UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

ARISTA NETWORKS, INC.,
Petitioner

v.

CORRIGENT CORPORATION,
Patent Owner

_____

IPR2023-00515
U.S. Patent No. 7,330,431

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

TABLE OF CONTENTS

Page

I. Introduction 1
II. Grounds for Standing 1
III. Summary of the ’431 Patent 1
IV. Prosecution History 2
V. Effective Priority Date of the ’431 Patent 3
VI. Level of Ordinary Skill in the Art 3
VII. Claim Construction 3
VIII. Relief Requested and the Reasons for the Requested Relief 3
IX. Identification of How Claims Are Unpatentable 4
A. Challenged Claims 4
B. Grounds 4
C. Ground 1: Claims 1-5, 7-11, 25-26 Obvious Over Baker-Wright-Holender ’699 5
1. Baker 5
2. Wright 6
3. Holender ’699 7
4. Reasons to combine Baker, Wright, and Holender ’699 7
5. Claim 1 15
6. Claim 2 38
7. Claim 3 39
8. Claim 4 42
9. Claim 5 42
10. Claim 7 44
11. Claim 8 46
12. Claim 9 47
11. Claim 10 50
12. Claim 11 52
13. Claim 25 54

14. Claim 26 58
D. Ground 2: Claims 12-16, 18-24, 27-30 Obvious Over Baker-Wright-Holender '699-Holender '894 58
1. Holender '894 58
2. Reasons to combine Baker and Holender '894 58
3. Claim 12 58
4. Claim 13 66
5. Claim 14 66
6. Claim 15 66
7. Claim 16 67
8. Claim 18 67
9. Claim 19 67
10. Claim 20 68
11. Claim 21 68
12. Claim 22 69
13. Claim 23 69
14. Claim 24 71
15. Claim 27 72
16. Claim 28 74
17. Claim 29 77
18. Claim 30 77
E. Ground 3: Claim 6 Obvious Over Baker-Wright-Holender '699-Zheng 77
1. Zheng 77
2. Reasons to combine Baker, Wright, Holender '699, and Zheng. 78
3. Claim 6 80
F. Ground 4: Claim 17 Obvious Over Baker-Wright-Holender '699-Holender '894-Zheng 82
1. Claim 17 82
X. Discretionary Denial Is Inappropriate 83
A. No basis for 35 U.S.C. § 325(d) denial 83

B. Discretionary denial under the *Fintiv* factors is not appropriate 84
1. No evidence regarding a stay 84
2. Parallel proceeding trial date 84
3. Investment in the parallel proceeding 85
4. Overlapping issues with the parallel proceeding 85
5. Whether petitioner is defendant 85
6. Other circumstances 86
C. Discretionary denial under *General Plastic* is not appropriate 86
1. Factor 1 86
2. Factors 2-5 87
3. Factors 6-7 87
XI. Conclusion 88
XII. Mandatory Notices 89
A. Real party-in-interest 89
B. Related matters 89
C. Lead and back-up counsel and service information 90
XIII. Appendix of Challenged Claims 91

PETITIONER'S EXHIBIT LIST[1]

Exhibit	Description
Ex.1001	U.S. 7,330,431
Ex.1002	Prosecution History of U.S. 7,330,431
Ex.1003	Declaration of Henry Houh, Ph.D. under 37 C.F.R. § 1.68
Ex.1004	*Curriculum Vitae* of Henry Houh, Ph.D.
Ex.1005	U.S. Pub. 2004/0095946 by Baker
Ex.1006	U.S. Pub. 2004/0174884 by Wright
Ex.1007	U.S. 6,104,699 to Holender
Ex.1008	U.S. 6,757,247 to Zheng
Ex.1009	U.S. Pub. 2003/0147400 by Devi
Ex.1010	U.S. 6,430,150 to Azuma
Ex.1011	U.S. Pub. 2007/0038753 by Jorgensen
Ex.1012	U.S. 7,675,926 to Olsen
Ex.1013	U.S. 7,953,888 to Ricciulli
Ex.1014	U.S. 7,450,598 to Chen
Ex.1015	Houh, Henry H., "Designing Networks for Tomorrow's Traffic," Thesis for the degree of Doctor of Philosophy at the Massachusetts Institute of Technology, February 1998
Ex.1017	United States District Court – National Judicial Caseload Profile (June 2022).
Ex.1018	U.S. Pub. 2004/0223497 to Sanderson
Ex.1020	U.S. 6,069,894 to Holender
Ex.1021	Declaration of Tal Lavian, Ph.D., under 37 C.F.R. § 1.68
Ex.1022	*Curriculum Vitae* of Tal Lavian, Ph.D.
Ex.1023	Printed Docket Corrigent Corp. v. Arista Networks, Inc., 1:22-cv-00497-RGA
Ex.1024	IETF RFC-2638 (1999)
Ex.1025	IETF RFC-2386 (1998)
Ex.1026	IETF RFC-3272 (2002)
Ex.1027	IETF RFC-3644 (2003)
Ex.1028	IEEE 802.17 Resilient Packet Ring Tutorial, November 7, 2003
Ex.1029	Raj Sharma, "Introduction to Resilient Packet Rings," March 2001

[1] Petitioner cites to exhibits' original page numbers. **Emphasis** in quoted material has been added. Claim terms are presented in *italics*.

Ex.1030	Enhanced ATM Port Adapter (ATM PA-A3) OC-12c, STM4, OC3c, STM1, DS3, E3, IMA, 2001
Ex.1031	Tim Sziget, "QoS Best Practices," October 5, 2004.
Ex.1032	Stein Gjessing and Fredrik Davik, "Performance Evaluation of Back-Pressure Fairness in RPR"
Ex.1033	Lim Wong, "Metro Ethernet Standards," May 2003
Ex.1034	Maly et. al, "Dynamic Bandwidth Allocation in a Network," 1988

I. INTRODUCTION

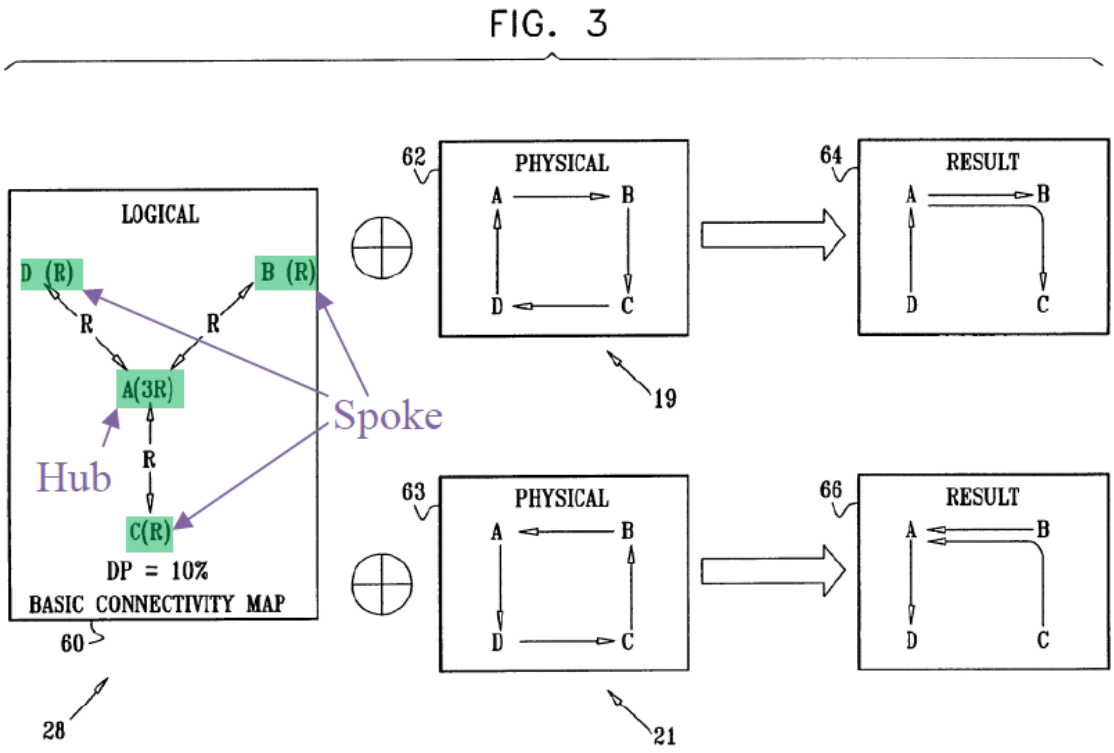
Arista Networks, Inc. ("Petitioner") respectfully requests that the Board review and cancel as unpatentable under (pre-AIA) 35 U.S.C. §103(a) claims 1-30 (the "Challenged Claims") of U.S. 7,330,431 (the "'431 patent," Ex.1001).

II. GROUNDS FOR STANDING

Petitioner certifies that the '431 patent is eligible for IPR and Petitioner is not barred or estopped from requesting IPR challenging the patent claims. 37 C.F.R. § 42.104(a).

III. SUMMARY OF THE '431 PATENT

The '431 patent relates to "bandwidth allocation that make more efficient use of the guaranteed bandwidth available on [a] ring network." Ex.1001, 2:7-10. The ring network is arranged in "a physical topology" with nodes and links, with "data transmission services" operating between nodes based on a "logical connection topology" different from the physical topology. *Id.* 2:11-16. Figure 3 (below) illustrates this with a hub-and-spoke logical topology mapped onto both directions of a two-way ring physical topology:



Ex.1001, Fig. 3 (annotated).

A network operator defines the logical topology and "required bandwidths for each of the nodes" via a manager node. Ex.1001, 7:12-28. The manager node maps this information to the physical topology, sums the bandwidth requirements for each link, and "allocates actual bandwidths to each of the links." *Id*. 7:42-62; Ex.1003, ¶¶25-27.

IV. PROSECUTION HISTORY

The examiner allowed the claims in the first Office Action, stating that the prior art allegedly failed to teach "*mapping [a] connection topology to the physical topology*..." and "*allocating a bandwidth for the service on each of the links*...." Ex.1002, 25-31.

V. EFFECTIVE PRIORITY DATE OF THE '431 PATENT

The '431 patent was filed September 3, 2004, and does not claim priority to any earlier application. For purposes of this IPR only, Petitioner does not dispute a September 3, 2004, priority date for the Challenged Claims.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A Person of Ordinary Skill in The Art ("POSITA") in September 2004 would have had a working knowledge of networking art that is pertinent to the '431 patent, including network communications techniques and bandwidth management methodologies. A POSITA would have had a bachelor's degree in computer science, computer engineering, electrical engineering, or an equivalent, and two years of professional experience relating to network communications including the use of logical topologies and bandwidth management. Lack of professional experience can be remedied by additional education, and vice versa. Ex.1003, ¶¶18-20.

VII. CLAIM CONSTRUCTION

Petitioner submits that, for the purposes of this proceeding and the grounds presented, no claim term requires express construction. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

VIII. 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.

IX. IDENTIFICATION OF HOW CLAIMS ARE UNPATENTABLE

A. Challenged Claims

Petitioner challenges all claims of the '431 patent.

B. Grounds

Ground	Claims	Basis
#1	1-5, 7-11, 25-26	35 U.S.C. § 103 (Pre-AIA) over Baker, Wright, and Holender '699
#2	12-16, 18-24, 27-30	35 U.S.C. § 103 (Pre-AIA) over Baker, Wright, Holender '699, and Holender '894
#3	6	35 U.S.C. § 103 (Pre-AIA) over Baker, Wright, Holender '699, and Zheng
#4	17	35 U.S.C. § 103 (Pre-AIA) over Baker, Wright, Holender '699, Holender '894, and Zheng

U.S. 2004/0095946 (Ex.1005, "**Baker**") was filed November 18, 2002.

U.S. 2004/0174884 (Ex.1006, "**Wright**") was filed March 5, 2003.

U.S. 6,104,699 (Ex.1007, "**Holender '699**") issued August 15, 2000.

U.S. 6,757,247 (Ex.1008, "**Zheng**") was filed February 20, 1998, and issued June 29, 2004.

U.S. 6,069,894 (Ex.1020, "**Holender '894**") issued May 30, 2000.

Baker and Wright are prior art under 35 U.S.C. § 102(e). Holender '699 and Holender '894 are prior art under 35 U.S.C. § 102(b). Zheng is prior art under 35 U.S.C. § 102(a) and (e).

C. Ground 1: Claims 1-5, 7-11, 25-26 Obvious Over Baker-Wright-Holender '699

1. Baker

Baker describes overlaying a logical topology (*e.g.*, a star topology) "on a non-star network, such as a ring network" using virtual paths, and automatically assigning network resources (including bandwidth) to the network's elements. Ex.1005, [0012], [0016], [0031], [0062]. Figure 5 shows an example star topology:

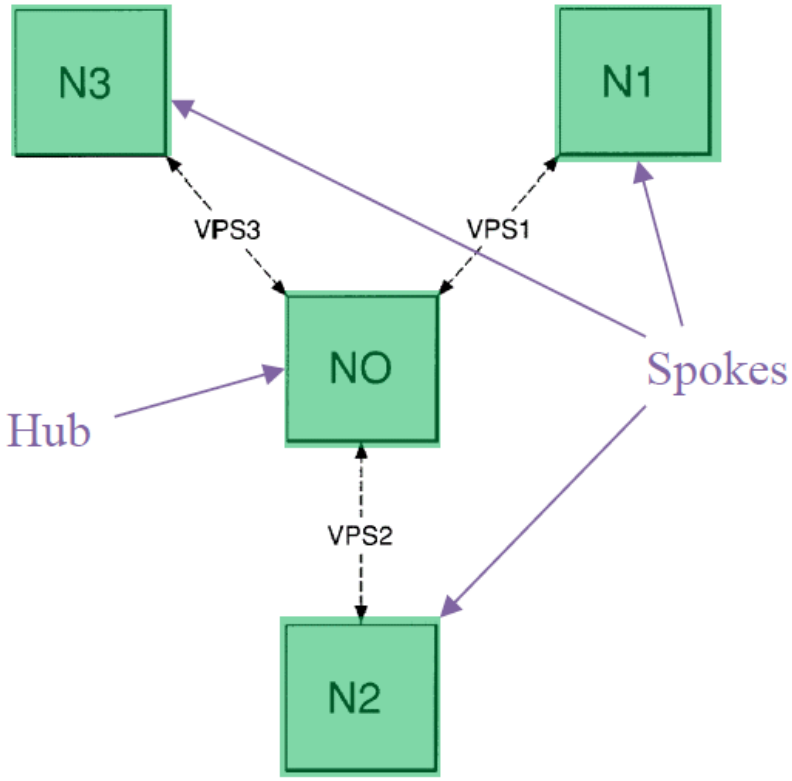


FIG. 5

Ex.1005, FIG. 5 (annotated); Ex.1003, ¶¶32-33.

Automatically assigning network resources includes "detecting the topology of connected elements in the network... allocating the network resources, and assigning the network resources to the network elements." Ex.1005, [0016]; Ex.1003, ¶34.

2. Wright

Like Baker, Wright discloses a logical topology overlaid onto a physical topology, and a procedure for assigning network resources. *See* Ex.1006, [0015]-[0016]. Wright's system constrains the logical connectivity to a "restricted topology (e.g., a virtual topology)" through the physical network to minimize bandwidth reservations used for providing "a bandwidth QoS." Ex.1006, [0016]-[0017]. The system receives the logical connectivity as data, provided "in terms of edge nodes and communication requirements between edge nodes" including "queuing and link scheduling mechanisms" for bandwidth guarantees. Ex.1006, [0018], [0015], [0024]. The "restricted topology" is created for a VPN service using the "logical connectivity data" and physical connections, and the bandwidth requirements calculated for "links within the restricted topology." Ex.1006, [0007], [0015], [0017], [0024]. Wright teaches reserving bandwidth on each physical link traversed by the restricted topology based on the calculation. Ex.1006, Abstract, [0005]-[0007], [0018], [0024]; Ex.1003, ¶¶35-37.

3. Holender ’699

Holender ’699, like Baker and Wright, discusses “partitioning of physical network resources” so multiple logical networks overlay the same physical network. Ex.1007, 1:6-8, 3:54-58. The overlaid network topologies “differ from the topology of the underlying physical network.” Ex.1007, 4:22-30; FIG. 1. Separate logical networks are offered for different services to support the often-different demands the different services have on resources including “bandwidth.” Ex.1007, 3:60-67. This separation supports service classes (also called traffic classes) arranged in groups “of similar properties...handled together in a logical network.” Ex.1007, 3:67-4:15, 4:66-5:5; Ex.1003, ¶¶182-84.

4. Reasons to combine Baker, Wright, and Holender ’699

A POSITA considering the teachings of Baker would have also considered the teachings of Wright, as they are analogous prior art pertaining to the same field of endeavor, namely, managing network resources for logical topology connections over an underlying physical topology. *See, e.g.,* Ex.1005, [0016] (disclosed is a method for automatically assigning network resources), [0030] (logical topology overlaid onto physical ring network); Ex.1006, [0005] (connectivity data received for logical topology and bandwidth reserved). A POSITA would have been motivated to combine the teachings of Baker and Wright for multiple reasons, as discussed below. Ex.1003, ¶38; Ex.1021, ¶95.

First, Baker teaches several concepts, including the overlaying of a logical topology onto a physical topology, assigning and managing network resources, and conveying traffic between nodes, while Wright provides further details about those same operations. For example, while Baker discloses overlaying a logical topology (such as a star topology) on an underlying physical network (such as a ring network), Baker is not concerned with where the logical topology originated. *See* Ex.1005, [0030]. A POSITA would have been motivated to turn to Wright for logical topology origination details, including a node receiving logical topology information. Ex.1003, ¶39; Ex.1021, ¶96

Wright discloses a node receiving "logical connectivity data," which is used to define a "restricted topology" (i.e., a logical topology) over a physical topology. Ex.1006, [0005]. It was well-known for one or more network nodes to receive logical topology information of the type disclosed in Baker, as demonstrated by Wright. *See, e.g.,* Ex.1006, [0005] (logical connectivity data received and used for logical topology); Ex.1010, 3:63-67 (each node "retains ... logical topology information"), 6:26-36 (nodes communicate logical topology updates to each other). It would have been obvious for a POSITA to turn to Wright for details regarding the receipt of logical connectivity data. Ex.1003, ¶39.

