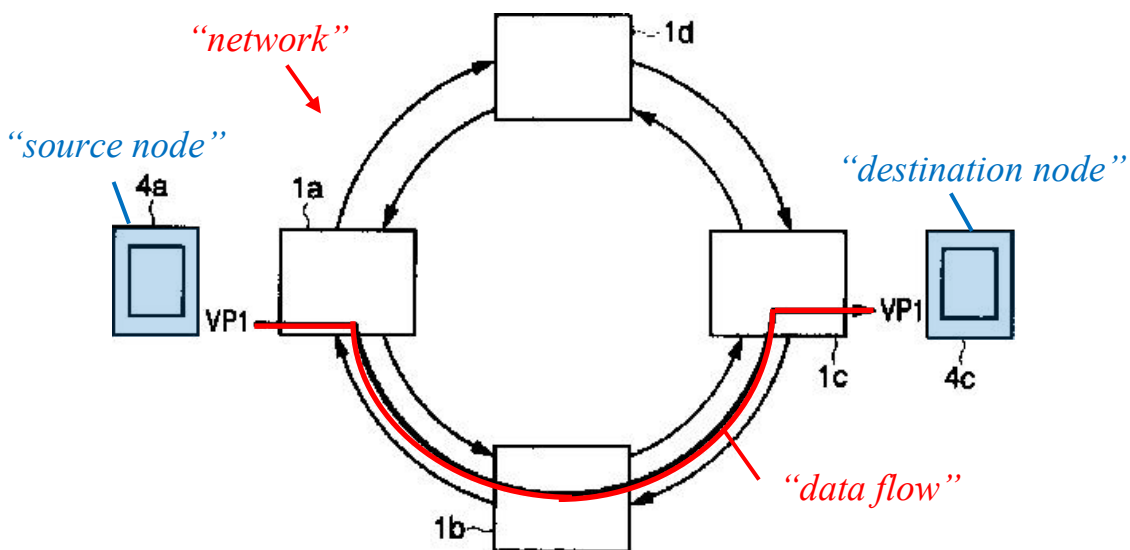
Thus, because Omichi constructs a ring link failure table in which each bit corresponds to a ring link and indicate whether there is a fault in that ring link, Omichi renders obvious "*constructing a general mask indicating which of the segments are reachable in the event of a fault in the network by assigning a respective general mask bit to each segment, indicating whether the segment is reachable following occurrence of the fault.*" Ex.1003, ¶¶68-72.

[1.2] for a given data flow to be conveyed through the network from a source node to a destination node, constructing a specific mask indicating the segments on a desired path of the flow by assigning a respective specific mask bit to each of the segments, indicating whether the flow was to be conveyed over the segment had occurrence of the segment been operational before the fault; and

First, Omichi describes a virtual path ("*a given data flow*") through the ring network ("*to be conveyed through the network from a source node to a destination node*"). Omichi describes "virtual paths" that are "established between branch line nodes 4a through 4d via a ring network and serve as communication paths for variable-length-size frames and fixed-length-size ATM cells which contain

information.” Ex.1005, [0029]; Ex.1003, ¶73.

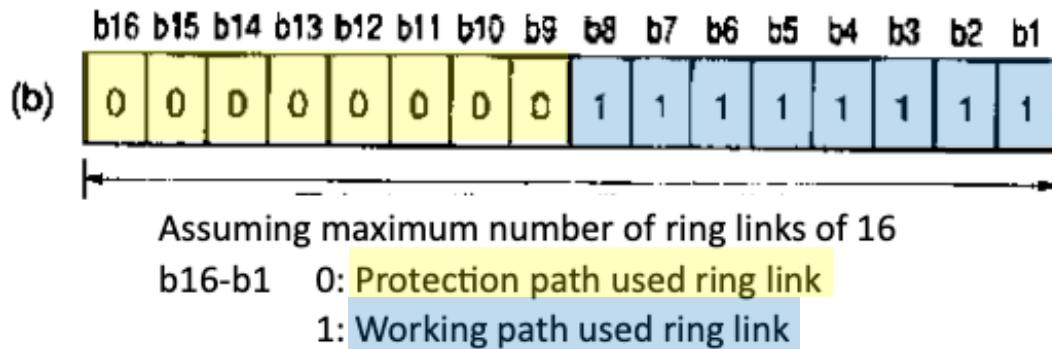
A virtual path may be a “working path.” Ex.1005, [0030]. “FIG. 3 describes the working path of a virtual path. A working path is a virtual path that is normally used. In FIG. 3, virtual path VP1, a route that extends from branch line node 4a to branch line node 4c, is shown as an example of a working path.” Ex.1005, [0030]; Ex.1003, ¶74.



Ex.1005, Fig. 3 (annotated); Ex.1003, ¶73.

Second, for each virtual path (“given data flow”), Omichi’s system creates a used ring link table (“specific mask”). “The used ring link table shown in FIG. 6(b) is provided for each virtual path and identifies the ring link that is used as a working path.” Ex.1005, [0037]. The used ring link table is shown in Fig. 6b

below.¹ Ex.1003, ¶74.



Ex.1005, Fig. 6a (annotated); Ex.1003, ¶74.

Third, Omichi’s used ring link table distinguishes a working path (“*segments on a desired path*”) from a protection path (e.g., a backup path). The used ring link table makes this distinction using the bits assigned to each segment. “The used ring link table has a bit width that corresponds to the maximum number of ring links in the ring network, and the bit number corresponds to the ring link number.” Ex.1005, [0037]. “A value of “0” for a bit shows that the corresponding ring link is used as a protection path. A value of “1” shows that the corresponding ring link is used as a working path.” Ex.1005, [0037]. Accordingly, by assigning a bit to each ring link (“*segment*”), Omichi teaches “*constructing a specific mask indicating the segments on a desired path of the flow by assigning a respective*

¹ Notably, the table in Fig. 6b applies to a larger exemplary ring network (with 16 segments) rather than the example ring of Fig. 3. Ex.1003, ¶74.

specific mask bit to each of the segments.” Ex.1003, ¶¶75-76.

Fourth, the used ring table uses a ‘1’ to indicate the working path assuming there is no fault (*“indicating whether the flow was to be conveyed over the segment had occurrence of the segment been operational before the fault”*). “A value of ‘0’ for a bit shows that the corresponding ring link is used as a protection path. A value of ‘1’ shows that the corresponding ring link is used as a working path.” Ex.1005, [0037]; Ex.1003, ¶77.

Omichi’s ring link failure table is similar to the “*specific mask*” as it is described in the ’859 patent. “For the flow shown in FIG. 1, the specific mask at node F has the form 0001111, to indicate that the flow passes through segments 31, 32, 33 and 34.” Ex.1001, 4:61-63; Ex.1003, ¶78.

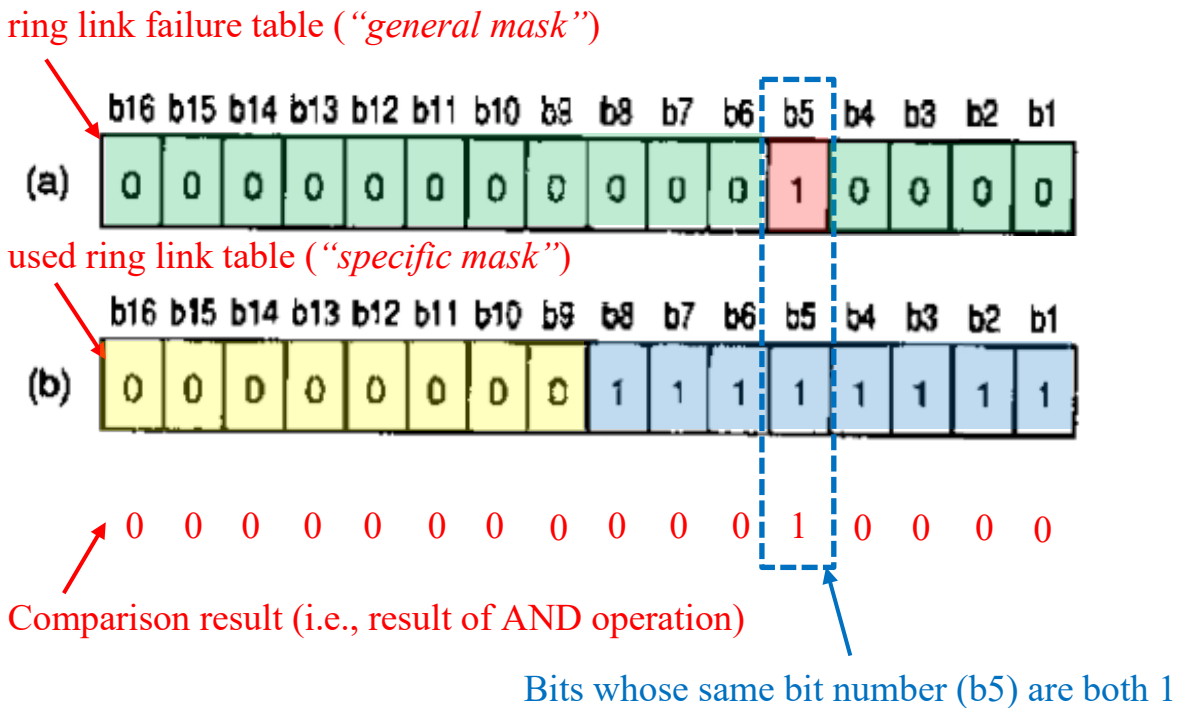
Thus, for each virtual path, Omichi’s system uses a ring link table in which each ring link corresponds to one bit and a ‘1’ value is used to indicate the links on the desired working path, which renders obvious *“for a given data flow to be conveyed through the network from a source node to a destination node, constructing a specific mask indicating the segments on a desired path of the flow by assigning a respective specific mask bit to each of the segments, indicating whether the flow was to be conveyed over the segment had occurrence of the segment been operational before the fault.”* Ex.1003, ¶¶73-79.

[1.3] superimposing the general and specific masks in order to determine a

disposition of the flow.

First, Omichi's system compares ("*superimpose[es]*") the bits of the ring link failure table ("*general mask*") with the bits of the used ring link table ("*specific mask*"). "[T]he used ring link table that corresponds to the virtual path number that was specified in step S2 **is compared against** the ring link failure table, and a determination is made as to whether or not there are bits having the same bit number and whose contents are both "1" (S4)." Ex.1005, [0040]; Ex.1003, ¶80.

The graphic below shows a comparison result of Omichi's ring link failure table of Fig. 6a ("*general mask*") with Omichi's used ring link table of Fig. 6b ("*specific mask*"). Ex.1003, ¶81.



Ex.1005, Fig. 6a, 6b (partial, annotated); Ex.1003, ¶81.

By comparing bits to see if they are both a ‘1’, Omichi’s system is performing an AND operation. Ex.1003, ¶82. In other words, a POSITA would have understood that what Omichi describes would be done using an AND operation. An AND operation is defined as follows: “AND (mathematics of computing) A Boolean operator having the property that if P is a statement, Q is a statement, R is a statement, ... , then the AND of P,Q,R, . . . is true if and only if all statements are true.” Ex.1006, 37; Ex.1003, ¶82.

Omichi’s comparing of both the ring link failure table and the used ring link table is within the scope of “*superimposing*” as recited in claim 1. Indeed, claim 2 (described in more detail below) recites that “*superimposing*” comprises

“combining the masks by means of a Boolean operation.” Ex.1003, ¶82.

Second, the two tables are compared to determine whether to reroute data (*“in order to determine a disposition of the flow”*). For a given ring link, if the bits from both tables are “1,” this means that the working path flows over a fault, and traffic should be re-routed on the opposite ring (i.e., the protection path).

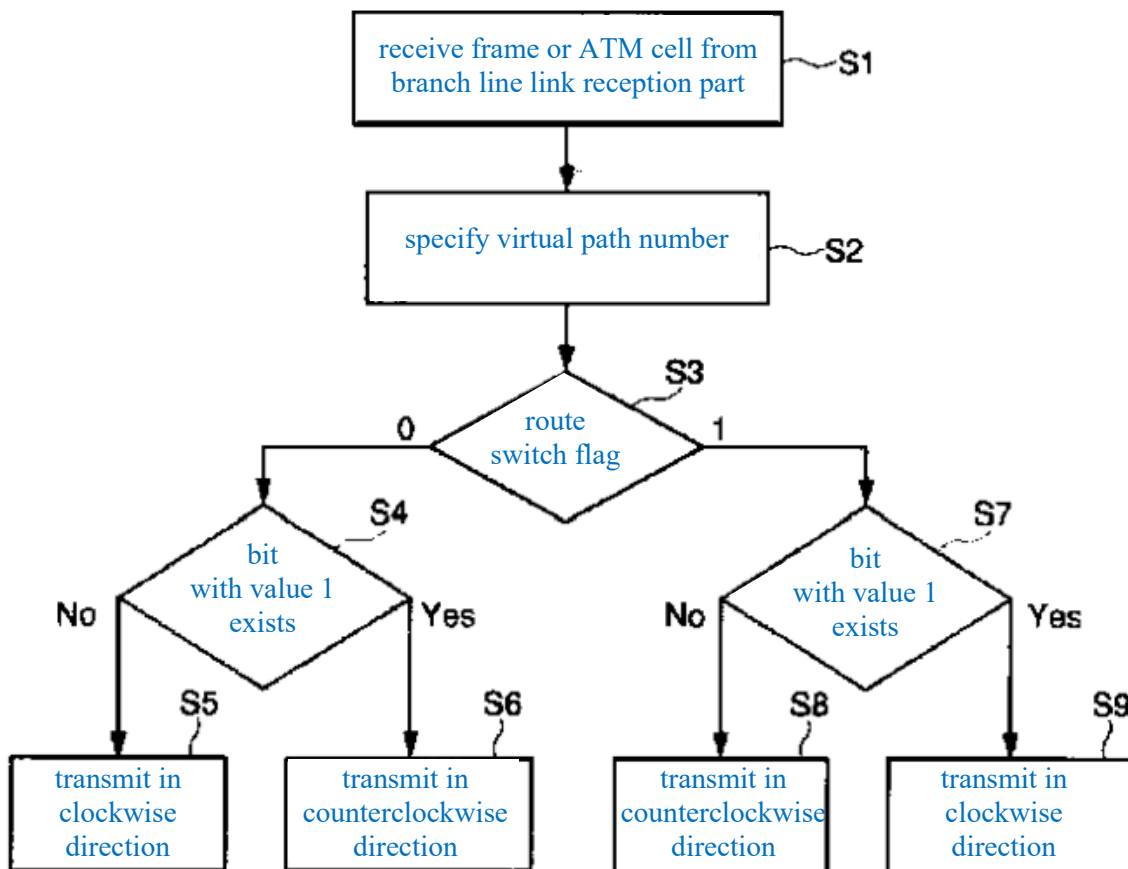
If there are bits having the same bit number and whose contents are both “1” (S4, Yes), because **this means that the working path includes a ring link where a failure has occurred**, ring link transmitting unit 10 is made **to transmit frame 5** or ATM-cell 6 in the **counterclockwise direction**. That is, frame 5 or ATM-cell 6 **is transmitted using the protection path** (S6).