Baker discloses assigning network resources to network elements and managing bandwidth in the network. *See* Ex.1005, [0016] (assign network

resources), [0062] (bandwidth management). Wright provides details about assigning and managing bandwidth for a network such as Baker's (a logical topology over a physical topology). *See* Ex.1006, [0016]-[0018], [0024]. For example, Wright determines logical connection bandwidth requirements, and aggregates those requirements on underlying physical links. *Id.* It would have been obvious to turn to Wright for details about bandwidth (for links and nodes) and the assignment of bandwidth as a network resource in Baker. Ex.1003, ¶40.

Baker also describes that traffic is conveyed between nodes in the physical network according to an overlaid logical topology, but Baker is agnostic to the types of services supported by, or associated with, that traffic. *See* Ex.1005, [0012], [0037]-[0038], [0080]. Wright provides, as examples of services that are traffic, a virtual private network (VPN) service, VoIP, video-on-demand, and video conferencing. *See* Ex.1006, [0003], [0015], [0025]. A POSITA would have been additionally motivated to apply Wright's additional examples of the types of service whose traffic traverses Baker's network. Ex.1003, ¶41.

Second, a POSITA would have had a reasonable expectation of success in combining the teachings of Wright with Baker. Ex.1003, ¶42. Wright's teachings are compatible with Baker's. Baker teaches "using Asynchronous Transfer Mode (ATM) over SONET [Synchronous Optical NETwork]." Ex.1005, [0037]. Wright, similarly, teaches using SONET for the physical links with ATM virtual circuits over

those links. Wright, [0015]; Ex.1007, 5:12-35 and FIG. 3 (ATM over SONET). Baker and Wright therefore teach using compatible network technologies. Ex.1003, ¶42; Ex.1021, ¶100.

Further, both Baker and Wright disclose the imposition of a logical network onto the physical network. In Baker, this is described as overlaying "a logical star topology ... on an underlying non-star network, such as a ring network" (which can be the physical network). Ex.1005, [0030]. In Wright, this is described as a "restricted topology" over the physical topology, based on "[l]ogical connectivity data" for VPN services. Ex.1006, [0005]-[0007], [0014]. A POSITA would have had a reasonable expectation of success in view of the compatibilities between Baker's and Wright's teachings, including logical networks overlaid onto similar underlying physical networks. Ex.1003, ¶43; Ex.1021, ¶101

Third, Baker's "head node" can implement Wright's teachings related to receiving connectivity data, determining bandwidth requirements, and supporting VPN services as a type of traffic. Baker's head node "executes the Administer Ring routine" as part of the overlay procedures of the logical topology onto the physical topology. Ex.1005, [0051]-[0052]. The head node is designated as a "peer group leader," or "PGL," which gives the PGL responsibilities beyond other peer nodes for routing and communication control. Ex.1005, [0046]. Baker teaches configuring the head node with additional computing and hardware resources so the "PGL/head

node" can accomplish its tasks. Ex.1005, [0047]. With these additional resources, Baker's head node would have sufficient resources to perform Wright's disclosed tasks, such that a POSITA would have had a reasonable expectation of success in combining Wright's and Baker's teachings. Ex.1003, ¶¶44-45.

Fourth, it would have been predictable and within a POSITA's skillset to combine Wrights' and Baker's teachings. Overlaying logical topologies onto physical topologies and managing available bandwidth were known concepts, as demonstrated by Wright and others. *See, e.g.*, Ex.1006, [0016]-[0018]; Ex.1009, [0015]. The combination of Baker's and Wright's teachings would predictably result in Baker's head node receiving logical topology information and assigning network resources (including bandwidth) based on the logical topology information, using techniques adapted from Wright. *See* Ex.1005, [0016]; Ex.1006, [0016]-[0018], [0024]. Applying Wright's concepts to Baker's network would advantageously allow Baker's network to provide "bandwidth QoS guarantees" for traffic such as Wright's connectionless VPN services. Ex.1006, [0014]; [0003]-[0004] (drawbacks of prior bandwidth management), [0015]; Ex.1005, [0013]; Ex.1003, ¶¶46, 48.

Finally, in view of the foregoing, the combination of Baker and Wright is nothing more than the combination of known elements (Baker's head node and traffic teachings, and Wright's procedure and VPN service teachings), according to known methods (using Wright's teachings in Baker's network by the head node), to

yield predictable results (Baker's head node receiving the logical topology information, determining bandwidth requirements, and allocating bandwidth per Wright, with Baker's network providing service for traffic like Wright's VPN service, VoIP, VOD, etc.). Ex.1003, ¶47; Ex.1021, ¶¶102-104.

Additionally, a POSITA considering the teachings of Baker would have also considered the teachings of Holender '699, as they are analogous prior art pertaining to the same field of endeavor of partitioning physical resources of an underlying physical topology for overlaying logical topologies. *See* Ex.1005, [0016], [0030] (assigning network resources for a logical topology overlaid onto a physical topology); Ex.1007, 1:6-8, 3:54-58 (partitioning physical resources shared among logical networks); Ex.1006, [0005] (link bandwidth requirements based on physical and logical connections); Ex.1003, ¶185; Ex.1021, ¶105.

First, a POSITA would have been motivated to turn to Holender '699 for the well-known option of overlaying multiple networks onto the same physical network. Baker discloses multiple logical topologies sequentially overlaid "on top of the ultimate, actual physical network." Ex.1005, [0030], [0064] (sequential overlay); [0030] (logical star), [0066] (logical ring). Holender '699 describes how different service demands can be met by employing multiple different logical networks at the same time over single a physical network. Ex.1007, 4:22-30 3:6367; Ex.1003, ¶195; Ex.1021, ¶106.

Holender '699 explains that it was already known to establish multiple logical networks on top of a physical network, illustrated as logical networks 1 through *X* in Figure 1, all overlaid onto a single physical network. Ex.1007, 1:12-27, 4:22-30, FIG. 1. Holender '699's approach for overlaying different logical networks onto a physical network demonstrates a well-known alternative for overlaying different logical network types, such as Baker's, onto a physical network. Doing so would have been nothing more than applying Baker's multiple overlaying logical networks onto a physical network at the same time and in parallel. Ex.1003, ¶187; Ex.1021, ¶107.

Second, a POSITA would have been motivated to combine Holender '699 with Baker to obtain Holender '699's stated benefits. Recognizing the drawbacks of supporting different services with different demands (e.g., bandwidth, grade of service, etc., and difficulty of network management) on the same logical network, Holender '699 instead offers "separate logical networks" for different services with such differing demands. Ex.1007, 3:60-4:4. Grouping services with similar demands together into a logical network provides the benefit of simplified network management at a higher level. Ex.1007, 4:66-5:1, and 3:674:14. A POSITA would have been motivated to obtain these benefits for Baker. Ex.1003, ¶188.

Third, a POSITA would have had a reasonable expectation of success in combining Holender '699's teachings with the systems of Baker and the Baker-

Wright combination. Like Baker and Wright, Holender '699 teaches using a network with SONET on the bottom of the transmission strata and a cross-connect stratum based on ATM on top of that. Ex.1007, 5:12-37, 6:14-22, FIG. 3; Ex.1005, [0037]; Ex.1003, ¶189.

Further like Baker and Wright, Holender '699 overlays a logical network onto a physical network. Holender '699 illustrates this in Figure 1's logical networks LN1-LNX overlaid onto physical network PN. Ex.1007, 4:22-26, FIG. 1; *cf.* Ex.1005, [0030]; Ex.1006, [0005]-[0007]. Thus, Holender '699, Baker, and Wright all apply similar concepts (overlaying logical networks onto physical networks) in compatible manners, giving a POSITA a reasonable expectation of success in combining their collective disclosures. Ex.1003, ¶190; Ex.1021, ¶¶107-110.

Fourth, it would have been predictable and within a POSITA's skillset to combine Holender '699's and Baker-Wright's teachings. Baker's traffic traversing the network is an example of Holender '699's more general teachings of "a wide variety of traffic types" that have various service/traffic classes. *See* Ex.1005, [0012], [0038], [0080] (traffic); Ex.1007, 5:7-9, 4:66-5:11 (various traffic types). Further, Baker already contemplated imposing multiple logical networks onto a physical network. While Baker teaches doing so sequentially, Holender '699 demonstrates that it was known and within a POSITA's skillset to do so in parallel to each other. Ex.1007, 4:22-26, FIG. 1; Ex.1003, ¶¶191-92.

Combining Holender '699's teachings with Baker's and Wright's teachings is nothing more than the combination of known elements (Baker's and Wright's physical and logical networks, and Holender '699's multiple logical networks per physical network for different traffic classes), according to known methods (Holender '699's teaching to employ multiple parallel logical networks) to yield predictable results (expanding the Baker-Wright combination to allow for multiple logical networks in parallel). Ex.1003, ¶192; Ex.1021, ¶111-112.

Fifth, a POSITA would have also been motivated to turn to Holender '699 and combine it with Baker to achieve advantages associated with employing multiple simultaneous logical network overlays. These include supporting a variety of traffic types and services, of potentially varying bandwidth, grade of service, control demands, delay sensitivity, and/or loss sensitivity, etc. *See* Ex.1007, 3:604:8. For at least the above reasons, a POSITA would have been motivated to combine Baker and Holender '699. Ex.1003, ¶¶193-94.

5. Claim 1

[1.0] A method for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the method comprising:

Baker discloses the preamble, to the extent it is limiting.

First, Baker discloses "a method for automatically **assigning network resources** to a collection of elements in a network," which includes "partitioning

resources of the network, allocating the network resources, and assigning the network resources to the network elements." Ex.1005, [0016]. Baker's allocated network resources include "**bandwidth**." *See* Ex.1005, [0062]; Ex.1003, ¶¶50-51.

Second, Baker's managed network includes "*nodes*" coupled by "*links*" arranged in a "*physical topology*." Figure 1 (below) illustrates "a bidirectional physical communications ring where N0 through N7 represent routing and switching **nodes**, PH1 through PH8 represent bidirectional physical **links** between nodes." Ex.1005, Fig. 1, [0031]-[0032]; [0030] (ring topology can "correspond to the topology of the actual physical network"); Ex.1003, ¶52.

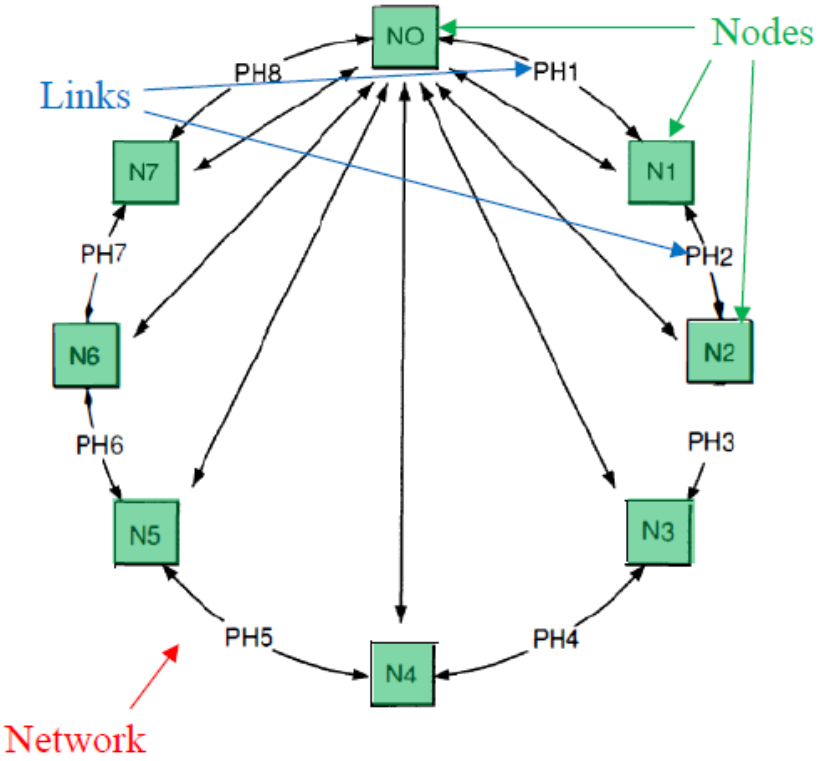


FIG. 1

Ex.1005, FIG. 1 (annotated); Ex.1003, ¶¶52-53.

Figure 2 illustrates another example of a ring network (a "physical topology") with links PH1-PH4 coupling nodes N0-N4:

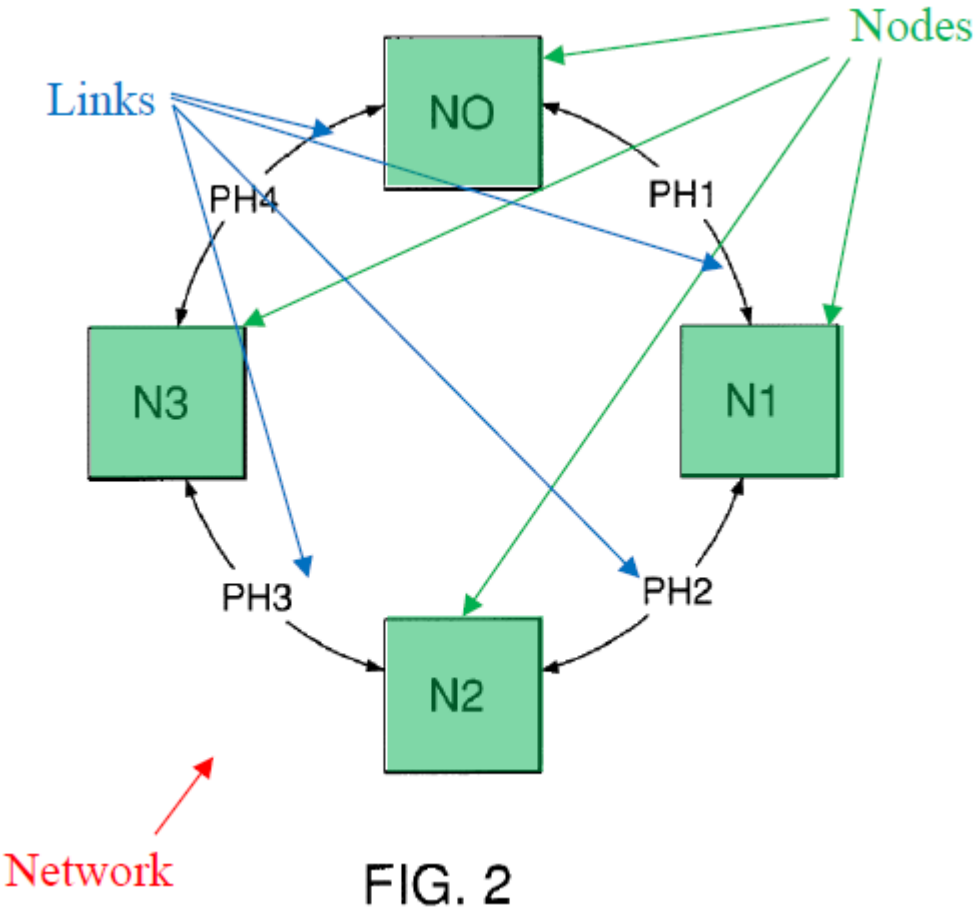


FIG. 2

Ex.1005, FIG. 2 (annotated), [0019]; Ex.1003, ¶¶53-54.

[1.1] defining between the nodes logical connections associated with a data transmission service to be provided over the network,

Baker, alone and in combination with Wright, renders this limitation obvious.

First, Baker discloses defining logical connections between the nodes. Baker overlays a logical topology onto a physical network. Ex.1005, [0030]. Figure 1

(below) illustrates physical links PH1-PH8 and "virtual paths" "VP1 through VP7" associated with the logical topology. Ex.1005, [0031]; [0032], [0076]. These virtual paths—which Baker also refers to as logical paths[2]—are "*logical connections*." Ex.1003, ¶¶55-56.

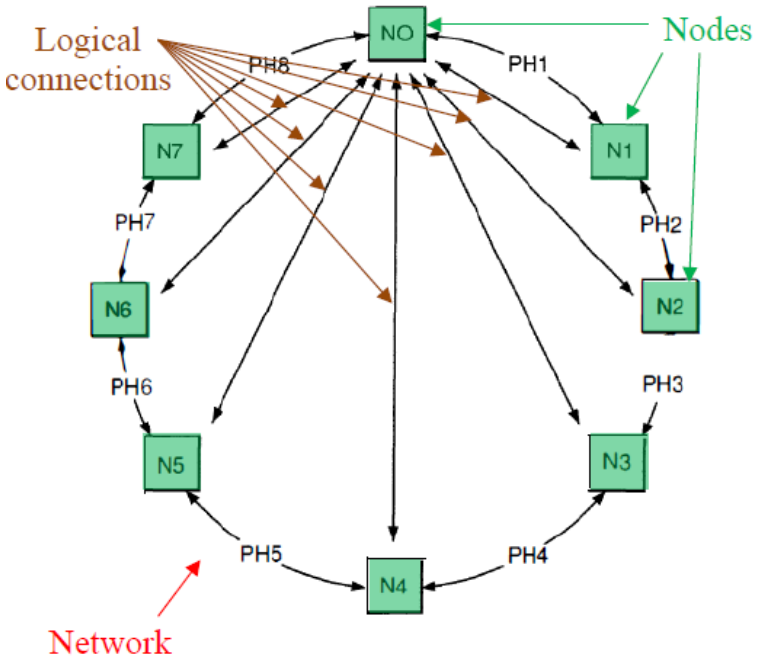
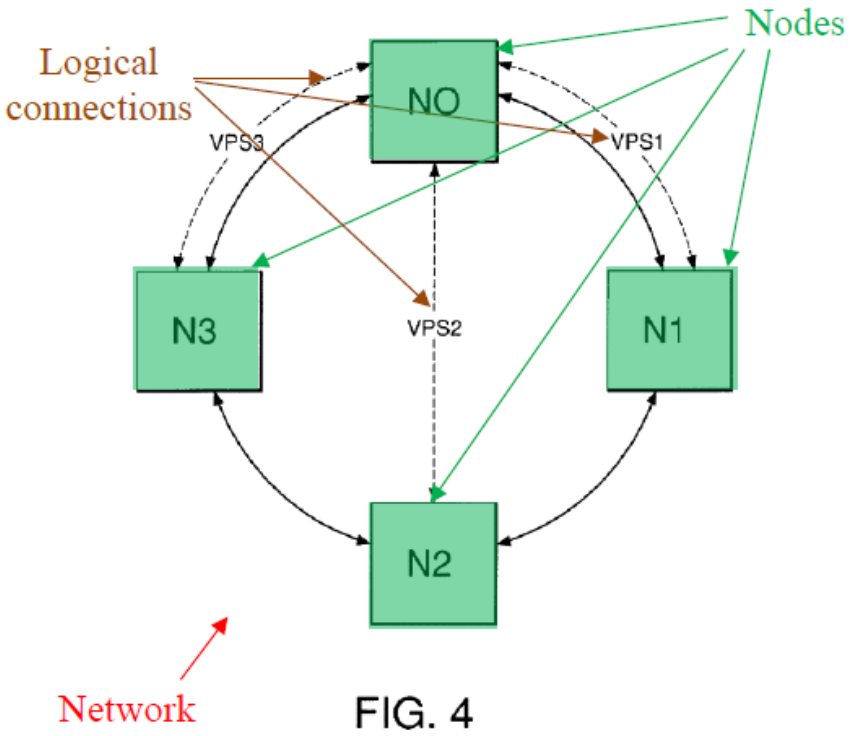


FIG. 1

Ex.1005, FIG. 1 (annotated); Ex.1003, ¶57.

[2] This petition generally uses the term "virtual path" in referring to Baker's disclosure. *See* Ex.1005, [0032] ("the terms 'virtual' and 'logical' are used interchangeably"), [0088] ("logical or virtual paths").

Baker's Figure 4 (below) illustrates another example, where a logical topology with virtual paths VPS1-VPS3 ("*logical connections*")[3] is overlaid onto a physical ring network. Ex.1005, [0054].



Ex.1005, FIG. 4 (annotated); Ex.1003, ¶¶58-59.

Baker creates a virtual path by "**predefining** a route through the network in advance of a communication." Ex.1005, [0076]. Baker's creation of multiple virtual

[3] A POSITA would have recognized that the "VPS" in Figure 4 correspond to the "VPG" described in the specification's description of Figure 4. Ex.1003, ¶59; Ex.1005, [0054] ("...dotted lines in FIG. 4 represent virtual paths...").

paths therefore discloses "*defining between the nodes logical connections*." Ex.1003, ¶60.

Second, Baker's virtual paths are associated with a "*data transmission service to be provided over the network*." For example, "data traffic" is transported on Baker's network, "logically carried" on logical links between nodes using the underlying physical topology. Ex.1005, [0080]; [0038]. Baker also discloses that "signals are transmitted" through the physical network according to the logical topology. Ex.1005, [0012]. Baker's "data traffic" and transmitted "signals" correspond to the claimed "*data transmission service*." *See* Ex.1001, 7:29-31 ("traffic of a data transmission service") & 1:20-30 ("services" that "transfer packets" and handle "traffic"); Ex.1003, ¶¶61-62, 64.

Baker's Figure 11 (below) illustrates virtual paths L1-L3, which "support information flow between their respective interconnected nodes." Ex.1005, [0080] ("...service traffic logically carried on L1..."). The "information flow" is another example of a "*data transmission service*." Thus, the virtual paths are "*associated with a data transmission service to be provided over the network*." Ex.1003, ¶63.

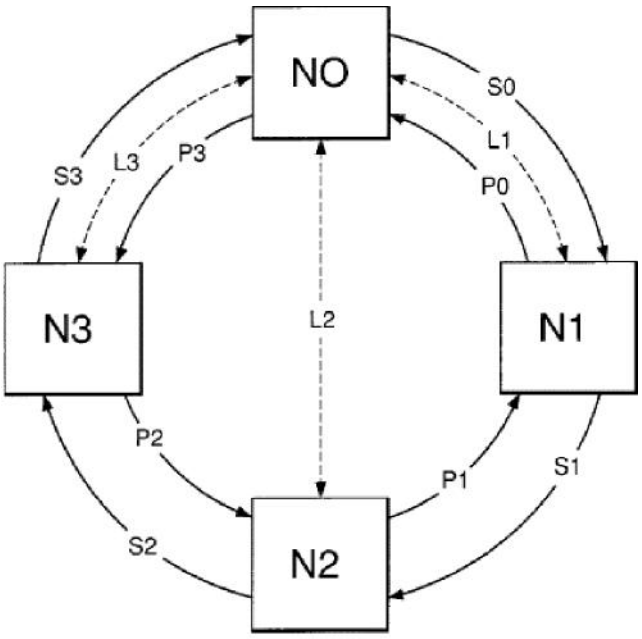


FIG. 11

Ex.1005, FIG. 11.

Third, the Baker-Wright combination also renders obvious "*logical connections*" associated with a "*data transmission service*." Like Baker, Wright describes a logical topology overlaid onto a physical topology. *See* Ex.1006, [0002]. Wright's "traffic engineering" for "virtual private network (VPN) services" with "bandwidth QoS guarantees" begins with "receiving physical connectivity data" and "[l]ogical connectivity data." Ex.1006, [0005]-[0007], [0014]. The bandwidth guarantees are provided "to ensure adequate bandwidth for the service." *Id.*, [0014]. Like Baker's virtual paths, the logical connectivity data illustrate how nodes communicate with one another "without regard to the physical implementation."

Ex.1006, [0016]; [0003] ("traffic between the endpoints of the VPN"). VPN services (another example "*data transmission service*") are provided as "packet-by-packet routing for a layer 3 service, or alternatively, an emulated VPLS [virtual private LAN service] for a layer 2 service." Ex.1006, [0015], [0025] (VoIP, video-on-demand, video conferencing as traffic examples on the VPN); *cf.* Ex.1001, 1:60-2:1 (VPLS as an example service). Wright's logical connectivity data used in traffic engineering for VPN services render obvious "*logical connections associated with a data transmission service to be provided over the network*." Ex.1003, ¶¶65-66.

A POSITA would have recognized that Wright's services (including VPN, VoIP, video-on-demand, and video conferencing) are examples of a "*data transmission service*." Baker's logical connections are configurable to convey traffic for such services since both Baker and Wright describe using the same underlying network communication technologies, such as ATM and SONET. Ex.1003, ¶67. It would have been obvious for various services (as described by Wright) to transmit packets over Baker's logical connections, and thus for such services to be associated with logical connections. Ex.1003, ¶¶67-68.

[1.2] the logical connections having a connection topology different from the physical topology;

Baker discloses this limitation. Baker's logical topology is different from the physical network onto which it is overlaid. Baker teaches a "logical star topology"

that is overlaid onto an "underlying non-star network, such as a ring network," where the underlying network is a physical network. Ex.1005, [0030], [0013]. Baker's Figure 1 (below) shows a "physical communications ring" overlaid with a "logical star topology." Ex.1005, [0031].

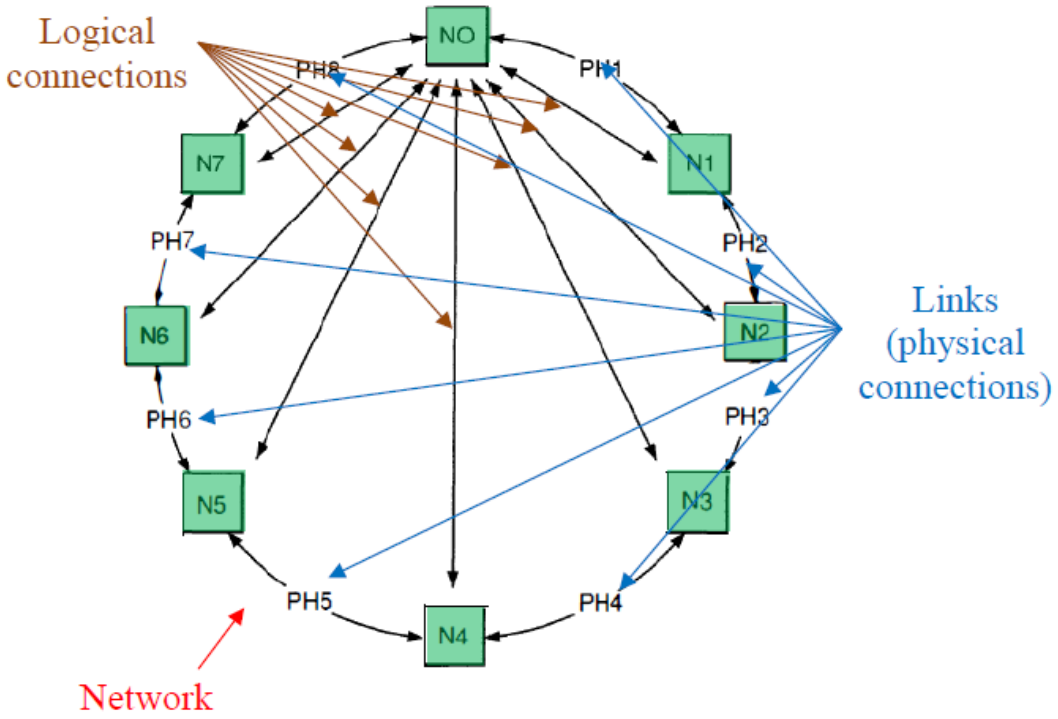
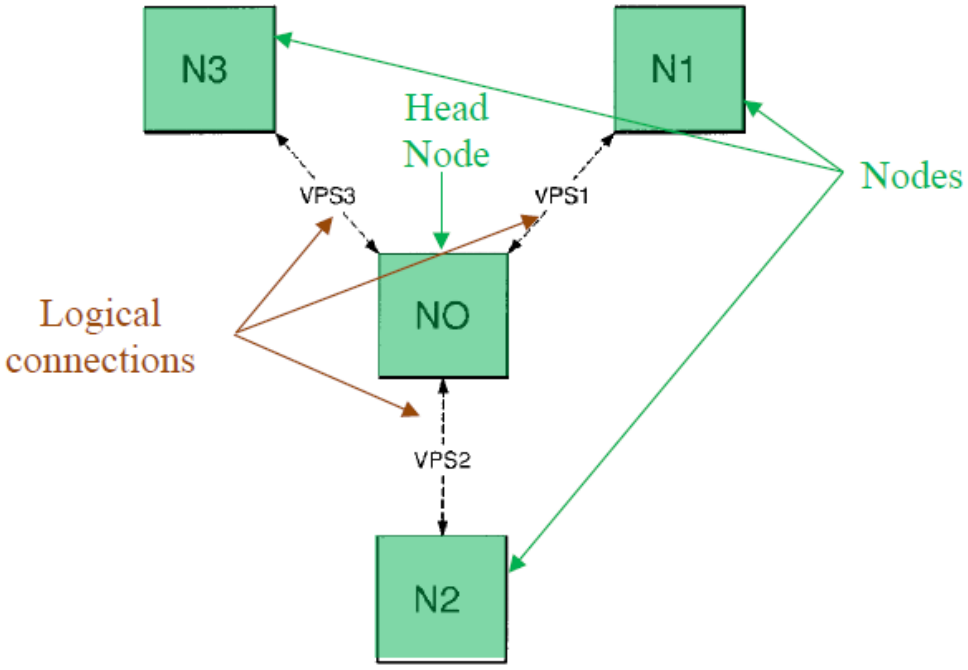


FIG. 1

Ex.1005, FIG. 1 (annotated); ¶¶69-70.



Ex.1005, Fig. 5 (annotated).

Thus, Baker discloses "*logical connections*" (the virtual paths in Figures 1 and 5) with a "*connection topology*" (a logical star topology) that is "*different from the physical topology*" (a ring network). Ex.1003, ¶¶71-73.

[1.3] determining respective bandwidth requirements for the logical connections based on parameters of the service;

The Baker-Wright combination renders this limitation obvious.

First, as discussed at [1.1], Baker's virtual paths and Wright's logical connectivity data, separately and together, render obvious "*logical connections*."

Baker describes managing network resources such as bandwidth. Ex.1005, [0062]. It would have been obvious to a POSITA that in managing a limited resource

such as bandwidth, Baker's system would have made decisions based on the bandwidth needed, desired, or used by the services operating over Baker's virtual paths. *See* Ex.1005, [0016], [0054]; Ex.1003, ¶¶74-76.

Second, Wright and Baker render obvious determining bandwidth requirements based on service parameters. Wright teaches "to identify the required bandwidth and to provide guarantees for that bandwidth." Ex.1006, [0018]. For example, "ATM virtual circuits are dimensioned to the required bandwidth." Ex.1006, [0018]; Ex.1003, ¶¶77-78.

Wright describes identifying exemplary bandwidth requirements for two logical connections: Node A to Node B (A-B), and Node A to Node C (A-C). Ex.1006, [0017]. Link A<->B requires *x* Mb/s, and link A<->C requires *y* Mb/s. *Id.* This identification of connection bandwidth requirements discloses "*determining respective bandwidth requirements for the logical connections*." Ex.1003, ¶78.

Wright further teaches the limitation with calculating "[a] bandwidth requirement for each link in the restricted topology." Ex.1006, [0005]-[0007], [0017] (e.g., links 302, 304, 306 of the restricted topology), [0024] (bandwidth requirements are determined for point-to-point links from "communication requirements" of logical connectivity data); FIG. 5:

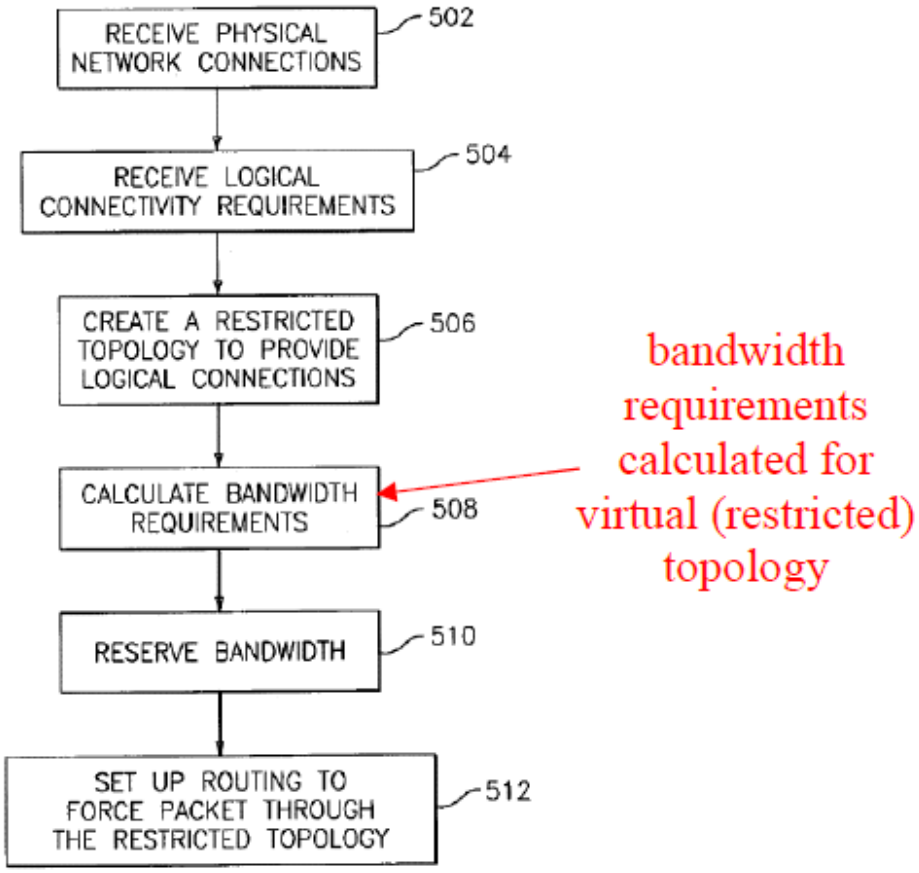


FIG. 5

Ex.1006, FIG. 5 (annotated); Ex.1003, ¶79.

From Figure 5, the bandwidth requirements are determined based on the "restricted topology," which is in turn created from the "logical connectivity requirements." Ex.1006, [0024]. It would have been obvious that the determined bandwidth requirements would include those for the logical connections (such as logical connections A-B and A-C in FIG. 3), since the bandwidth requirements of the logical connections are identified from the restricted topology. Ex.1003, ¶80;

Ex.1006, [0017]. Wright's "bandwidth requirements" calculated for virtual links of the virtual topology are therefore based on the "communication requirements" ("*parameters of the service*") of the logical connectivity requirements. Ex.1006, [0024]; Ex.1003, ¶¶80-81. Wright describes multiple additional exemplary ways in which bandwidth requirements are "*based on parameters of [a] service*":

- "[B]andwidth allocation at each link could specify a minimum bandwidth, or a maximum bandwidth." Ex.1006, [0018]. The minimum and maximum bandwidth values are each an example of "*parameters of the service*."
- VPN service may include "QoS [quality of service] guarantees." Ex.1006, [0020]. A QoS guarantee is another example "*parameter[] of the service*."
- "[T]he bandwidth requirement would correspond to the number of active calls" supported by the service. *Id.*
- Whether a service is "symmetric" or "asymmetric." *Id*.
- Whether a service is a "dynamic session based service[],... (e.g., video-on-demand, video conferencing)." Ex.1006, [0025].

See Ex.1003, ¶82.

Wright further describes example services such as voice over IP (VoIP) and video conferencing. Ex.1006, [0025]. A POSITA would have been familiar with

how video conferencing commonly requires significantly greater bandwidth than VoIP, and thus it would have been obvious to determine a bandwidth requirement based on a parameter specifying a type of communication service (e.g., whether voice or video). Ex.1003, ¶¶83-85.

To the extent Baker and Wright do not disclose this limitation, Baker, Wright, and Holender '699 render obvious determining bandwidth requirements based on service parameters. Ex.1021, ¶¶120-123. Holender '699 teaches that "[l]ogical link capacities are determined" where the "logical link capacity" refers to the "individual traffic capacity" that each individual logical link in the logical network has. Ex.1007, 1:53-55, 3:9-15, 6:4-10. Specifically, Holender '699's Figure 4 describes that the logical link capacities are determined "such that the route blocking on each individual route in each one of the logical networks is less than or possibly equal to a maximum allowed blocking probability, given for each individual route, by distributing the route blocking evenly among the logical links used by the respective route." *Id.*; FIG. 4.