Ex.1005, [0041]; Ex.1003, ¶83.

If, however, there are no ring links for which the bits in both table are a “1,” then no re-route need be taken. “If there are no bits having the same bit number and whose contents are both “1” (S4, No), this means either that no failure has occurred in the ring network or that even if a failure has occurred, the working path does not include a ring link where a failure has occurred.” Ex.1005, [0040]. In that case, Route selection processing part 8 “then causes ring link transmission part 10 to transmit frame 5 or ATM cell 6 in the clockwise [direction] (S5).” Ex.1005, [0040]; Ex.1003, ¶84.

The example described above is for the case where the working path is in the

clockwise direction, and the protection path is in the counter-clockwise direction, as indicated by the route switching flag. “A route switching flag of “0” shows that the working path is clockwise.” Ex.1005, [0038]. The overall process of selecting either a clockwise or counter-clockwise direction for a transmission is illustrated in Omichi’s Figure 7, below. Ex.1003, ¶85.



Ex.1005, Fig. 7 (annotated with translation); Ex.1003, ¶85.

S1. Receive frame or ATM cell from branch line link reception part

S2. Specify virtual path number

S3. Route switch flag

S4. Bit with value of “1” exists

S5. Transmit in clockwise direction

S6. Transmit in counterclockwise direction (circumvent the failure)

S7. Bit with value of “1” exists

S8. Transmit in counterclockwise direction

S9. Transmit in clockwise direction (circumvent the failure)

Ex.1005, Fig. 7 translation.

Omichi also illustrates the case where the working path is in the counter-clockwise direction and the protection path is in the clockwise direction: “A value of ‘1’ shows that the working path is counterclockwise.” Ex.1005, [0038]. In this case, if the working path includes a fault, traffic is rerouted from the (counterclockwise) working path to the (clockwise) protection path.

Furthermore, if there are bits having the same bit number and whose contents are both “1” (S7, Yes), the working path includes a ring link where a failure has occurred. The ring link transmission part 10 is then made **to transmit frame 5 or ATM cell 6 in the clockwise direction.**

In other words, frame 5 or ATM cell 6 is sent using the protection path.

Ex.1005, [0043]; Ex.1003, ¶86.

However, if no bits are both a ‘1,’ then no re-route is needed. The system can keep using the counterclockwise working path. “If no bits have the same bit

number and content of “1” (S7, No), this means either that no failure has occurred in the ring network or that even if a failure has occurred, the working path does not include a ring link where a failure has occurred.” Ex.1005, [0042]. The Route selection processing part 8 “then causes ring link transmission part 10 to transmit frame 5 or ATM cell 6 in the counterclockwise [direction] (S8).” Ex.1005, [0042]; Ex.1003, ¶87.

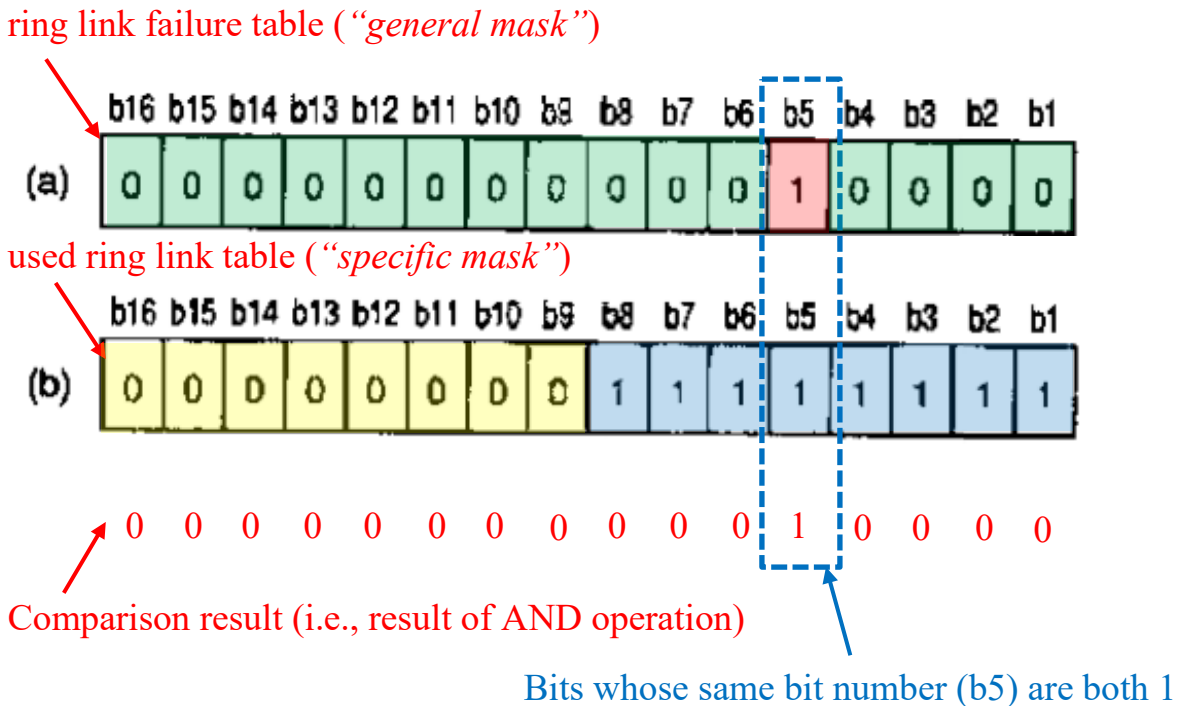
By selecting a transmission direction, Omichi’s process “*determine[s] a disposition of the flow.*” Thus, because Omichi compares the bits in the ring link failure table with the bits in the used ring link table to determine whether to reroute data, Omichi renders obvious “*superimposing the general and specific masks in order to determine a disposition of the flow.*” Ex.1003, ¶¶80-88.

3. Claim 2

[2.1] A method according to claim 1, wherein superimposing the masks comprises combining the masks by means of a Boolean operation.

First, as explained above at [1.3], Omichi describes comparing the masks to see where there is a ‘1’ in both fields: “[T]he used ring link table that corresponds to the virtual path number that was specified in step S2 is compared against the ring link failure table, and a determination is made as to whether or not there are bits having the same bit number and whose contents are both “1” (S4).” Ex.1005, [0040]. The graphic below shows a comparison result of Omichi’s ring link failure

table of Fig. 6a (“*general mask*”) with Omichi’s used ring link table of Fig. 6b (“*specific mask*”). Ex.1003, ¶¶89-90.



Ex.1005, Fig. 6a, 6b (partial, annotated); Ex.1003, ¶90.

Second, a POSITA would have understood that comparing bits in the manner described by Omichi is effectively performing a Boolean AND operation. A Boolean AND operations compares two bits to determine if both bits are ‘1’:

“AND (mathematics of computing) A Boolean operator having the property that if P is a statement, Q is a statement, R is a statement, ... , then the AND of P,Q,R, ... is true if and only if all statements are true.” Ex.1006, 37. Omichi’s comparing of both the ring link failure table (Fig. 6a) and the used ring link table (Fig. 6b) (“*superimposing*”) is thus “*combining the masks by means of a Boolean*

operation.” Ex.1003, ¶¶91-92.

Thus, Omichi describes what is known as a Boolean AND operations by comparing the two tables to see where there is a ‘1’ in both corresponding bit numbers, which renders obvious “*wherein superimposing the masks comprises combining the masks by means of a Boolean operation.*” Ex.1003, ¶¶89-93.

4. Claim 3

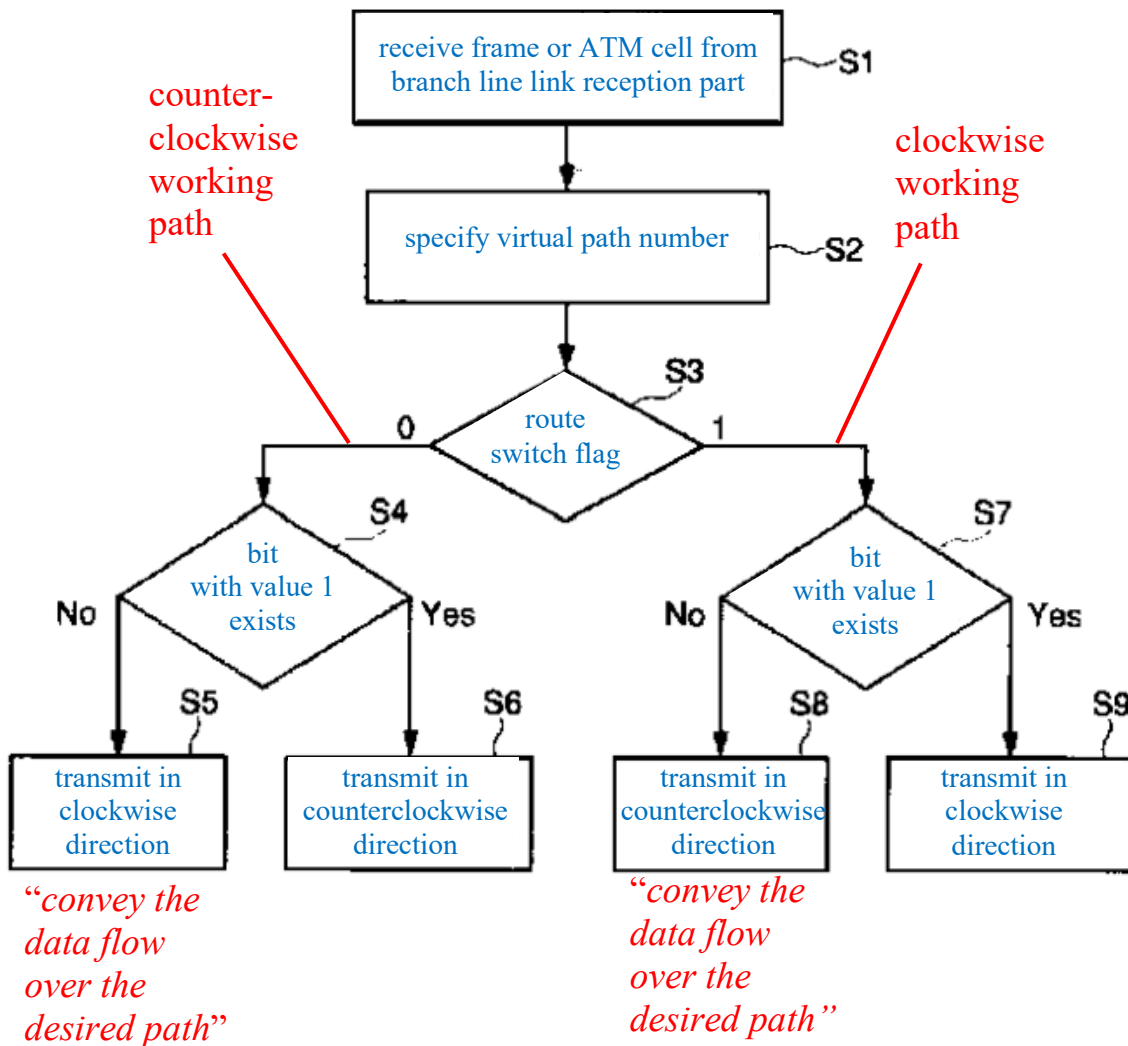
[3.1] *A method according to claim 1, wherein superimposing the masks comprises determining whether to convey the data flow over the desired path, to steer the data flow over an alternative path, or to stop conveying the data flow.*

First, for the reasons explained above at [1.3], Omichi describes the situation in which the system decides to maintain the data flow over the working path (“*desired path*”). If the result of the comparison (i.e., Boolean AND operation) between the ring link failure table (“*general mask*”) and the used ring link table (“*specific mask*”) is all zeros, then there are no failures along the working path.

If there are no bits having the same bit number and whose contents are both “1” (S4, No), this means either that no failure has occurred in the ring network or that even if a failure has occurred, the working path does not include a ring link where a failure has occurred. [Route selection processing part 8] **then causes ring link transmission** part 10 to transmit frame 5 or ATM cell 6 **in the clockwise [direction]** (S5).

Ex.1005, [0040]; Ex.1003, ¶94

Accordingly, traffic is maintained along the clockwise working path. Omichi also describes the same example in the case where the working path is the counterclockwise path. “If no bits have the same bit number and content of “1” (S7, No), this means either that no failure has occurred in the ring network or that even if a failure has occurred, the working path does not include a ring link where a failure has occurred.” Ex.1005, [0042]. The route selection processing part 8 “then causes ring link transmission part 10 to transmit frame 5 or ATM cell 6 in the counterclockwise [direction] (S8).” Ex.1005, [0042]; Ex.1003, ¶95.



Ex.1005, Fig. 7 (annotated); Ex.1003, ¶95.