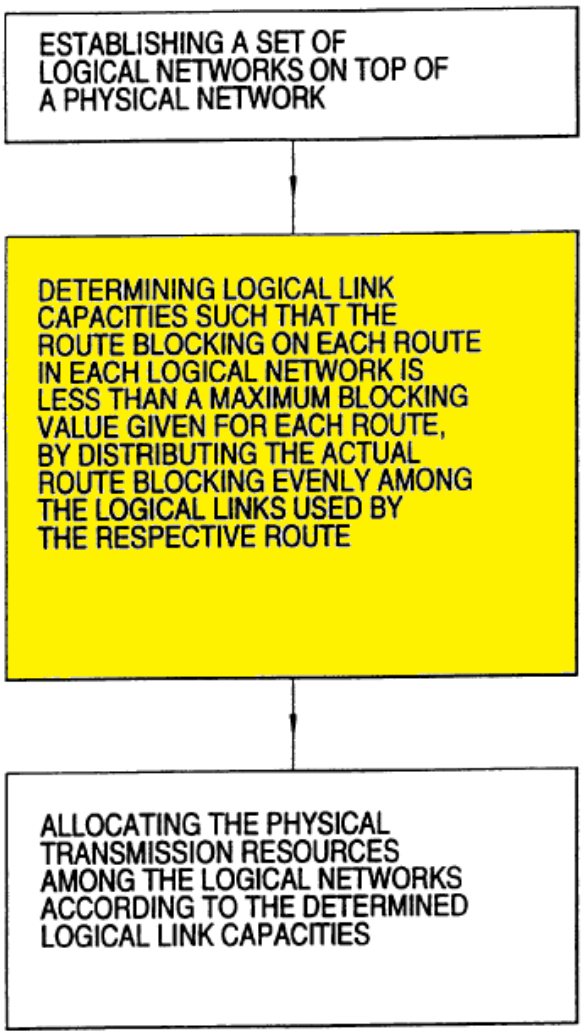


Fig.4

Ex.1007, FIG. 4 (annotated).

This teaching therefore discloses "*determining respective bandwidth requirements for the logical connections*." Ex.1021, ¶121.

Holender '699 further teaches that the bandwidth requirements are "*based on parameters of the service*" by disclosing that such requirements are determined

based on the "maximum allowed blocking value" for each route. *Id.*, 3:9-15, 6:4-10. The "maximum allowed blocking value" is similar to Wright's disclosure of a minimum and maximum bandwidth, which are examples of "*parameters of the service*." *See* Ex.1003, ¶¶80-81; Ex.1021, ¶122. Holender '699 further teaches how to derive the normalized logical link capacities associated with a physical link based on variables including, among others, the capacity of the physical link (C_k^{phsy}):

$$\hat{C}_{ki} = \frac{C_{ki}}{\sum_{l=1}^{n} C_{kl}} C_k^{phys}, \; i = 1, \ldots, n \qquad (8)$$

See id., 6:48-8:58 (describing the "mathematical framework and dimensioning model" to determine logical link capacities).

[1.4] mapping the connection topology to the physical topology, so that each of the logical connections is associated with one or more links of the physical topology; and

Baker discloses this limitation. Baker describes "a set of special 'star overlay' procedures including 'Administer Ring'" to overlay the logical topology to the physical topology. Ex.1005, [0051]. The Administer Ring procedure, when executed the first time, includes determining the total number of nodes and partitioning a virtual path (VP) address space by the number of nodes. Ex.1005, [0053]. For a logical star topology, each network node is assigned one or more

virtual paths between itself and a head node. Ex.1005, [0053]-[0054]. Figure 1 shows how each node has a VP connection to a central node N0. *See* Ex.1005, [0054]; [0032]. Figure 4 (below) similarly shows "virtual paths assigned between the head node [N0] and" each other node in the network using the underlying physical communication links between nodes. Ex.1005, [0054].

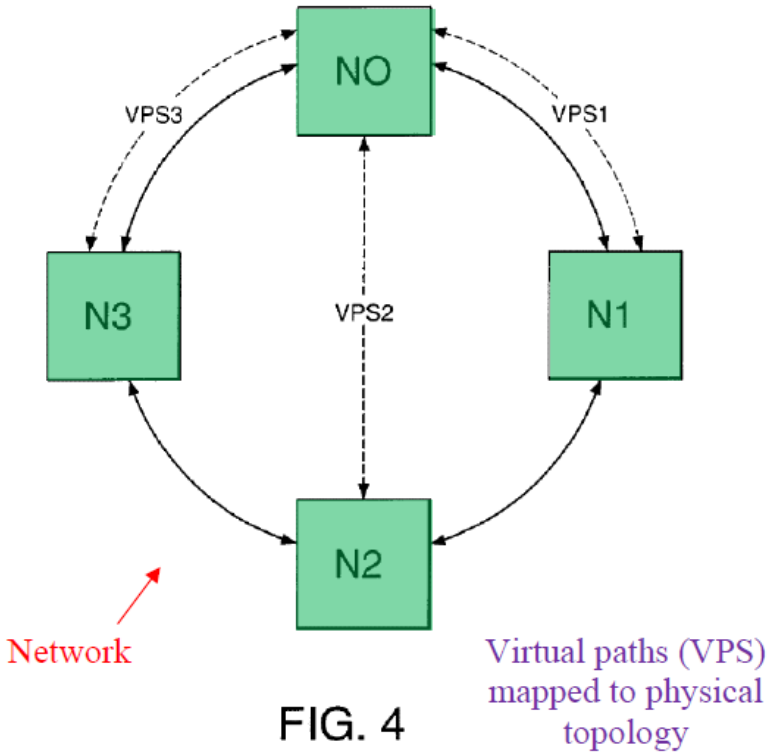


FIG. 4

Ex.1005, FIG. 4 (annotated); Ex.1003, ¶87.

Baker provides further examples of "mappings" that demonstrate how each virtual path corresponds to one or more physical links that physically carry traffic for the virtual path. *See, e.g.*, Ex.1005, [0069]-[0070] ("Traffic logically carried on

[virtual path] L2 in an abstraction may be physically carried on the combination of [physical links] PH2 and PH3."). Baker further describes "mapping between logical paths and physical paths" for the example network of Figure 10. Ex.1005, [0083], [0078]-[0085]. Baker's multiple disclosures and examples of overlaying or mapping virtual paths to a physical topology disclose the claimed "*mapping*." Ex.1003, ¶¶88-89.

[1.5] allocating a bandwidth for the service on each of the links in response to the bandwidth requirements of the logical connections and to the mapping.

The Baker-Wright combination renders this limitation obvious. **First**, Baker discloses a "method for automatically assigning network resources" that includes "allocating the network resources." Ex.1005, [0016]; *see also* [1.0]. One allocated resource is "bandwidth." Ex.1005, [0062]. Baker's resource and bandwidth allocation techniques are executed as part of an overlay procedure that includes the "Administer Ring" routine. Ex.1005, [0051]-[0056], Fig.3; Ex.1003, ¶¶90-91.

Second, Baker acknowledges a need to ensure that "sufficient bandwidth is available." *See* Ex.1005, [0009]. Wright provides further details on ensuring the available bandwidth is sufficient for the service (e.g., Baker's data traffic, transmitted signals, information flow, Wright's VPN service, voice-over-IP, video-on-demand, and video conferencing, *see* [1.1], [1.4]). Ex.1003, ¶92.

Wright teaches the use of "logical connectivity requirements" (virtual paths) and "communication requirements" (service parameters, *see* [1.3]) to "calculate bandwidth requirements on links." Ex.1006, [0024]. And, as demonstrated at [1.3], it would have been obvious for Wright's "communication requirements" to include "*bandwidth requirements*" for the logical connections as one of the "*parameters of the service*" so that the bandwidth requirements on the physical links may be calculated. Ex.1003, ¶93.

Wright further explains that after the bandwidth is calculated, "the required bandwidth is reserved" on "each link in the restricted topology." Ex.1006, [0024], [0005]. It would have been obvious that the bandwidth reservations are for the physical links corresponding to the virtual links of the virtual topology, since the restricted (virtual) topology is implemented "utilizing the underlying ... links 108 depicted in FIG. 1." Ex.1003, ¶94; Ex.1006, [0015]-[0016]. The bandwidth reservations are for the physical links even if Wright's "links within the restricted topology" (Ex.1006, [0024]) references the virtual links: "only the bandwidth actually required is reserved on the **links 108**" (i.e., physical links 108). Ex.1006, [0017]. It would have been obvious for reserving bandwidth on those virtual links to include reserving bandwidth on the underlying physical links ("*in response to... the mapping*"). Thus, Wright's description renders obvious "*allocating a bandwidth for the service on each of the links*." Ex.1003, ¶¶94-95.

Wright explains that bandwidth guarantees (e.g., allocations) are "designed to ensure adequate bandwidth for the service." Ex.1006, [0014]. Wright also explains that "only the bandwidth actually required is reserved." Ex.1006, [0017]. Accordingly, it would have been obvious for Wright's bandwidth allocations to be "*in response to the bandwidth requirements*" of the services provided. Ex.1003, ¶97.

Further, Wright's FIG. 5 process shows that bandwidth reservation ("*allocat[ion]*") in step 510 occurs after defining the logical network relative to the physical links (the "*mapping*") and calculating "*bandwidth requirements*." *See* Ex.1006, [0024], FIG. 5:

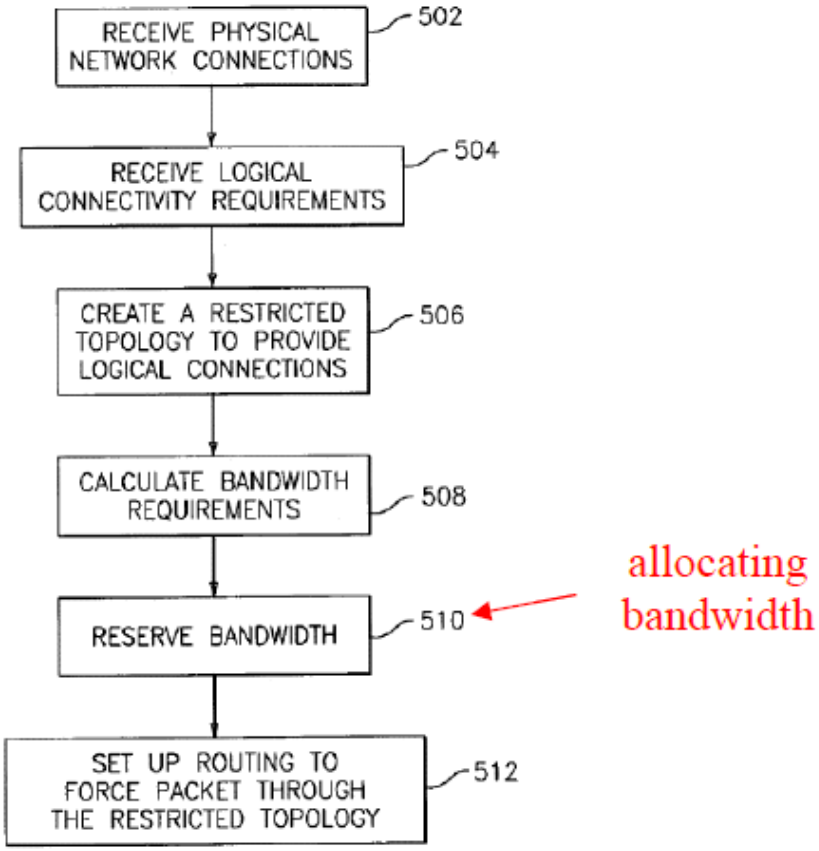


FIG. 5

Ex.1006, FIG. 5 (annotated); Ex.1003, ¶96.

A POSITA would have implemented Wright's "*allocat[ing]*" as part of Baker's "special 'star overlay' procedures" that includes "Administer Ring" (the "*mapping*"). Just as Baker's Administer Ring routine results in a logical-to-physical network mapping, Wright discloses a logical-to-physical mapping when creating the restricted topology. *See* Ex.1005, [0016], [0062], [0051]-[0056].

Wright's allocation follows the creation of the restricted topology, and thus in combination with Baker would follow Baker's "Administer Ring" routine

("*mapping*"). *See* Ex.1006, [0024]; Ex.1003, ¶96. In addition to following the logical-to-physical mapping, Wright's "*allocating*" occurs after the bandwidth determination ("*determining*"). Ex.1006, [0024]. It would have therefore been obvious that the logical-to-physical mapping and bandwidth requirements calculated ("*determin[ed]*") would be used in allocating bandwidth in Wright's step 510, so that the "*allocating*" is "*in response to the bandwidth requirements ... and to the mapping*." Ex.1006, [0024]; Ex.1003, ¶¶96-98.

To the extent Baker-Wright does not disclose this limitation, Baker-Wright-Holender '699 renders it obvious. Holender '699 discloses that after the logical link capacities are determined, "the physical transmission resources are **allocated** among the logical links of the logical networks according to the determination." Ex.1021, ¶¶126-129; Ex.1007, 3:15-17, 6:10-13, 9:22-25; FIG. 4.

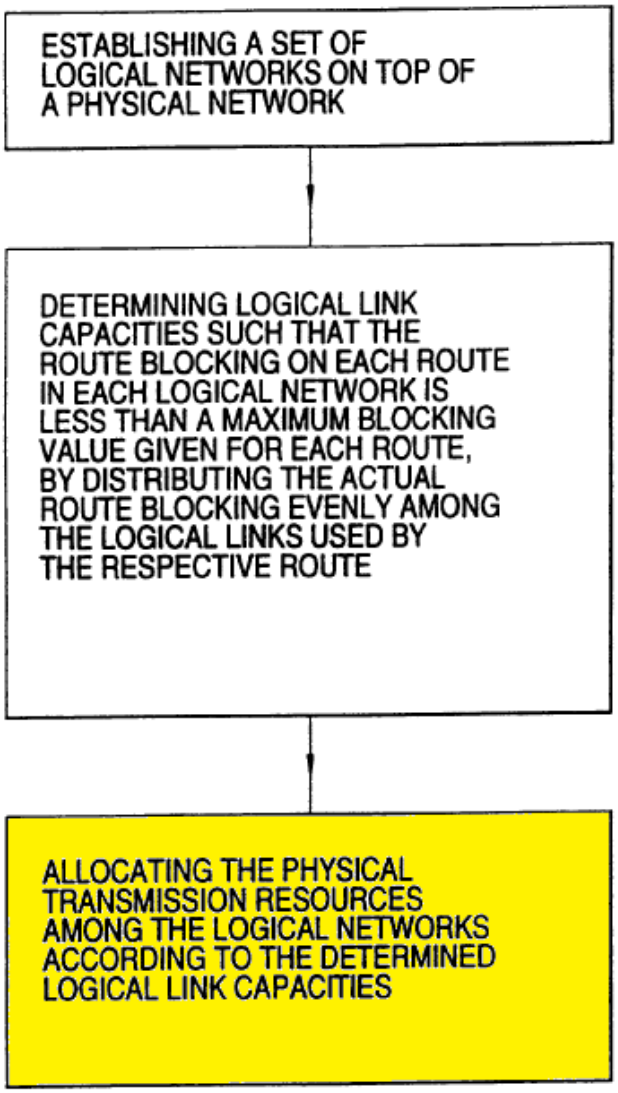


Fig.4

Ex.1007, FIG. 4 (annotated).

In other words, Holender '699 discloses "*allocating a bandwidth for the service on each of the links*." Ex.1021, ¶127.

Holender '699 further discloses that the allocation is "*in response to the bandwidth requirements of the logical connections*" because the allocation is "according to the determined logical link capacities" (the "*bandwidth requirements of the logical connections*"). *Id.*, 3:15-17. Moreover, Holender '699 discloses that the allocation is "*in response to the…to the mapping*" because the allocation first requires "a set of logical networks [being] established on top of a physical network by associating different parts of the traffic with different parts of the physical transmission and switching resources" (the "*mapping*"). *Id.*, 9:4-7; 2:26-32, 5:63-6:2. Ex.1021, ¶128.

A POSITA would have implemented Holender '699's "*allocating*" as part of Baker's "special 'star overlay' procedures" for the same reasons a POSITA would have implemented Wright's "*allocat[ing]*," as explained above. Ex.1021, ¶129.

6. Claim 2

[2.0] The method according to claim 1,

See [1.0]-[1.5].

[2.1] wherein the network comprises a ring network, and wherein the physical topology comprises a ring topology.

Baker discloses overlaying a logical topology onto an underlying network, "such as a ring network" that "may correspond to the topology of the actual physical network." Ex.1005, [0030]; [0019], FIGs. 1, 2; [1.0]. For example, Figure 2 shows a physical ring network with a ring topology:

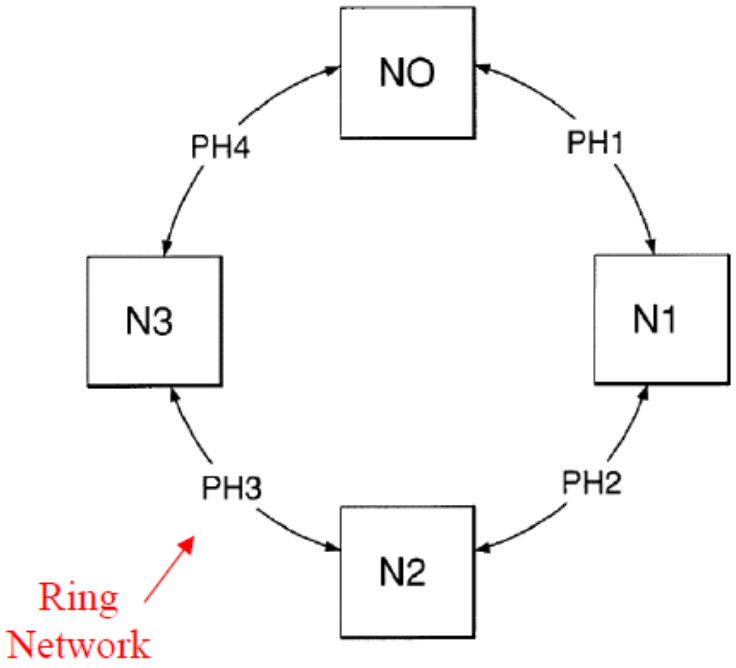


FIG. 2

Ex.1005, FIG. 2 (annotated); Ex.1003, ¶¶99-102.