Second, for the reasons explained above at [1.3], Omichi describes the situation where the system decides to switch from the working path to the protection path (*"to steer the data flow over an alternative path"*). For a given ring link, if the bits from both tables are "1," this means that the working path flows over a fault, and traffic should be re-routed on the opposite ring (i.e., the protection

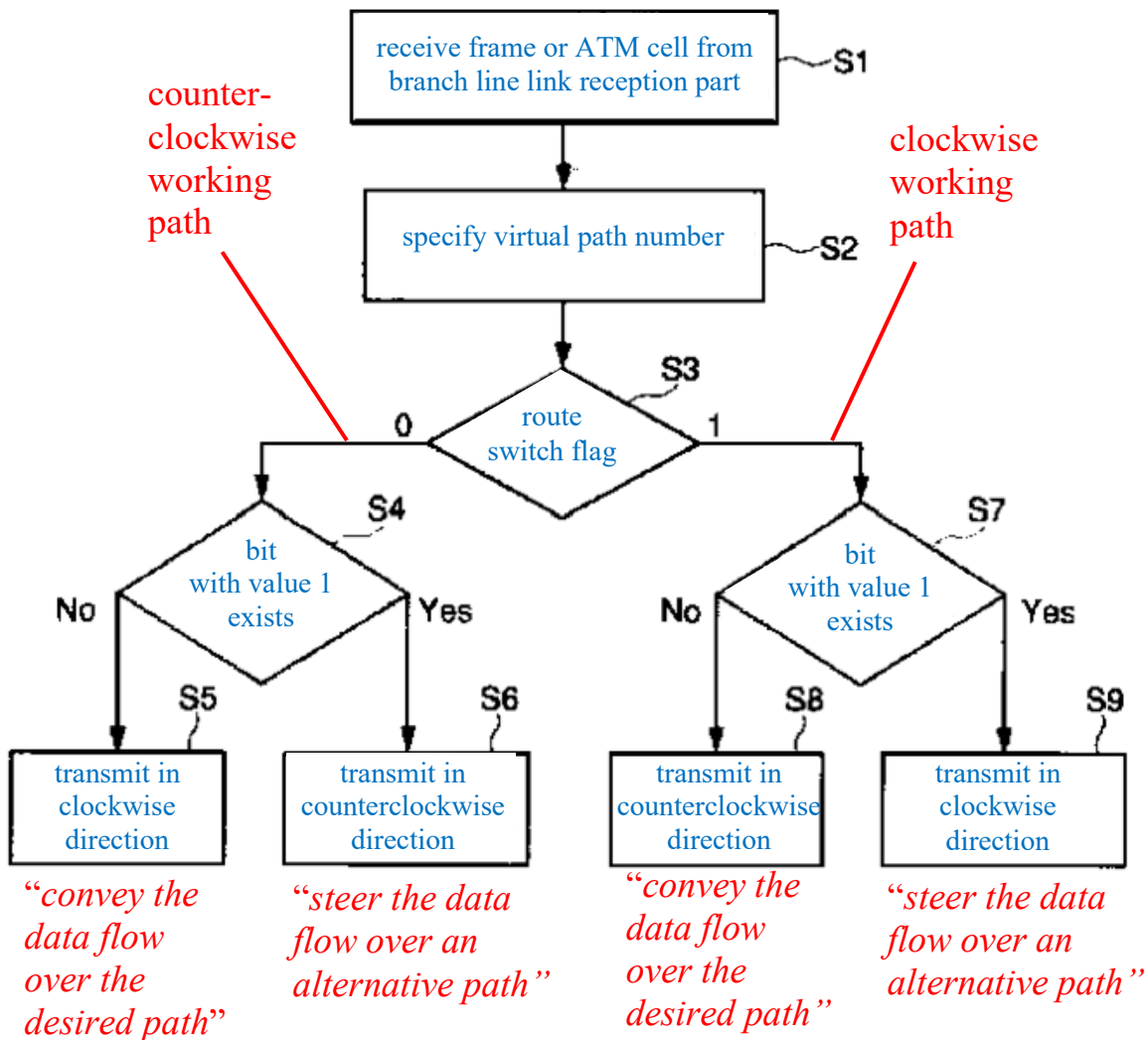
path).

If there are bits having the same bit number and whose contents are both “1” (S4, Yes), because this means that the working path includes a ring link where a failure has occurred, ring link transmitting unit 10 is made to transmit frame 5 or ATM-cell 6 in the counterclockwise direction. That is, frame 5 or ATM-cell 6 is transmitted using the protection path (S6).

Ex.1005, [0041]; Ex.1003, ¶96.

Accordingly, traffic is rerouted to the protection path. Omichi also describes the same example in the case where the working path is the counterclockwise path. Ex.1003, ¶97.

Omichi also illustrates the case where the working path is in the counterclockwise direction and the protection path is in the clockwise direction: “A value of ‘1’ shows that the working path is counterclockwise.” Ex.1005, [0038]. In this case, if the working path includes a fault, traffic is rerouted from the (counterclockwise) working path to the (clockwise) protection path. “Furthermore, if there are bits having the same bit number and whose contents are both ‘1’ (S7, Yes), the working path includes a ring link where a failure has occurred.” Ex.1005, [0043]. “The ring link transmission part 10 is then made to transmit frame 5 or ATM cell 6 in the clockwise direction. In other words, frame 5 or ATM cell 6 is sent using the protection path.” Ex.1005, [0043]; Ex.1003, ¶98.



Ex.1005, Fig. 7 (annotated); Ex.1003, ¶98.

Third, it would have been obvious that if both rings have a fault, there would be no reason to transmit data along either path. Ex.1003, ¶99. In other words, if both the working path and the protection path both fail, there is no reason to transmit data along either path. Such a decision is merely obvious to try. Ex.1003, ¶99. When faced with a situation in which all paths have failed, there are

two options: transmit the data or not transmit the data. It would have at least been obvious to not transmit data when both paths have failed. Ex.1003, ¶100. A POSITA would have thus found it obvious “*to stop conveying the data flow*” when both the working path and the protection path fail. Ex.1003, ¶100. Indeed, it would be inconsistent with Omichi’s goal of using “link bands efficiently” to attempt to transmit data when both paths to the destination node have failed. *See* Omichi, [0009], [0048].

Accordingly, Omichi teaches two of the three alternative recitations of this claim, and a POSITA would have found the third alternative recitation obvious in view of Omichi’s teachings. Ex.1003, ¶101.

Thus, Omichi’s system compares the ring link failure table with the used ring link table to decide whether to stay with the working path or switch to the protection path, which renders obvious “*wherein superimposing the masks comprises determining whether to convey the data flow over the desired path, to steer the data flow over an alternative path, or to stop conveying the data flow*” as claimed. Ex.1003, ¶¶94-102.

5. Claim 4

[4.1] *A method according to claim 3, wherein superimposing the masks comprises generating a combined mask, and determining that the data flow should be conveyed over the desired path when the combined mask is null.*

First, as described above at [1.3], Omichi describes comparing the ring link

failure table with the used ring link table through a Boolean AND operation. The result of this comparison operation teaches a “*combined mask*” as claimed.

Ex.1003, ¶103.

Both the ring link failure table of Fig. 6a and the used ring link table of Fig. 6b are represented using bits. *See* Ex.1005, [0036]-[0037]. Accordingly, it would have been obvious that the comparison operations described by Omichi similarly results in a set of bits. The resulting set of bits is thus achieved by combining (through an AND operation) the ring link failure table and the used ring link table. The resulting set of bits is thus a “*combined mask*” as claimed. Ex.1003, ¶104.

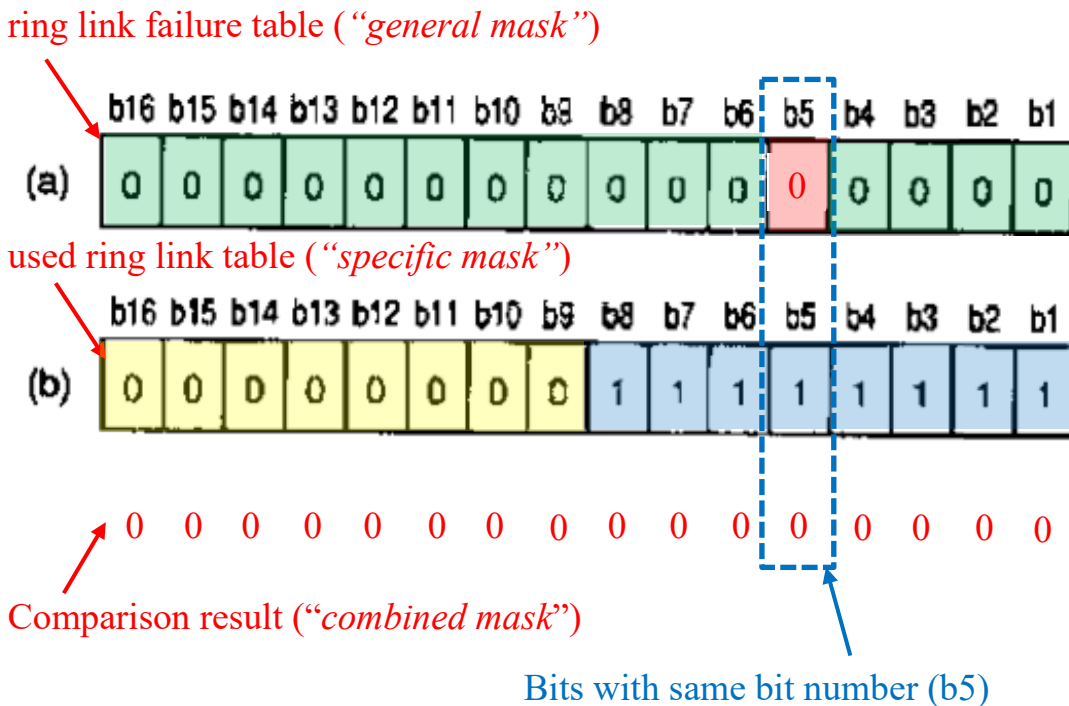
Second, for the reasons described at [3.1], Omichi teaches “*determining that the data flow should be conveyed over the desired path.*” Ex.1003, ¶105.

Third, Omichi’s system decides to stay with the working path when the result of the comparison is that no bits are “1” (“*when the combined mask is null*”). “If there are no bits having the same bit number and whose contents are both “1” (S4, No), this means either that no failure has occurred in the ring network or that even if a failure has occurred, the working path does not include a ring link where a failure has occurred.” Therefore, the system stays with the working clockwise path and thus “causes ring link transmission part 10 to transmit frame 5 or ATM cell 6 in the clockwise [direction] (S5).” Ex.1005, [0040]. In binary, values can be either a zero or a one. Thus, when Omichi describes a result in which there are no

‘1’s, it means that all values are ‘0.’ Ex.1003, ¶¶106-07.

Omichi also describes the same example in the case where the working path is the counterclockwise path. “If no bits have the same bit number and content of “1” (S7, No), this means either that no failure has occurred in the ring network or that even if a failure has occurred, the working path does not include a ring link where a failure has occurred.” The system thus stays with the working counterclockwise path and “causes ring link transmission part 10 to transmit frame 5 or ATM cell 6 in the counterclockwise [direction] (S8).” Ex.1005, [0042]; Ex.1003, ¶108.

Dr. Min provides a modified ring link failure table to match the scenario described above, in which “no failure has occurred in the ring network.” Ex.1005, [0040], [0042]; Ex.1003, ¶109.



Ex.1005, Figs. 6a, 6b (partial, annotated); Ex.1003, ¶109.

A POSITA would have understood that the term “null” refers to a set of ‘0’s. Ex.1006, 748. Accordingly, when “there are no bits having the same bit number and whose contents are both ‘1,’” the combined result of the Boolean AND operation is a set of ‘0’s (“the combined mask is null”). Ex.1005, [0040]; Ex.1003, ¶110.

Thus, because Omichi’s system determines to stay with the working path when the comparison result between the ring link failure table and used ring link table has no bits with both a 1, thus resulting in only zeros, Omichi renders obvious “wherein superimposing the masks comprises generating a combined mask, and determining that the data flow should be conveyed over the desired path when the

combined mask is null.” Ex.1003, ¶103-11.

6. Claim 5

[5.1] *A method according to claim 3, wherein superimposing the masks comprises generating a combined mask, and determining that the data flow should be steered over the alternative path when the combined mask corresponds to the general mask.*

First, as described above at [1.3], Omichi describes comparing the ring link failure table with the used ring link table through a Boolean AND operation. The result of this comparison operation teaches a “*combined mask*” as claimed.

Ex.1003, ¶112.

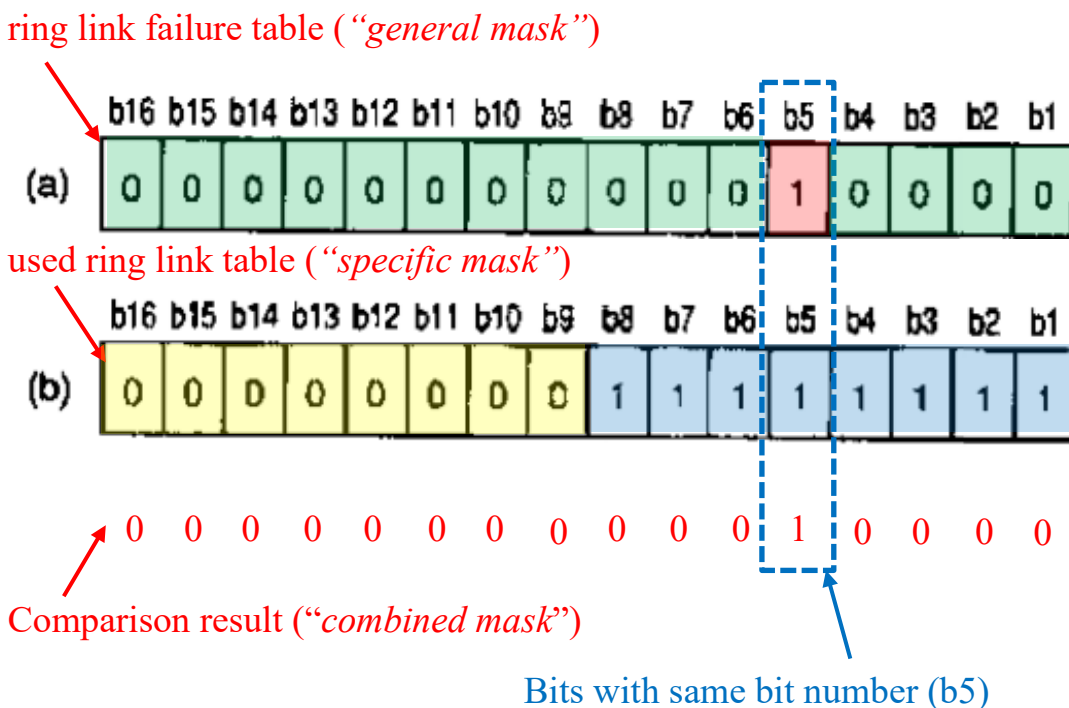
Second, for the reasons described at [3.1], Omichi teaches “*determining that the data flow should be steered over the alternative path.*” Ex.1003, ¶113.