7. Claim 3

[3.0] The method according to claim 1,

See [1.0]-[1.5].

[3.1] wherein the connection topology is chosen from one of a hub-and-spoke topology and a full mesh topology.

Baker discloses this limitation. Baker describes a "logical star topology" that is "overlaid onto an underlying non-star network." Ex.1005, [0030]. The overlaid logical star topology ("*connection topology*" per [1.2]) is illustrated in FIG. 5:

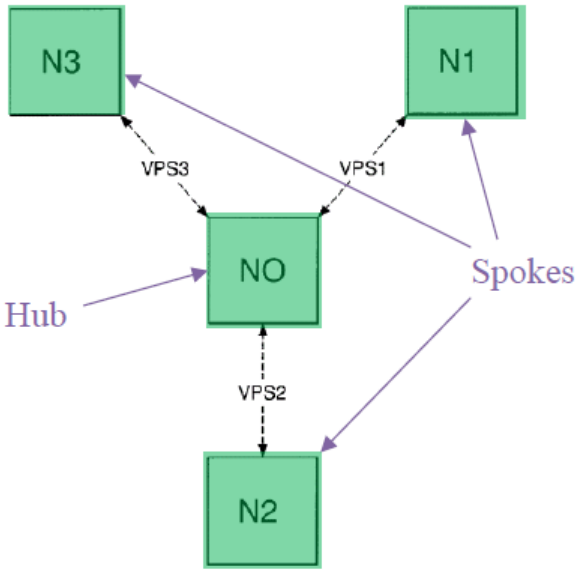
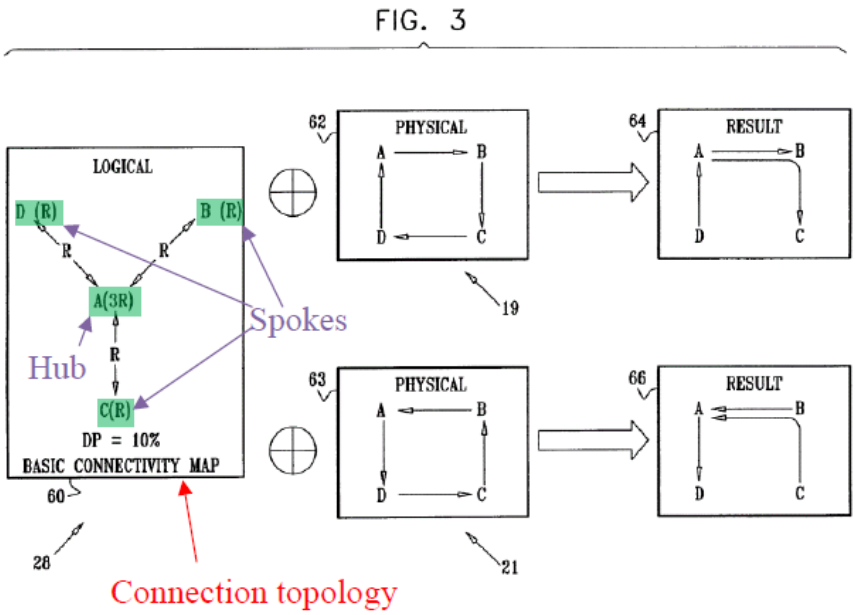


FIG. 5

Ex.1001, FIG. 5 (annotated); Ex.1003, ¶106.

Baker's star topology is a "*hub-and-spoke*" topology; the star has a "hub" and "spoke nodes." Ex.1005, [0011]. The '431 patent illustrates an **identical** "hub-and-spoke" layout in Figure 3:



Ex.1001, Fig. 3 (annotated); Ex.1003, ¶106.

Claim 3 requires "*one of*" two topologies, so Baker's star topology alone discloses this limitation. Ex.1003, ¶107. Baker and Wright each also disclose a "full mesh" topology. Ex.1005, [0046]; Ex.1006, [0014], [0016]. Hub-and-spoke and full mesh topologies were well-known and among a limited set of topology options, making it obvious to try either or both. *See* Ex.1013, 6:1720, 40-43, FIG. 3a (full connectivity mesh); Ex.1014, 3:32-37, claims 14, 17 (full mesh logical topology); Ex.1003, ¶108 (citing Ex.1015, 60-61 & Ex.1018, [0007]). While Wright notes advantages that some topologies have over a full mesh topology, Wright does not discourage a POSITA from pursuing the full mesh topology. Ex.1003, ¶¶107-10.

8. Claim 4

[4.0] The method according to claim 1

See [1.0]-[1.5].

[4.1] wherein the data transmission service comprises a guaranteed bandwidth service.

Baker and Wright render obvious this limitation. As discussed at [1.1], Baker and Wright disclose examples of a "*data transmission service*." Wright further teaches "to provide a quality of service guarantee on a connectionless VPN service" and "to ensure adequate bandwidth for the service." Ex.1006, [0001], [0014]; [0004] ("to guarantee bandwidth for a connectionless service"); [0025] (services); [0015] (VPLS as a service); Ex.1001, 2:27-35 (VPLS is a service). Further, services may be "characterized by a quality of service (QoS) metric, or guarantee," for which bandwidth is "fundamental." Ex.1006, [0002]-[0003]; Ex.1003, ¶¶111-14.

Thus, Wright's disclosure of guaranteeing bandwidth for various network services renders obvious a "*guaranteed bandwidth service*." Ex.1003, ¶¶114-15.

9. Claim 5

[5.0] The method according to claim 1,

See [1.0]-[1.5].

[5.1] wherein the data transmission service comprises a class of service defined by a protocol under which the network operates.

First, as discussed at [1.1], the prior art renders obvious various "*data transmission service[s]*." Ex.1003, ¶¶196-97.

Second, Baker and Wright describe networks operating under the asynchronous transfer mode (ATM) protocol. *See, e.g.*, Ex.1005, [0045]; Ex.1006, [0015]. A POSITA would have known that the ATM protocol defines classes of service for data traffic on a network. Ex.1003, ¶199, *quoting* Ex.1011, [0279] ("ATM can also support multiple quality of service (QoS) classes..."). With this understanding, it would have been obvious for each of the data traffic examples taught by Baker-Wright to comprise one of the QoS classes defined by ATM. Ex.1003, ¶199. Thus, this limitation would have been obvious based on Baker-Wright and a POSITA's knowledge about network protocols including ATM. Ex.1003, ¶¶198-99.

Third, Holender '699 confirms this limitation's obviousness by describing how logical resource separation offers "different Grade of Service classes." Ex.1007, 2:54-59; 4:66-5:9 (grade of service classes also referred to as traffic classes). Handling different traffic groups, each with one or more service classes, in different logical networks is "advantageous for an **ATM network carrying a wide variety of traffic types**." Ex.1007, 4:66-5:9; 3:60-4:14; Ex.1003, ¶200. As Baker and Wright use ATM networking, it would have been obvious to achieve this advantage by employing Holender '699's traffic grouping techniques with the Baker-Wright

combination's "*data transmission service*" on Baker's ATM network. Ex.1003, ¶¶200-02.

10. Claim 7

[7.0] The method according to claim 1,

See [1.0]-[1.5].

[7.1] wherein mapping the connection topology to the physical topology comprises generating a bandwidth requirement for each of the links.

The Baker-Wright combination renders obvious this limitation.

First, as discussed at [1.4], the prior art renders obvious "*mapping*." Ex.1003, ¶¶116-18. As discussed at [1.3], the prior art renders obvious determining "*bandwidth requirements for the logical connections*," such as Baker's virtual paths. Ex.1003, ¶118. And as discussed at [1.5], the prior art renders obvious "*allocating a bandwidth*" on each of the physical links. Ex.1003, ¶118.

Second, Wright renders obvious "*generating a bandwidth requirement for each of the links*" when it teaches "calculat[ing] bandwidth requirements on links within the restricted topology." Ex.1006, [0024]. It would have been obvious that the "bandwidth requirement" for each link is for the physical links impacted by the restricted topology (and by Baker's logical topology in combination), since the restricted topology is implemented by the underlying physical links. Ex.1003, ¶119 (citing Ex.1006, [0015]-[0016] (referring to "physical links" of the "physical connectivity")). Wright explains calculating the bandwidth requirement for a link as

a sum of virtual path bandwidths on a physical link or as the maximum of the virtual path bandwidths on the physical link. Ex.1006, [0017]; Ex.1003, ¶120.

Combining Wright's teachings with Baker would have resulted in Baker's head node calculating, per Wright's teachings, bandwidth requirements for each physical link as a sum or maximum of corresponding virtual path bandwidths. Ex.1003, ¶121. Wright's restricted topology is based on received logical connectivity and physical topology information. Ex.1006, [0024]. Further, Wright's calculation requires as an input the restricted topology. *Id.* Thus, it would have been obvious that the calculating would occur after determining the logical connectivity bandwidth requirements from the restricted topology, so that "only the bandwidth actually required is reserved **on the links 108**" (i.e., physical links). Ex.1006, [0024], [0017]; Ex.1003, ¶¶121-22.

Third, it would have been obvious to determine the appropriate bandwidth to be allocated on each of the physical links before actually allocating it as part of the "*mapping*." Ex.1003, ¶123. Wright teaches "the reserved bandwidth is calculated" and afterward "the bandwidth actually required is reserved," resulting in "the bandwidth actually required [being] reserved on the [physical] links 108." Ex.1006, [0017]; Ex.1003, ¶123. In Wright each physical link's required bandwidth is determined before it is allocated (and after mapping the restricted topology). Ex.1006, [0017]. It would have therefore been obvious to determine ("*generat[e]*")

a bandwidth requirement on each physical link as part of the "*mapping*" according to Baker-Wright's overlay procedures, prior to the allocating step. Ex.1003, ¶¶123-24.

11. Claim 8

[8.0] The method according to claim 1,

See [1.0]-[1.5].

[8.1] wherein parameters of the service comprise respective node-bandwidths required by each of the nodes to provide the service.

Baker combined with Wright renders obvious this limitation

First, as discussed at [1.3], the prior art renders obvious "*determining... bandwidth requirements... based on parameters of the service*." Ex.1003, ¶¶12528.

Second, Wright further renders obvious the bandwidth requirements including "*node-bandwidths*." Wright explains that there is a "maximum bandwidth that can be generated from edge node 102 'A,'" which corresponds to the claimed "*node-bandwidth[]*." Ex.1006, [0017]. Wright uses this information in determining bandwidth requirements in an "exemplary virtual topology." *Id.* Thus, Wright's use of a node's maximum bandwidth in calculating bandwidths for a virtual topology renders obvious using "*node-bandwidths*" as "*parameters of the service*" when "*determining respective bandwidth requirements for the logical connections*." Ex.1003, ¶129.

Alternatively, Wright describes a "restricted topology" determined based on logical connectivity requirements. Ex.1006, [0018], [0024]. The logical connectivity requirements are "in terms of edge nodes and communication requirements between edge nodes." Ex.1006, [0024]. Providing bandwidth guarantees for nodes includes "provid[ing] the necessary queuing and link scheduling mechanisms to provide the bandwidth guarantees for each link." Ex.1006, [0018]; [0015] (queuing at a node occurs with contention for service on an egress link); Ex.1003, ¶130.

Queuing and link scheduling were both known as examples related to "*node-bandwidths*." *See, e.g.*, Ex.1012, 1:45-59 (node traffic management involves queues and control of the queue depth, as well as queue scheduling), 5:20-28 (queue depth impacts packet treatment); Ex.1003, ¶131. It would have been obvious to have provided a bandwidth guarantee for the nodes of the restricted topology (via Wright's queuing and link scheduling) to handle the traffic of the restricted topology in a prioritized manner over other traffic. *See* Ex.1006, [0016]. Wright's logical connectivity requirements ("*parameters of the service*") therefore include "*node-bandwidths*" for each node on the targeted paths. Ex.1003, ¶¶131-33.

12. Claim 9

[9.0] The method according to claim 1,

See [1.0]-[1.5].

[9.1] and comprising monitoring traffic generated in the network by the data transmission service, and adjusting the bandwidth in response to the traffic.

First, Baker describes the head node "check[ing] to see...whether a topology update has occurred," which can be "triggered by a change...in traffic patterns" in the network. Ex.1005, [0052]. Baker's "check[ing] to see" renders obvious "*monitoring*." Additionally, it would have been obvious that detecting a change in traffic patterns would have included "*monitoring traffic generated in the network*." Ex.1003, ¶¶134-37; Ex.1007, 4:51-53 (known for controllers to monitor the traffic).

Second, Baker discloses that when a traffic change or other topology update is detected in response to checking, the "Administer Ring" routine executes. Ex.1005, [0057], [0052]. As discussed at [1.5], the Baker-Wright combination renders obvious allocating bandwidth as part of Baker's overlay procedure. *See* Ex.1005, [0016], [0062]; Ex.1006, [0005], [0024]. Thus, executing the Administer Ring routine (including re-allocating bandwidth following the mapping) in response to a change in traffic renders obvious "*adjusting the bandwidth in response to the traffic*." Ex.1003, ¶¶138-41.

Additionally, Holender '699 discloses this limitation. **First**, Holender '699 discloses "*monitoring traffic generated in the network by the data transmission service*" when it describes that "the network manager can flexibly and very quickly adapt the overall network system to **changing traffic conditions, such as changes**

in offered traffic, but also to facility failures and new demands on the logical network topology." Ex.1021, ¶154; Ex.1007, 10:1-6.

Second, Holender '699's Figure 6 further discloses "*adjusting the bandwidth in response to the traffic*." If the "offered traffic varies," then the "determining and allocating steps" are "repeated in response to **changing traffic conditions** so as to **change the logical link capacities** of the various logical networks." Ex.1021, ¶155; Ex.1007, 10:6-29.

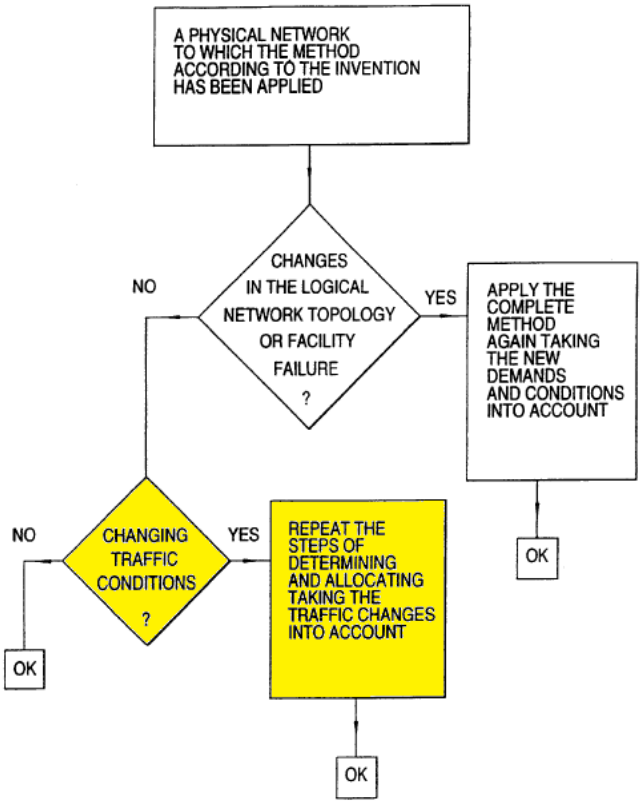


Fig.6

Ex.1007, FIG. 6 (annotated).

11. Claim 10

[10.0] The method according to claim 1,

See [1.0]-[1.5].

[10.1] wherein the data transmission service comprises a plurality of subclasses of traffic, and

First, as discussed at [1.1], the prior art renders obvious various "*data transmission service[s]*." Ex.1003, ¶¶203-05. It would have been obvious that Baker's and Wright's different examples of a "*data transmission service*" would have comprised "*a plurality of subclasses of traffic*" because they include different types of traffic, such as "voice over IP...video-on-demand, [and] video conferencing." Ex.1006, [0025]; Ex.1003, ¶205.

Second, Holender '699 further renders this limitation obvious by extending Baker-Wright's logical network concepts to multiple logical networks. Holender '699 explains that it is "not at all easy to integrate services with very different demands." Ex.1007, 3:60-63. Instead, it "turn[s] out to be better to support different services by offering separate logical networks" for them. Ex.1007, 3:54-58, 63-67. Holender '699 teaches arranging traffic of different service classes (also called traffic classes) into different groups, so that "only those of similar properties are handled together in a logical network." Ex.1007, 3:67-4:4, 4:66-5:5; Ex.1003, ¶¶206-07.

Each group has potentially varying bandwidth demands. Ex.1007, 4:66-5:7, 8:59-62. As a result, different "traffic groups are handled separately in different logical subnetworks." Ex.1007, 5:5-7. This is consistent with the '431 patent's use of "*subclasses*," where a "guaranteed traffic" service includes a specific "subclass of guaranteed traffic." Ex.1001, 12:39-44. It would have been obvious that Holender '699's different traffic groups are, with their service classes of multiple traffic types with "similar properties" grouped together, a "*data transmission service compris[ing] a plurality of subclasses of traffic*." Ex.1007, 3:67-4:4; Ex.1003, ¶¶208-11.

[10.2] wherein allocating the bandwidth comprises allocating a reserved bandwidth to one of the subclasses.

First, as discussed at [1.5], the prior art renders obvious "*allocating a bandwidth*." *See* Ex.1005, [0016]; Ex.1006, [0024], [0005]; Ex.1003, ¶¶212-13.

Second, as discussed at [10.1], Holender '699 teaches arranging traffic classes into groups with one or more traffic types per group, each group "handled separately in [a] different logical subnetwork[]." Ex.1007, 5:5-7; Ex.1003, ¶214. Where traffic types are sufficiently different, Holender '699 teaches each individual traffic type (and, thus, a "*subclass*") being handled by its own separate logical network. Ex.1007, 5:1-11. Wright's and Baker's disclosures have a per-logical-topology focus, including Wright's allocation of bandwidth. Ex.1005, [0059]; Ex.1006,

[0024]. It would have been obvious to repeat Wright's bandwidth allocations for each individual traffic type according to Holender '699's per-logical-network basis, resulting in "*allocating a reserved bandwidth to one of the subclasses*." Ex.1007, 5:1-11; Ex.1003, ¶¶215, 217.

Holender '699 renders this limitation obvious yet another way. Holender '699 discloses that traffic types are associated with routes over "logical links which belong to the same logical network." Ex.1007, 2:1-14. Each route "carries only a single type of traffic," with parallel routes for multiple traffic types, and requires an amount of bandwidth per logical link. Ex.1007, 7:8-11, 8:20-25. It would have been obvious for each traffic type (with different route) to have its own bandwidth requirement and allocation. Ex.1003, ¶¶216-18.

12. Claim 11

[11.0] The method according to claim 1,

See [1.0]-[1.5].

[11.1] wherein allocating the bandwidth comprises comparing a mapping bandwidth determined in response to the bandwidth requirements of the logical connections and to the mapping with a full bandwidth determined by assuming all possible logical connections in the network are provided for.

First, as discussed at [1.5], the prior art renders obvious "*allocating*." Ex.1003, ¶¶142-44.

Second, the prior art renders obvious determining a "*mapping bandwidth*." The bandwidth Wright determines "*for the service*" (*see* [1.5]) is an example of the

"*mapping bandwidth*." Wright additionally teaches that "[o]ne way to calculate the required reserved bandwidth...is to reserve 'x+y' Mb/s." Ex.1006, [0017]; Ex.1003, ¶146. Wright's required reserve bandwidth, calculated by summing the bandwidths of virtual paths sharing a link, is a "*mapping bandwidth*." Ex.1003, ¶¶145-47; *see* Ex.1001, 7:42-44, 8:67-9:2.

Third, Baker-Wright further renders obvious comparing a "*mapping bandwidth*" with a "*full bandwidth*." Wright illustrates a "logical connectivity mesh" in Figure 2, which Wright differentiates from "a full logical mesh approach" with a much larger bandwidth requirement. Ex.1006, [0016]; FIG. 2. Wright's "full logical mesh approach" represents a "*full bandwidth determined by assuming all possible logical connections in the network are provided for*" because it corresponds to all logical connections of Wright's logical topology (mirroring the underlying physical connectivity). Wright contrasts – or "*compar[es]*" – the full mesh approach with the "logical connectivity mesh that is constrained to a specific restricted topology (e.g., a virtual topology)." Ex.1006, [0014], [0016]. It is those physical links underlying the logical connectivity mesh that have bandwidth reserved for a target QoS. Ex.1006, [0016]. Comparing cannot occur in Wright until after the bandwidth requirements are calculated, and only the reserving step follows the calculating step in Wright. Ex.1006, [0024], FIG. 5. Therefore, it would have been obvious for

Wright's comparing to occur as part of the reserving ("*allocating*") step. Ex.1003, ¶148.

Wright mirrors the '431 patent's description. Ex.1003, ¶¶149, 145. The '431 patent describes "*mapping bandwidth*" as "[t]he bandwidth for each link [that] is derived by summing the individual connection requirements of the link." Ex.1001, 8:67-9:2. This is compared to the "*full bandwidth*," "bandwidth[] for each link if every possible connection in the network is provided for." Ex.1001, 7:46-49, 9:31-44 (Table III), 11:1-29 (Table VI). The '431 patent lists the same connections in Tables III and VI, but Table III shows "full bandwidth requirements" (all possible connections) while Table VI shows a "balanced full mesh map." Ex.1001, 9:18-22 (full bandwidth), 10:26-30 (Table V is full mesh), 10:65-67 (Table VI relates to Table V). Thus, Wright's comparing a full mesh approach to a logical connectivity approach is substantially the same as the '431 patent's corresponding disclosure and renders obvious the "*comparing*." Ex.1003, ¶¶149-50.

13. Claim 25

[25.0] Apparatus for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the apparatus comprising:

To the extent the preamble is limiting, Baker discloses it. As demonstrated at [1.0], Baker discloses a method "*for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology.*" Baker further discloses a

head node, which is part of the network's physical topology, that executes the overlay procedure including the "Administer Ring" routine to overlay a logical topology onto the physical topology. Ex.1005, [0051]; *see* [1.4]. Baker's head node renders obvious an "*apparatus*" as claimed. Ex.1003, ¶¶151-54.

[25.1] a controller which is adapted to:

Baker renders obvious this limitation. Baker's "head node" is responsible for executing the overlay procedure including the "Administer Ring" routine. Ex.1005, [0051]-[0052]. The head node acts as a "peer group leader" ("PGL"). Ex.1005, [0051], [0044]; Ex.1003, ¶¶155-56.

The PGL includes "additional resources ... e.g., processing power, redundant hardware for protection, and memory" to perform tasks including "topology and routing control." Ex.1005, [0047], [0046]. Thus, it would have been obvious that the PGL includes one or more components that perform such control tasks; those components correspond to the claimed "*controller*." *See* Ex.1005, [0047], [0046]; Ex.1006, [0006] ("computer program product ... for execution by the processing circuit for performing a method"), [0026]; Ex.1003, ¶¶157-58.

[25.2] [a controller which is adapted to] receive a definition of logical connections between the nodes, the logical connections being associated with a data transmission service to be provided over the network,

First, as discussed at [1.1], Baker-Wright renders obvious "*defining...logical connections associated with....*" Ex.1003, ¶¶159-60.

Second, it would have been obvious for the controller in Baker's PGL to "*receive a definition of logical connections*." Baker explains that the PGL is "designated" to overlay a star network topology. Ex.1005, [0047]. Because the PGL "knows" that it will perform "'star overlay' procedures," it would have been obvious that the PGL has received information about the virtual paths to be established. Ex.1005, [0051]; Ex.1003, ¶161. Furthermore, it was well-known for a controller to receive information about desired virtual paths to be set up between nodes. Ex.1003, ¶162; Ex.1010, 3:63-67 (nodes retain logical topology information), 6:26-36 (each node receives logical topology information as it is updated in all nodes in the network).

Third, Wright confirms this limitation is obvious: its "logical connectivity requirements are **received**," which are used for creating the restricted topology "to provide logical connections." Ex.1006, [0024], FIG. 5:

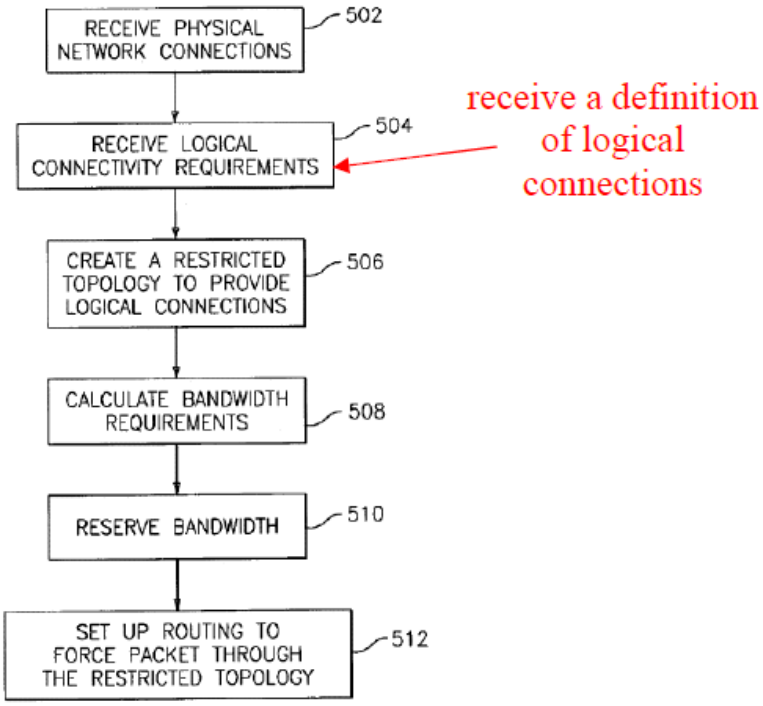


FIG. 5

Ex.1006, FIG. 5 (annotated); Ex.1003, ¶163.

As discussed at [1.5], Wright's logical connectivity requirements correspond to Baker's virtual paths and the claimed "*logical connections*." It would have therefore been obvious for Baker's PGL to receive its logical topology information, as demonstrated by Wright. Ex.1003, ¶¶163-66.

[25.3]-[25.6] the logical connections... to the mapping.

The remainder of claim 25 recites steps corresponding to limitations [1.2]-[1.5], which the prior art renders obvious. *See supra* [1.2]-[1.5]; Ex.1003, ¶¶167-76. It would have been obvious for Baker's PGL to perform these steps because they relate to "topology and routing control." Ex.1005, [0046]; Ex.1003, ¶¶167-76.

14. Claim 26

[26.0] Apparatus according to claim 25,

See [25.0]-[25.6].

[26.1] wherein the controller is comprised in one of the nodes.

As discussed at [25.1], it would have been obvious for Baker's PGL to include the "*controller*." Baker's PGL is also the "head node" in the network and is therefore "*one of the nodes*." Ex.1005, [0049], [0051], [0044], Fig. 2; Ex.1003, ¶¶177-81.

D. Ground 2: Claims 12-16, 18-24, 27-30 Obvious Over Baker-Wright-Holender '699-Holender '894

1. Holender '894

Holender '894 shares the same inventors as Holender '699. The references also share portions of their specification and figures. Ex.1021, ¶90; *supra* §IX.C.3.

2. Reasons to combine Baker and Holender '894

A POSITA considering the teachings of Baker would have been motivated to combine Baker with Holender '894 for the same reasons a POSITA would have been motivated to combine the teachings of Holender '699 with Baker. *See supra* §X.C.4; Ex.1021, ¶¶180-181.

3. Claim 12

[12.0] A method for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the method comprising:

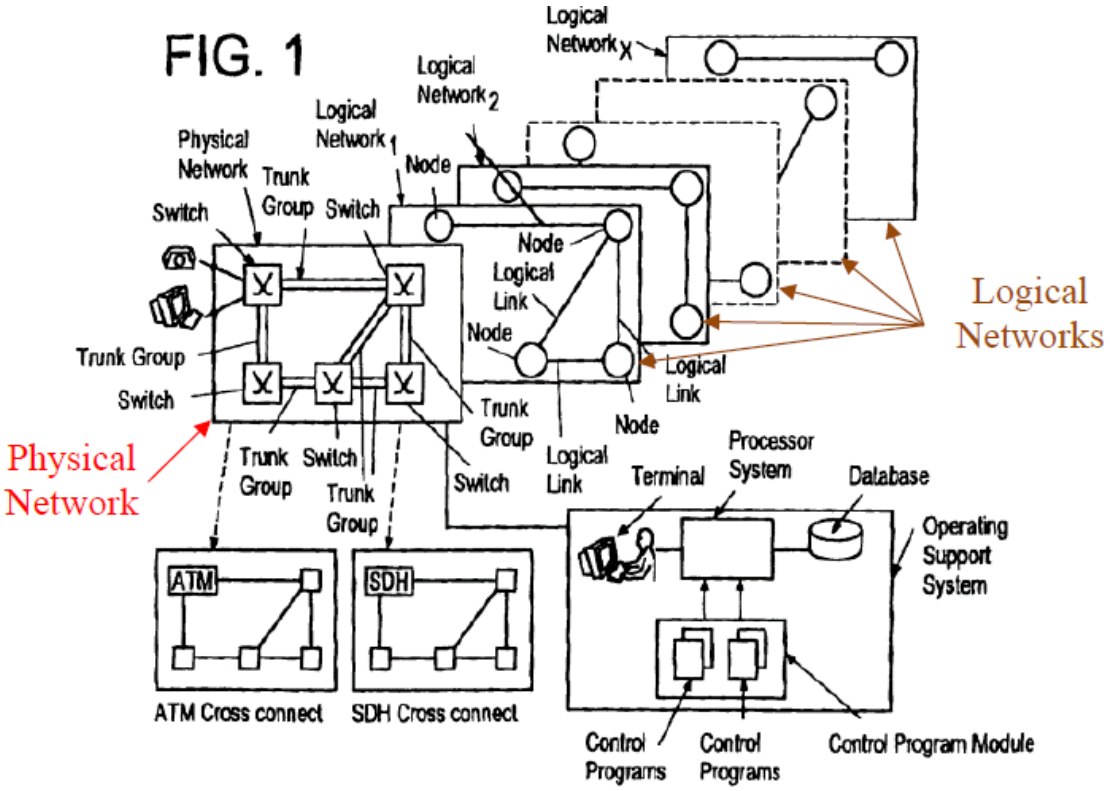
To the extent the preamble is limiting, Baker discloses it. *See* [1.0]; Ex.1003, ¶219.

[12.1] defining between the nodes a first set of logical connections associated with a first data transmission service to be provided over the network, and a second set of logical connections associated with a second data transmission service to be provided over the network, the first set of logical connections having a first connection topology, the second set of logical connections having a second connection topology,

First, as discussed at [1.1] and [1.2], the prior art renders obvious "*defining... logical connections... having a connection topology*." Ex.1003, ¶¶220-21; Ex.1021, ¶184.

Second, it would have been obvious to provide for multiple data transmission services, since networks commonly supported numerous services. Ex.1003, ¶222; Ex.1021, ¶185; Ex.1006, [0025] (VPN, VoIP, video-on-demand, video conferencing services). And as discussed at [1.1] and [1.2], the prior art renders obvious multiple different data transmission services, which correspond to the recited "*first...*" and "*second...*" "*data transmission service[s]*" limitations. *See* Ex.1006, [0014]; [0005], [0006]; Ex.1005, [0038], [0080]; Ex.1003, ¶222; Ex.1021, ¶185.

Third, both Holender references describe how "**a number of logical networks are established**...shar[ing] the same physical transmission and switching resources." Ex.1021, ¶186; Ex.1007, 2:50-53; Ex.1020, 4:62-65; Ex.1007, FIG. 1, 4:23-30 (logical network topologies differ from underlying physical network), 4:54-65 (defining multiple logical topologies); Ex.1020, FIG. 1, 6:11-19, 6:43-54.



Ex.1007, FIG. 1 (annotated).

Both Holender references teach different logical networks for different traffic groups, including going so far as to provide a different logical network for each individual traffic type, rendering obvious a different set of "*logical connections*" for each "*data transmission service*." Ex.1007, 5:1-11; Ex.1020, 6:57-67. The different logical networks have different "view[s]" of the physical network, with each logical network different from the other. Ex.1007, 1:16-27; Ex.1020, 1:13-24. Further, Figure 1 (above) shows that different logical networks have different connection topologies from each other. Thus, both Holender references render obvious defining multiple "*set[s] of logical connections*," each with its own "*connection topology*,"

and each for a different "*data transmission service*." Ex.1021, ¶¶186-187; Ex.1003, ¶¶223-24; Ex.1007, 5:1-11, 3:60-4:14; Ex.1020, 6:57-67, 5:49-64.

In combination with Baker-Wright, both Holender references render obvious applying Baker-Wright's bandwidth allocating procedures (*see* claim 1) to each "separate logical network." Ex.1003, ¶¶225-26. Ex.1021, ¶188.

[12.2] the first and second connection topologies being different from the physical topology;

Baker (*see* [1.2]) and the Holender references describe how each logical topology (a "*connection topolog[y]*") differ from an underlying physical topology. Ex.1005, [0030], [0013], Figs. 1-2; Ex.1007, 4:28-30, 4:54-65; Ex.1020, 6:17-19, 6:43-54; Ex.1003, ¶¶227-31; Ex.1021, ¶¶189-190.

[12.3] determining respective first bandwidth requirements for the first set of logical connections based on first parameters of the first data transmission service and respective second bandwidth requirements for the second set of logical connections based on second parameters of the second data transmission service;

First, as discussed at [1.3], the prior art renders obvious "*determining respective bandwidth requirements....*" Ex.1003, ¶¶232-33; Ex.1021, ¶192.

Second, Wright contemplates bandwidth determination per logical topology. Ex.1006, [0024]. Likewise, Baker's focus is on a particular logical topology for bandwidth management. Ex.1005, [0059].

Third, both Holender references teach the application of multiple logical topologies. *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54. A POSITA would have

therefore been motivated to apply Baker-Wright's combined teachings and allocate bandwidth on a per-logical network basis. Ex.1003, ¶¶234-35. Ex.1021, ¶194.

Fourth, Holender '894 expressly discloses "*determining respective **first** bandwidth requirements…and respective **second** bandwidth requirements*…." Ex.1021, ¶195. Specifically, Holender '894 discloses optimizing a predefined objective function "associated with resource partitioning" that involves "**calculat[ing]…the logical link capacities for the corresponding logical networks**." Ex.1020, 7:37-41, 8:36-44, Fig. 4 (below).

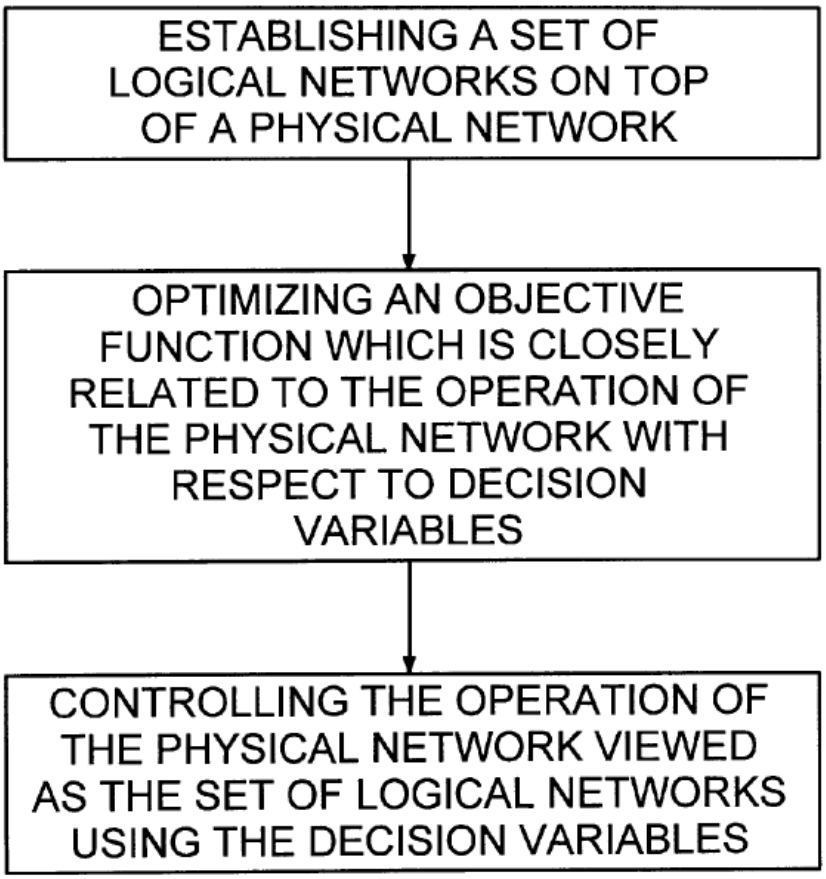


FIG. 4

[12.4] generating a first mapping of the first connection topology to the physical topology, so that each of the first set of logical connections is associated with one or more links of the physical topology;

The prior art renders obvious "*mapping*...." *See* [1.4]. It would have been obvious that performing [1.4]'s "*mapping*..." results in "*generating a... mapping*." The prior art's act of associating physical network resources to logical network

resources results in the mapping between those resources. *See* [1.4]; Ex.1003, ¶¶236-37.