Third, Omichi’s system decides to switch from the working path to the protection path when there are bits having the same bit number and whose contents are both ‘1.’ When “there are bits having the same bit number and whose contents are both ‘1’ (S4, Yes), because this means that the working path includes a ring link where a failure has occurred, ring link transmitting unit 10 is made to transmit frame 5 or ATM-cell 6 in the counterclockwise direction.” Ex.1005, [0041]. The system then switches to the protection path: “That is, frame 5 or ATM-cell 6 is transmitted using the protection path (S6).” Ex.1005, [0041]; Ex.1003, ¶114.

Where the clockwise direction is the protection path, and “there are bits

having the same bit number and whose contents are both “1” (S7, Yes), the working path includes a ring link where a failure has occurred.” Ex.1005, [0043]. “The ring link transmission part 10 is then made to transmit frame 5 or ATM cell 6 in the clockwise direction. In other words, frame 5 or ATM cell 6 is sent using the protection path.” Ex.1005, [0043]; Ex.1003, ¶114.

The combined figure below illustrates the case where “there are bits having the same bit number and whose contents are both ‘1.’” Ex.1005, [0041], [0043].



Ex.1005, Figs. 6a, 6b (partial, annotated); Ex.1003, ¶115.

As can be seen, the comparison result (“combined mask”) is identical to the ring link failure table (“general mask”). Accordingly, “the combined mask corresponds to the general mask” as claimed. Ex.1003, ¶116.

Thus, Omichi's system determines to switch to the protection path when the comparison result between the ring link failure table and used ring link table matches the ring link failure table, which renders obvious "*wherein superimposing the masks comprises generating a combined mask, and determining that the data flow should be steered over the alternative path when the combined mask corresponds to the general mask.*" Ex.1003, ¶112-17.

7. Claim 6

[6.1] *A method according to claim 3, wherein superimposing the masks comprises generating a combined mask, and determining that the data flow should not be conveyed when the combined mask is neither null, nor does it correspond to the general mask.*

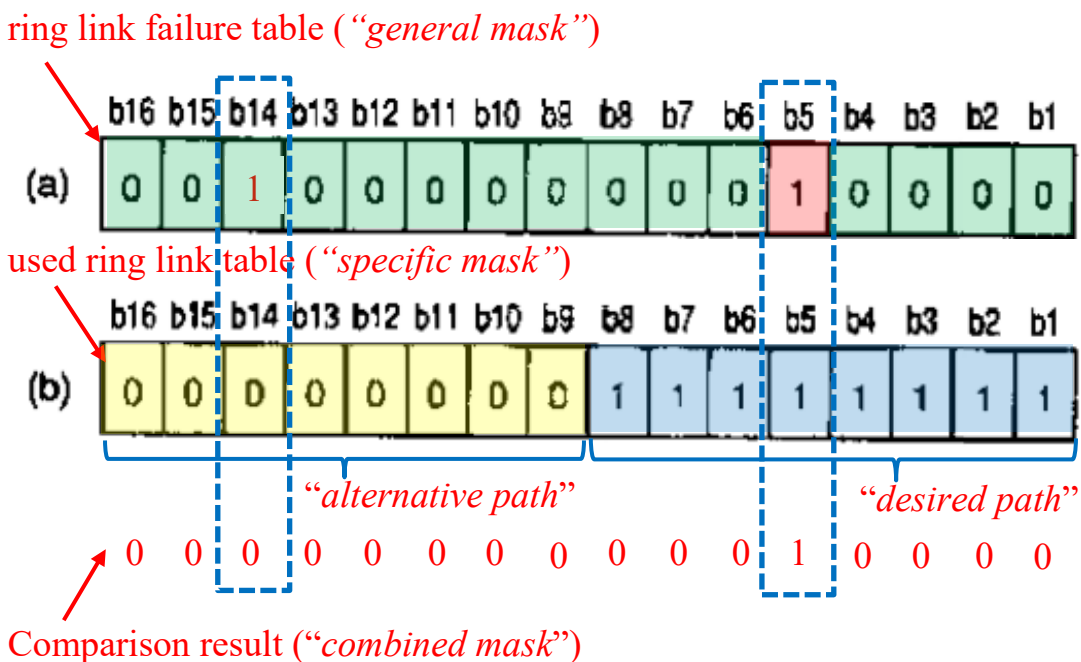
First, as described above at [1.3], Omichi describes comparing the ring link failure table with the used ring link table through a Boolean AND operation. The result of this comparison operation teaches a "*combined mask*" as claimed. Ex.1003, ¶118.

Second, for the reasons described at [3.1], it would have been obvious that where both the working path and the protection path fail, "*the data flow should not be conveyed.*" Ex.1003, ¶119.

Third, Omichi contemplates that either the clockwise path or the counterclockwise path may fail. *See* Ex.1005, [0041] (the clockwise path is the working path and "the working path includes a ring link where a failure has

occurred.”), [0043] (the counterclockwise path is the working path and “the working path includes a ring link where a failure has occurred.”). Because either path may fail, it may be the case that both paths fail at the same time. Ex.1003, ¶120.

Dr. Min provides a modified figure (shown below) to illustrate the case where there are at least two ring link failures (one on the working path and one on the protection path). Ex.1005, [0041], [0043]; Ex.1003, ¶121.



Ex.1005, Figs. 6a, 6b (partial, annotated); Ex.1003, ¶121.

As can be seen, the comparison result (“combined mask”) includes a ‘1’ (is not null) and is different than (does not correspond to) the ring link failure table (“general mask”). Accordingly, “the combined mask is neither null, nor does it

correspond to the general mask” as claimed. Ex.1003, ¶122.

Thus, in Omichi’s system when there is a fault in both the working path and the protection path, and there is thus no reason to transmit data, this will be indicated by a non-null comparison result that is different than the used ring link failure table, which renders obvious “*wherein superimposing the masks comprises generating a combined mask, and determining that the data flow should not be conveyed when the combined mask is neither null, nor does it correspond to the general mask.*” Ex.1003, ¶123.

8. Claim 7

[7.0] *A communication device for use in a bidirectional ring network, in which nodes are mutually connected by network segments,*

First, for the reasons described above at [1.0], Omichi teaches a bidirectional ring network having a plurality of branch insertion nodes (“*a bidirectional ring network, in which nodes are mutually connected by network segments.*”). Ex.1003, ¶124.

Second, each of Omichi’s branch insertion nodes is a “*communication device for use in*” the bidirectional network because each node communicates with the other nodes as described above at [1.0]. Ex.1003, ¶125.

[7.1] *the device comprising a network processor,*

First, Omichi’s branch insertion nodes (“*device[s]*”) include a processing

means (“*network processor*”). “[A] processing means that uses the information regarding the location of the ring link where a failure has occurred that is held in the first table, the information regarding the ring link to be used as a working path that is set in the second table.” Ex.1005, [0014]. “Because the processing means uses the values set in the first table, the second table and the route switching flag to determine whether or not a virtual path is affected by the failure of a ring link, whether or not a virtual path is affected by a failure of a ring link can be determined quickly, thus enabling a quick recovery from a failure.” Ex.1005, [0015]; Ex.1003, ¶126.