The Holender references further describe "how to distribute or partition said physical network resources among the logical networks," which is an act of "*generating a... mapping.*" *See* Ex.1007, 2:59-67, 5:38-41; Ex.1020, 2:24-29, 4:4-6; Ex.1007, 1:53-57 (physical link is logically subdivided into logical links); Ex.1020, 1:51-53; Ex.1003, ¶¶238-39; Ex.1021, ¶¶196-198.

[12.5] allocating a first bandwidth for the first data transmission service on each of the links in response to the first bandwidth requirements of the first set of logical connections and to the first mapping;

The prior art renders this limitation obvious. *See* [1.5]; Ex.1003, ¶240.

[12.6] generating a second mapping of the second connection topology to the physical topology, so that each of the second set of logical connections is associated with one or more links of the physical topology;

As discussed at [12.4] and [1.4], the prior art renders obvious "*generating a...mapping....*" Based on the Holender references' multiple logical topologies and Baker-Wright's per-logical-network granularity, it would have been obvious to perform "*generating...*" for each logical topology. *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶241-43; Ex.1021, ¶201.

[12.7] allocating a second bandwidth for the second data transmission service on each of the links in response to the second bandwidth requirements of the second set of logical connections and to the second mapping; and

As discussed at [12.5] and [1.5], the prior art renders obvious "*allocating....*" Based on the Holender references' multiple logical topologies and Baker-Wright's per-logical-network granularity, it would have been obvious to perform "*allocating...*" for each logical topology. *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶244-46; Ex.1021, ¶203.

[12.8] summing the first and the second bandwidths to determine a total allocation for each of the links.

The Holender references explain that the "sum of logical link capacities on the same physical link cannot exceed the capacity of the physical link." Ex.1007, 6:60-65; Ex.1020, 8:57-59. The "logical link capacities" are from the "number of logically separate logical networks" established on top of the physical network. Ex.1007, 6:50-52; Ex.1020, 8:45-47. It would have been obvious to sum allocated bandwidths for the first and second data transmission services to ensure that they do not exceed the available physical link capacity. Ex.1003, ¶¶247-50; Ex.1021, ¶205; Ex.1005, [0009] (discussing "available" bandwidth); Ex.1006, [0004], [0016] (same).

Wright additionally teaches summing bandwidths by explaining that "[o]ne way to calculate the required reserved bandwidth... is to reserve 'x+y' Mb/s." Ex.1006, [0017]. It would have been obvious to repeat Wright's summing for each

logical topology, as demonstrated by the Holender references. Ex.1003, ¶¶251-52. Ex.1021, ¶206.

4. Claim 13

[13.0] The method according to claim 12,

See [12.0]-[12.8].

[13.1] wherein the network comprises a ring network, and wherein the physical topology comprises a ring topology.

See [2.1]; Ex.1003, ¶¶253-54.

5. Claim 14

[14.0] The method according to claim 12,

See [12.0]-[12.8].

[14.1] wherein the first connection topology comprises a hub-and-spoke topology and the second connection topology comprises a full mesh topology.

First, as discussed at [3.1], the prior art renders obvious "*hub-and-spoke*" and "*full mesh*" topologies. Ex.1003, ¶¶255-57.

Second, the Holender references render obvious multiple logical topologies, each with a different topology. Ex.1007, 1:21-25, 9:4-7, Fig. 1; Ex.1020, 1:18-22, 13:18-21, Fig. 1; Ex.1003, ¶258. Ex.1021, ¶212. It would have been obvious for two logical topologies to have the well-known and commonly used hub-and-spoke and full mesh topologies. Ex.1003, ¶¶258-59. Ex.1021, ¶212.

6. Claim 15

[15.0] The method according to claim 12,

See [12.0]-[12.8].

[15.1] wherein at least one of the first and second data transmission services comprises a guaranteed bandwidth service.

See [4.1]. Ex.1003, ¶¶260-63.

7. Claim 16

[16.0] The method according to claim 12,

See [12.0]-[12.8].

[16.1] wherein at least one of the first and second data transmission services comprises a class of service defined by a protocol under which the network operates.

See [5.1]. Ex.1003, ¶¶264-67.

8. Claim 18

[18.0] The method according to claim 12,

See [12.0]-[12.8].

[18.1] wherein generating the first mapping comprises generating a first bandwidth requirement for each of the links, and wherein generating the second mapping comprises generating a second bandwidth requirement for each of the links.

See [7.1]. Based on the Holender references' multiple logical topologies, it would have been obvious to perform "*generating a... bandwidth requirement*" for physical links used by each logical topology. *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶268-70. Ex.1021, ¶219.

9. Claim 19

[19.0] The method according to claim 12,

See [12.0]-[12.8].

[19.1] wherein the first parameters of the first service comprise respective first node-bandwidths required by each of the nodes to provide the first service, and wherein the second parameters of the second service comprise respective second node-bandwidths required by each of the nodes to provide the second service.

See [8.1]. Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious for "*parameters*" of each service to include "*node-bandwidths*." *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶271-73. Ex.1021, ¶222.

10. Claim 20

[20.0] The method according to claim 12,

See [12.0]-[12.8].

[20.1] and comprising monitoring traffic generated in the network by the first and second data transmission services, and adjusting the total allocation in response to the traffic.

See [9.1]. Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious to "*monitor[] traffic generated*" by each service and "*adjust[]*" accordingly. *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶274-76. Ex.1021, ¶225.

11. Claim 21

[21.0] The method according to claim 12,

See [12.0]-[12.8].

[21.1] wherein the first data transmission service comprises a plurality of subclasses of traffic, and

See [10.1]; Ex.1003, ¶¶277-78.

[21.2] wherein allocating the first bandwidth comprises allocating a reserved bandwidth to one of the subclasses.

See [10.2]; Ex.1003, ¶279.

12. Claim 22

[22.0] The method according to claim 12,

See [12.0]-[12.8].

[22.1] wherein the first connection topology is different from the second connection topology.

See [14.1]. Ex.1003, ¶¶280-83.

13. Claim 23

[23.0] The method according to claim 12, wherein summing the first and the second bandwidths to determine a total allocation for each of the links comprises:

See [12.0]-[12.8].

[23.1] determining a first mapping bandwidth in response to the first bandwidth requirements of the first set of logical connections and to the first mapping;

As discussed at [11.1], the prior art renders obvious "*a mapping bandwidth determined...*" as part of "*allocating*." Thus, it would have been obvious to "*determin[e] a first mapping bandwidth*" as part of the step of "*summing...to determine a total allocation.*" Ex.1003, ¶¶284-89.

[23.2] determining a second mapping bandwidth in response to the second bandwidth requirements of the second set of logical connections and to the second mapping; and

See [23.1] and [11.1]. Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious to "*determin[e] a second mapping bandwidth*" for a "*second set of logical connections*." *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶290-94. Ex.1021, ¶236.

[23.3] comparing the first mapping bandwidth and the second mapping bandwidth with a full bandwidth determined by assuming all possible logical connections in the network are provided for.

See [11.1]. Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious to "*compar[e]*" each "*mapping bandwidth*" with a "*full bandwidth*." *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶295-97.

Alternatively, it would have been obvious to "*compar[e]*" the combination of the "*first mapping bandwidth*" and the "*second mapping bandwidth*" with a "*full bandwidth*." Wright and the Holender references each teach summing bandwidth requirements of all logical connections over the same physical link, to avoid using more bandwidth than is available for that link. *See* Ex.1006, [0016], [0017]; Ex.1007, 6:63-65 (sum of logical link capacities cannot exceed physical link capacity); Ex.1020, 8:57-59; Ex.1008, 5:16-25 (same). In combination, it would have been obvious to consider all logical network's logical link capacities on a given

physical link when comparing with the "*full bandwidth*." Ex.1003, ¶¶297-99; Ex.1021, ¶¶238-239.

14. Claim 24

[24.0] A method... comprising:

See [1.0] and [2.1]. Ex.1003, ¶300.

[24.1] defining between the nodes... to be provided over the network,

See [12.1]. Ex.1003, ¶301.

[24.2] the first set of logical connections... connection topology;

See [12.1] and [14.1]. Ex.1003, ¶¶302-04.

[24.3] determining... of the second data transmission service;

See [12.3]. Ex.1003, ¶305.

[24.4] generating... the ring network;

See [12.4]. Ex.1003, ¶306.

[24.5] determining... first mapping;

See [23.1] ("first mapping bandwidth" corresponding to "first bandwidth"). Ex.1003, ¶307.

[24.6] generating... the ring network;

See [12.6]. Ex.1003, ¶308.

[24.7] determining... second mapping;

See [23.2] ("*second mapping bandwidth*" corresponding to "*second bandwidth*"). Ex.1003, ¶309.

[24.8] summing... for each of the links; and

See [12.8]. Ex.1003, ¶310.

[24.9] allocating one of... over the network.

As discussed at [12.5] and [1.5], the prior art renders obvious "*allocating a first bandwidth*." As discussed at [12.7], the prior art renders obvious "*allocating a second bandwidth*." And as discussed at [12.8], the prior art renders obvious "*summing... bandwidths to determine a total allocation*." Since [24.9] recites a Markush group, any of those alone renders this limitation obvious. Ex.1003, ¶311.

Additionally, as discussed at [12.8], it was known that the allocated bandwidth should not exceed the available link capacity. *See, e.g.*, Ex.1006, [0025] (admission on a session-by-session basis, such that bandwidth is not allocated when sufficient capacity not available); Ex.1007, 6:60-65; Ex.1020, 8:57-59. Thus, it would have been obvious to provide less than all services (the *first service* or *second service*) when the link capacity would not be sufficient to provide both services. Ex.1003, ¶¶311-15; Ex.1021, ¶¶250-251.

15. Claim 27

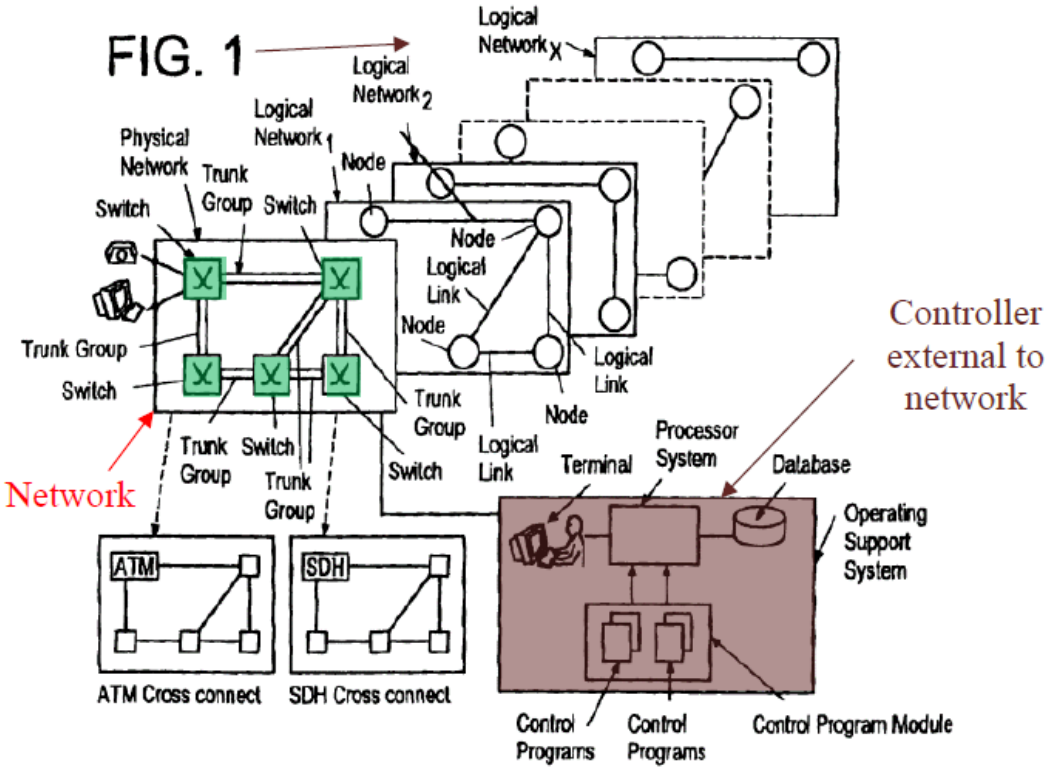
[27.0] Apparatus according to claim 25,

See [25.0]-[25.6].

[27.1] wherein the controller is external to the network.

As discussed at [25.1], the prior art renders obvious a "*controller*" such as Baker's PGL and processing hardware within a node of the network. *See* Ex.1005, [0051]; Ex.1003, ¶¶316-18.

The Holender references describe an "operation and support system OSS" responsible for mapping logical networks to the physical network, including determining and allocating bandwidth. Ex.1007, 4:31-32, 4:54-65; Ex.1020, 6:20-25, 6:43-54. The OSS is external to the physical network and communicates via "[s]pecial data links." Ex.1007, 4:48-53, FIG. 1; Ex.1020, 6:37-42.



Ex.1007, FIG. 1 (annotated); Ex.1003, ¶319.

The Holender references explain that the location of various processors and functions is largely a design choice. Ex.1007, 4:32-53 (discussing "usual[]" arrangements and options such as "regional processors" for a "not completely distributed system"); Ex.1020, 6:20-42 (same). Thus, it would have been obvious as a simple design choice to partly or completely centralize the PGL functionality of the Baker-Wright combination in an external controller as suggested by the Holender references. Ex.1003, ¶320; Ex.1021, ¶¶255-256. Alternatively, it would have been obvious to try locating PGL functionality external to the network, because there were a limited number of predictable solutions as demonstrated by both Baker (internal to the network) and the Holender references (partially or completely external to the network), demonstrating a reasonable expectation of success in locating the controller externally. Ex.1003, ¶¶321-22. Ex.1021, ¶256.

16. Claim 28

[28.0] Apparatus... comprising:

See [25.0]. Ex.1003, ¶323.

[28.1] a controller which is adapted to:

See [25.1]. Ex.1003, ¶324.

[28.2] receive... a second connection topology,

As discussed at [25.2]-[25.3] and [1.1]-[1.2], the prior art renders obvious a "*controller... adapted to: receive...*" and "*logical connections having a connection topology*." Ex.1003, ¶¶325-26; Ex.1021, ¶259.

Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious to "*receive*" multiple "*set[s] of logical connections*," each associated with a "*data transmission service*" and having a "*connection topology*." *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶327-28; *supra* [12.1]; Ex.1021, ¶260.

[28.3] the first and second connection topologies being different from the physical topology,

See [12.2], [25.3]. Ex.1003, ¶329.

[28.4] determine... based on second parameters of the second data transmission service,

As discussed for [25.3]-[25.6] and [1.3], the prior art renders obvious a "*controller... adapted to: determine respective bandwidth requirements...*" Ex.1003, ¶330-31.

Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious to "*determine*" multiple "*bandwidth requirements*." *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶332-33; *supra* [12.1], [12.3]; Ex.1021, ¶263.

[28.5] generate a first mapping... links of the physical topology,

As discussed for [25.3]-[25.6] and [1.4], the prior art renders obvious a "controller... adapted to: map the connection topology..." Ex.1003, ¶¶334-36.

[28.6] allocate a first bandwidth... and to the first mapping,

As discussed for [25.3]-[25.6] and [1.5], the prior art renders obvious a "*controller... adapted to: allocate a bandwidth...*" Ex.1003, ¶337.

[28.7] generate a second mapping... links of the physical topology,

See [28.5]. Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious to "*generate* a *mapping*" for each of multiple "*connection topolog[ies]*" to the "*physical topology.*" *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶338-41; [12.1], [12.4], [12.6]; Ex.1021, ¶267.

[28.8] allocate a second bandwidth... and to the second mapping, and

See [28.6]. Based on the Holender references' multiple logical topologies providing multiple services, it would have been obvious to "*allocate* a *bandwidth*" for each of multiple "*data transmission service[s].*" *See* Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶342-45; *supra* [12.1], [12.7]. Ex.1021, ¶269.

[28.9] sum... for each of the links.

First, as discussed at [12.8], the prior art renders obvious "*summing....*"

Second, as discussed for claim 25, the prior art renders obvious a "*controller*." Ex.1005, [0046]; Ex.1003, ¶¶346-47. It would have been obvious for Baker's PGL

and corresponding hardware ("*controller*") to "*sum... bandwidths*" as part of its duty to perform "topology and routing control" and ensure that the physical link capacity is not exceeded. Ex.1005, [0046]; [12.8]; Ex.1006, [0017] (teaching "to reserve 'x+y' Mb/s"); Ex.1003, ¶¶348-50.

17. Claim 29

[29.0] Apparatus according to claim 28,

See [28.0]-[28.9].

[29.1] wherein the controller is comprised in one of the nodes.

See [26.1]. Ex.1003, ¶¶351-52.

18. Claim 30

[30.0] Apparatus according to claim 28,

See [28.0]-[28.9].

[30.1] wherein the controller is external to the network.

See [27.1]. Ex.1003, ¶¶353-54.