A POSITA would have recognized Omichi’s processing means to be a network processor, as network processors were commonly used in the branch nodes described by Omichi. *See e.g.*, Ex.1007, 6:42-43 (“Branch nodes 231-235 may each be associated with a host (such as a network processor).”). Ex.1003, ¶127.

The processing means performs the steps in Fig. 7: “FIG. 7 is a flowchart showing the **processing sequence** of a branch insertion node according to the present embodiment.” Ex.1005, [0039]; Ex.1003, ¶128.

Thus, Omichi’s branch insertion nodes include a processing means to perform the processes described within its disclosure, which renders obvious “*the device comprising a network processor.*” Ex.1003, ¶129.

[7.2] *which is adapted to construct a general mask indicating which of the segments are reachable in the event of a fault in the network, the general mask comprising a respective general mask bit for each segment, indicating whether the segment is reachable following occurrence of the fault, and*

First, as explained above at [7.1], Omichi describes “a processing means that uses the information regarding the location of the ring link where a failure has occurred that is held in the first table.” Ex.1005, [0014]. As described above, at [1.1], Omichi’s ring link failure table teaches a “*general mask*” as claimed. Ex.1003, ¶130.

Second, for the reasons explained above at [1.1], Omichi renders obvious “*which is adapted to construct a general mask indicating which of the segments are reachable in the event of a fault in the network, the general mask comprising a respective general mask bit for each segment, indicating whether the segment is reachable following occurrence of the fault.*” Ex.1003, ¶131.

[7.3] *to construct a specific mask for a given data flow to be conveyed through the network from a source node to a destination node, the specific mask indicating the segments on a desired path of the flow by comprising a respective specific mask bit for each segment, indicating whether the flow was to be conveyed over the segment had occurrence of the segment been operational before the fault, and*

First, as explained above at [7.1], Omichi describes “a processing means that uses ... the information regarding the ring link to be used as a working path that is set in the second table.” Ex.1005, [0014]. As described above, at [1.2], Omichi’s used ring link table teaches a “*specific mask*” as claimed. Ex.1003, ¶132.

For the reasons explained above at [1.2], Omichi renders obvious “*to construct a specific mask for a given data flow to be conveyed through the network from a source node to a destination node, the specific mask indicating the segments on a desired path of the flow by comprising a respective specific mask bit for each segment, indicating whether the flow was to be conveyed over the segment had occurrence of the segment been operational before the fault.*” Ex.1003, ¶133.

[7.4] *to superimpose the general and specific masks in order to determine a disposition of the flow.*

First, as described above at [7.1], Omichi describes a series of steps performed by a processing means (“*network processor*”) as illustrated in Fig. 7. “FIG. 7 is a flowchart showing the **processing sequence** of a branch insertion node according to the present embodiment.” Ex.1005, [0039]; Ex.1003, ¶134.

For the reasons explained above at [1.3], the steps described in connection with Omichi’s Fig. 7 render obvious “*to superimpose the general and specific masks in order to determine a disposition of the flow.*” Ex.1003, ¶135.

9. Claim 8

[8.1] *A device according to claim 7, wherein the processor is adapted to superimpose the masks by performing a Boolean operation on the masks.*

See [2.1] and [7.1]. Ex.1003, ¶136.

10. Claim 9

[9.1] *A device according to claim 7, wherein the processor is adapted to*

determine whether to convey the data flow over the desired path, to steer the data flow over an alternative path, or to stop conveying the data flow based on the superimposed masks.

See [3.1] and [7.1]. Ex.1003, ¶137.

11. Claim 10

[10.1] *A device according to claim 9, wherein the processor is adapted to superimpose the masks so as to generate a combined mask, and to determine that the data flow should be conveyed over the desired path when the combined mask is null.*

See [4.1] and [7.1]. Ex.1003, ¶138.

12. Claim 11

[11.1] *A device according to claim 9, wherein the processor is adapted to superimpose the masks so as to generate a combined mask, and to determine that the data flow should be steered over the alternative path when the combined mask corresponds to the general mask.*

See [5.1] and [7.1]. Ex.1003, ¶139.

13. Claim 12

[12.1] *A device according to claim 9, wherein the processor is adapted to superimpose the masks so as to generate a combined mask, and to determine that the data flow should not be conveyed when the combined mask is neither null, nor does it correspond to the general mask.*

See [6.1] and [7.1]. Ex.1003, ¶140.

XII. CONCLUSION

Accordingly, Petitioner has established a reasonable likelihood that the Challenged Claims are unpatentable.

Respectfully submitted,

Dated: June 2, 2025
HAYNES AND BOONE, LLP
2801 N. Harwood St., Suite 2300
Dallas, Texas 75201
Customer No. 27683

/Theodore M. Foster/
Theodore M. Foster
Lead Counsel for Petitioner
Registration No. 57,456

XIII. MANDATORY NOTICES

A. Real Party-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioner certifies that the real party-in-interest is Cisco Systems, Inc.

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), to the best knowledge of the Petitioner, the '859 patent is involved in the following cases:

Case Heading	Number	Court	Date
<i>Quicker Connections LLC v. Cisco Systems, Inc.</i>	2-24-cv-01074	EDTX	December 24, 2024

C. Lead and Back-up Counsel and Service Information

Lead Counsel

Theodore M. Foster
HAYNES AND BOONE, LLP
2801 N. Harwood St., Suite 2300
Dallas, TX 75201

Phone: (303) 382-6205
Fax: (214) 200-0853
ipr.theo.foster@haynesboone.com
USPTO Reg. No. 57,456

Back-up Counsel

David L. McCombs
HAYNES AND BOONE, LLP
2801 N. Harwood St., Suite 2300
Dallas, TX 75201

Phone: (214) 651-5533
Fax: (214) 200-0853
david.mccombs.ipr@haynesboone.com
USPTO Reg. No. 32,271

Calmann J. Clements
HAYNES AND BOONE, LLP
2801 N. Harwood St., Suite 2300
Dallas, TX 75201

Phone: (972) 739-8638
Fax: (214) 200-0853
calmann.clements.ipr@haynesboone.com
USPTO Reg. No. 66,910

Please address all correspondence to lead and back-up counsel. Petitioner consents to service in this proceeding by email at the addresses above.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioner hereby certifies, in accordance with and in reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 9,622.

Pursuant to 37 C.F.R. § 42.24(d), this word count excludes the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing.

Dated: June 2, 2025

/Theodore M. Foster/

Theodore M. Foster
Lead Counsel for Petitioner
Registration No. 57,456

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, service was made on Patent Owner as detailed below.

Date of service June 2, 2025

Manner of service PRIORITY MAIL EXPRESS

Documents served Petition for *Inter Partes* Review Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104 of U.S. 7,061,859; Petitioner's Exhibit List; All Exhibits; Petitioner's Power of Attorney.

Persons served May Patents Ltd.
c/o Dorit Shem-Tov
P. O. Box 7230
Ramat-Gan, - 5217102
ISRAEL

/Theodore M. Foster/
Theodore M. Foster
Lead Counsel for Petitioner
Registration No. 57,456