E. Ground 3: Claim 6 Obvious Over Baker-Wright-Holender '699-Zheng

1. Zheng

Zheng relates to "controlling virtual circuit connections in a ring network." Ex.1008, 1:8-10. Zheng's controller determines when to allow a connection in the network so that the bandwidth capacities of the ring segments are not exceeded by the sum of all required bandwidth. Ex.1008, 5:4-25. To further buttress against over-

allocation, Zheng discloses using "over-allocated bandwidth," which is "bandwidth that is allocated to a virtual connection that exceeds the required or subscribed bandwidth for service on the virtual connection." Ex.1008, 5:29-35; Ex.1003, ¶¶355-57. Ex.1021, ¶88.

2. Reasons to combine Baker, Wright, Holender '699, and Zheng

A POSITA considering the teachings of Baker would have also considered the teachings of Zheng. Baker and Zheng both describe how to manage physical resources (like bandwidth) in a network. *See* Ex.1005, [0016], [0030] (assigning network resources, which includes bandwidth); Ex.1007, 1:8-10, 4:56-5:14 (assessing whether enough bandwidth on each link of connection); Ex.1006, [0005] (bandwidth requirements for each link); Ex.1003, ¶358. Ex.1021, ¶277.

First, while Baker contemplates managing network resources, Baker provides limited details about how to best manage highly variable traffic flows, including traffic from sources that may briefly exceed their peak rate. A POSITA would have been motivated to refer to other sources, such as Zheng, to take advantage of Zheng's teachings. *See* Ex.1008, 6:21-23, 5:31-35 (bandwidth management with over-allocated bandwidth, referring to deliverable bandwidth that exceeds the required bandwidth). Zheng teaches using this approach because it "assures quality of performance in the network." Ex.1008, 5:29-35. The over-allocated bandwidth is not

wasted, but rather "may be used at different times by different traffic sources ... when a traffic source meets or exceeds its peak rate." Ex.1008, 6:30-34; Ex.1003, ¶359; Ex.1021, ¶278-279.

Second, a POSITA would have had a reasonable expectation of success in combining Zheng's over-allocated bandwidth teachings with Baker-Wright-Holender '699's teachings. Zheng's network teachings are compatible with Baker's network teachings, just like Wright and Holender '699. *Supra* §X.C.4. Zheng uses ATM over a SONET ring network, just like Baker. Ex.1008, 1:36-40, 1:52-54; Ex.1005, [0037]; Ex.1006, [0015]. Zheng's determination of over-allocated bandwidth, and whether to allow a connection, is performed by a "connection controller 102" that controls a network feeder. *See* Ex.1008, 5:16-46. This is compatible with Baker's PGL (a "*controller*") that is used to manage "network feeder utilization" for better management of bandwidth. *See* Ex.1005, [0062]; Ex.1003, ¶360. Ex.1021, ¶280-281.

Baker's PGL, configured with sufficient resources to accomplish its additional tasks, would in combination with Zheng have sufficient resources to apply Zheng's over-allocation determination teachings. *See* Ex.1005, [0047]. Accordingly, since Baker and Zheng are applicable to ATM over SONET, and contemplated implementing their respective functions at a controller, Zheng was compatible with

Baker such that a POSITA would have had a reasonable expectation of success in the Baker-Zheng combination. Ex.1003, ¶361. Ex.1021, ¶282.

Third, the Baker-Zheng combination would have been predictable and within a POSITA's skill set. As already noted, Baker and Zheng are both applicable to ATM over SONET. Accordingly, combining Zheng with Baker would have been nothing more than the combination of known elements (Baker's PGL managing bandwidth, and Zheng's over-allocated bandwidth), according to known methods (applying Zheng's teachings in Baker's PGL), to yield predictable results (Baker's PGL determining an over-allocated bandwidth, per Zheng, for a link's deliverable bandwidth). For at least the above reasons, a POSITA would have been motivated to combine Baker and Zheng. Ex.1003, ¶¶362-63. Ex.1021, ¶283.

3. Claim 6

[6.0] The method according to claim 1,

See [1.0]-[1.5].

[6.1] and comprising multiplying the bandwidth by a correction factor to determine an actual bandwidth.

First, as discussed at [1.3], Baker and Wright render obvious "*determining...bandwidth requirements*." Ex.1003, ¶¶364-68. Ex.1021, ¶288.

Second, Zheng further teaches an approach for determining a bandwidth requirement that over-allocates bandwidth to virtual connections, while remaining within the underlying physical links' limits. Like Wright, Zheng ensures that "the

sum of all the bandwidth required for each connection...is less than or equal to the total bandwidth available" on each physical link. Ex.1008, 5:4-25. To achieve this result, Zheng teaches dividing a sum of bandwidth B_j requirements by a granularity value *G*, applying a "ceiling function," and then multiplying the ceiling value by the granularity value G:

$$DB = \left\lceil \frac{\sum_j B_j}{G} \right\rceil \times G$$

Ex.1008, 6:1-18; 6:47-7:7, 5:36-37.

A POSITA would have known that dividing by *G* is mathematically equivalent to multiplying by $\frac{1}{G}$, so Zheng teaches multiplying a sum of bandwidths by both G and $\frac{1}{G}$, either of which is a "*correction factor*." Ex.1003, ¶¶369-70. Ex.1021, ¶¶289-290.

It would have been obvious for Baker's PGL to multiply Baker-Wright-Holender '699's bandwidth requirements by a granularity value to determine an "over-allocated" bandwidth for the actual bandwidth, used for the same purpose in Baker-Wright as in Zheng, to provide extra bandwidth should a traffic source exceed an allowed peak rate. Ex.1003, ¶¶371-72. Ex.1021, ¶291.

F. Ground 4: Claim 17 Obvious Over Baker-Wright-Holender '699-Holender '894-Zheng

Claim 17 recites similar limitations to claim 6 demonstrated as obvious over Baker-Wright-Holender '699-Zheng in Ground 3 above. Further, claim 17 depends from claim 12, analyzed in Ground 2 with the addition of Holender '894. Therefore, claim 17 is obvious over Baker-Wright-Holender '699-Holender '894-Zheng. A POSITA would have been motivated to combine Zheng with Baker-Wright-Holender '699-Holender '894 for substantially the same reasons given for each reference. *See supra* §X.D.2 (Holender '894), X.E.2 (Zheng); Ex.1003, ¶373. Ex.1021, ¶¶292-299.

1. Claim 17

[17.0] The method according to claim 12,

See [12.0]-[12.8].

[17.1] and comprising multiplying at least one of the first and second bandwidths by a correction factor to determine a corrected bandwidth.

First, as discussed at [6.1], the prior art renders obvious "*multiplying... by a correction factor....*" Since claim 17 recites a Markush group, this teaching alone renders the claim obvious. Ex.1003, ¶¶374-76.

Second, based on Holender '699 and Holender '894's multiple logical topologies providing multiple services with corresponding bandwidths, it would have been obvious to "*multiply[]*" multiple "*bandwidths*" by a correction factor. *See*

Ex.1007, 4:54-65; Ex.1020, 6:43-54; Ex.1003, ¶¶377-78; *supra* [12.1], [12.3]. Ex.1021, ¶303.

X. DISCRETIONARY DENIAL IS INAPPROPRIATE

A. No basis for 35 U.S.C. § 325(d) denial

None of Baker, Wright, Holender '699, Holender '894, and Zheng were cited or considered by the Examiner during prosecution of the '431 patent. Ex.1002; Ex.1001, p.1 (056). The prior art presented in this petition renders obvious the "*mapping*" and "*allocating*" limitations that the Examiner emphasized in allowing the claims.

Claims 25-27 of the '431 patent were recently challenged by a different petitioner ("Unified") in IPR2022-01514 (September 29, 2022). *See* IPR2022-01514, Paper 1. Claims 1-30 were also recently challenged by Cisco Systems, Inc., Dell Technologies Inc., and Dell Inc. ("Cisco") in IPR2023-00169 (November 17, 2022). *See* IPR2023-00169, Paper 1. While some of the art used in the Unified and Cisco petitions is largely the same, the arguments differ. Also, the PTO has not yet passed judgment on any of the overlapping art, because both petitions are still pre-Patent Owner Preliminary Response and pre-Institution Decision. *See also infra* §XI.C. Accordingly, discretionary denial under 35 U.S.C. § 325(d) is not appropriate.

B. Discretionary denial under the *Fintiv* factors is not appropriate

The six factors considered for §314 denial strongly favor institution. *See Apple Inc. v. Fintiv, Inc*., IPR2020-00019, Paper 11 (Mar. 20, 2020).

1. No evidence regarding a stay

No motion to stay has been filed, so the Board should not infer the outcome of such a motion. *See Dish Network L.L.C. v. Broadband iTV, Inc.*, IPR2020-01359, Paper 15 (Feb. 12, 2021) ("It would be improper to speculate, [] what the [] court might do regarding a motion to stay..."). However, historically the courts in the District of Delaware have been willing to stay cases pending the resolution of the IPR. *See, e.g.*, *RAB Lighting Inc. v. Ideal Indus. Lighting LLC*, No. 20-cv-1574-RGA (D. Del. Oct. 18, 2021), Dkt. 71. Therefore, this factor weighs against a discretionary denial.

2. Parallel proceeding trial date

No scheduling order has been issued in the parallel litigation. Ex.1023. In addition, the current median time-to-trial in Delaware is 36 months. Ex.1017 at 14. Under this timeline, trial in the parallel litigation would occur in mid-April 2025. Accordingly, this factor weighs against discretionary denial. *See Sand Revolution II, LLC v. Continental Intermodal Grp.—Trucking LLC*, IPR2020-01393, Paper 24 (June 16, 2020) (granting institution on rehearing concluding uncertainty over district court's trial date weighed against discretionary denial).

3. Investment in the parallel proceeding

The parallel litigation is in its early stages, and the investment has been minimal. As stated above, no scheduling order has yet been issued. *See PEAG LLC v. Varta Microbattery GMBH*, IPR2020-01214, Paper 8 at 17 (Jan. 6, 2021) (finding low investment in the parallel proceeding, weighed against discretionary denial).

4. Overlapping issues with the parallel proceeding

Instituting a proceeding will allow the Board to address the asserted prior art, and the issues will be narrowed in the co-pending litigation due to the estoppel provisions of 35 U.S.C. § 315(e)(2).

Moreover, there will be no overlap of prior art issues. If the Board institutes trial, Petitioner will cease asserting in the co-pending litigations the combination of references on which trial is instituted for the claims on which trial is instituted. This factor weighs against discretionary denial. *See Verizon v. Huawei*, IPR2020-01079, Paper 10 at 38 (Jan. 14, 2021) (finding a similar stipulation "mitigates the concern about overlapping issues" and weighs "against discretionary denial of the Petition.").

5. Whether petitioner is defendant

Petitioner is the defendant in the co-pending litigation. While *Fintiv* indicates that a difference between the district court defendant and the petitioner may weigh against discretionary denial, nothing in *Fintiv* suggests the same party between the proceedings weighs in favor of discretionary denial. *See HP Inc. v. Slingshot*

Printing LLC, IPR2020-01084, Paper 13 at 9 (having the "same parties as parallel proceeding" makes factor 5 "neutral"). This factor is neutral.

6. Other circumstances

The prior art presented in this Petition renders the Challenged Claims unpatentable as obvious. The merits of Petitioner's arguments are compelling because they lead to a strong conclusion that one or more claims are unpatentable by a preponderance of the evidence. This factor therefore weighs against discretionary denial.

As such, the *Fintiv* factors are either neutral or weigh against discretionary denial. Because this Petition was filed approximately three months before the statutory bar date, institution should not be denied on discretionary factors.

C. Discretionary denial under *General Plastic* is not appropriate

None of the *General Plastic* discretionary institution factors favor denial. *See General Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 16 (Sept. 6, 2016) (Section II.B.4.i. precedential).

1. Factor 1

Factor 1 weighs against discretionary denial because none of the earlier-filed petitions involved the same petitioners. Those petitioners (Unified and Cisco) are not co-defendants to Arista in the co-pending litigation. *Cf. Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 at 9-10 (precedential) (finding a

"significant relationship" between different petitioners when they were "co-defendants in the District Court litigation"); *see* IPR2022-01514, Paper 1, at 92 ("Unified is not a defendant in a related court case.").

Additionally, Unified certified in its Petition that "no other party exercised control or could exercise control over Unified's participation [], or conduct in any ensuing trial." IPR2022-01514, Paper 1, at 1. Arista has not communicated with Unified Patents regarding the substance of Unified's petition and had no notice of Unified's petition until after it was filed. Thus, there is no "significant relationship" with either Cisco or Unified. *Valve* at 10. This weighs against discretionary denial.

2. Factors 2-5

Given the short time between the filing of Unified and Cisco's petitions and the present Petition, Factors 2 and 4 also weigh against discretionary denial. *See Mercedes-Benz* at 13. This Petition is being filed less than four months after Unified's Petition and approximately two months after Cisco's Petition.

Importantly, Corrigent has not filed any Patent Owner Preliminary Response, so Petitioner receives no potential benefit or tactical advantage. Factors 2-5 therefore weigh against discretionary denial.

3. Factors 6-7

Petitioner challenges all claims, whereas Unified's petition only challenges claims 25-27. Therefore, joinder would not be possible with Unified's petition. Even

were both proceedings to result in trial, the small overlap between challenged claims would result in limited repetition. In contrast, there is substantial overlap between this petition and the Cisco petition challenging the same claims and using overlapping prior art. Arista's petition includes the same grounds as the Cisco petition with the addition of a single prior art reference for elements [1.3], [1.5], and [9] for ground 1 (Holender '699) and element [12.3] for ground 2 (Holender '894). The similarities that exist between these petitions provide strong basis for efficiency. The Arista and Cisco petitions could be joined, due to the substantial overlap between the proceedings. Arista agrees to allow Cisco's counsel to take the lead on overlapping issues.

Petitioner has a meaningful due process interest in being heard in this forum on the merits, because of its choice to raise the unpatentability grounds before the Board. This fact also favors not denying institution.

XI. CONCLUSION

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

XII. 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 Arista Networks, Inc.

B. Related matters

Pursuant to 37 C.F.R. § 42.8(b)(2), to the best knowledge of Petitioner, the '431 patent is or was involved in the following cases:

Case Heading	Number	Court	Filed
Corrigent Corporation v. Dell Technologies, Inc. et al	1-22-cv-00496	D. Del.	April 19, 2022
Corrigent Corporation v. Cisco Systems, Inc.	6-22-cv-00396	W.D. Tex.	April 19, 2022
Unified Patents, LLC v. Corrigent Corporation	IPR2022-01514	PTAB	September 29, 2022
Cisco Systems, Inc., Dell Technologies, Inc. et al v. Corrigent Corporation	IPR2023-00169	PTAB	November 17, 2022

C. Lead and back-up counsel and service information

LEAD COUNSEL	BACK-UP COUNSEL
Eliot D. Williams (Reg. No. 50,822) Baker Botts L.L.P. 700 K Street, N.W. Washington, D.C., 20001-5692 Tel: 202-639-1334 Eliot.Williams@BakerBotts.com	Kurt Pankratz (Reg. No. 46,977) Baker Botts L.L.P. 2001 Ross Avenue, Suite 900 Dallas, TX 75201-2980 Tel: 214-953-6500 Kurt.Pankratz@BakerBotts.com Jeremy J. Taylor (Reg. No. 73,912) Baker Botts L.L.P. 101 California Street, Suite 3200 San Francisco, CA 94111 Tel: 415-291-6200 Jeremy.Taylor@BakerBotts.com

Petitioner consents to service at lead counsel's address provided above and consents to e-mail service, provided it is made to all the following e-mail addresses: eliot.williams@bakerbotts.com, kurt.pankratz@bakerbotts.com, and jeremy.taylor@bakerbotts.com. A Power of Attorney is filed concurrently herewith under 37 C.F.R. § 42.10(b).

XIII. APPENDIX OF CHALLENGED CLAIMS

[1.0] A method for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the method comprising:

[1.1] defining between the nodes logical connections associated with a data transmission service to be provided over the network,

[1.2] the logical connections having a connection topology different from the physical topology;

[1.3] determining respective bandwidth requirements for the logical connections based on parameters of the service;

[1.4] mapping the connection topology to the physical topology, so that each of the logical connections is associated with one or more links of the physical topology; and

[1.5] allocating a bandwidth for the service on each of the links in response to the bandwidth requirements of the logical connections and to the mapping.

[2.0] The method according to claim 1,

[2.1] wherein the network comprises a ring network, and wherein the physical topology comprises a ring topology.

[3.0] The method according to claim 1,

[3.1] wherein the connection topology is chosen from one of a hub-and-spoke topology and a full mesh topology.

[4.0] The method according to claim 1,

[4.1] wherein the data transmission service comprises a guaranteed bandwidth service.

[5.0] The method according to claim 1,

[5.1] wherein the data transmission service comprises a class of service defined by a protocol under which the network operates.

[6.0] The method according to claim 1,

[6.1] and comprising multiplying the bandwidth by a correction factor to determine an actual bandwidth.

[7.0] The method according to claim 1,

[7.1] wherein mapping the connection topology to the physical topology comprises generating a bandwidth requirement for each of the links.

[8.0] The method according to claim 1,

[8.1] wherein parameters of the service comprise respective node-bandwidths required by each of the nodes to provide the service.

[9.0] The method according to claim 1,

[9.1] and comprising monitoring traffic generated in the network by the data transmission service, and adjusting the bandwidth in response to the traffic.

[10.0] The method according to claim 1,

[10.1] wherein the data transmission service comprises a plurality of subclasses of traffic, and

[10.2] wherein allocating the bandwidth comprises allocating a reserved bandwidth to one of the subclasses.

[11.0] The method according to claim 1,

[11.1] wherein allocating the bandwidth comprises comparing a mapping bandwidth determined in response to the bandwidth requirements of the logical connections and to the mapping with a full bandwidth determined by assuming all possible logical connections in the network are provided for.

[12.0] A method for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the method comprising:

[12.1] defining between the nodes a first set of logical connections

associated with a first data transmission service to be provided over the network, and a second set of logical connections associated with a second data transmission service to be provided over the network, the first set of logical connections having a first connection topology, the second set of logical connections having a second connection topology,

[12.2] the first and second connection topologies being different from the physical topology;

[12.3] determining respective first bandwidth requirements for the first set of logical connections based on first parameters of the first data transmission service and respective second bandwidth requirements for the second set of logical connections based on second parameters of the second data transmission service;

[12.4] generating a first mapping of the first connection topology to the physical topology, so that each of the first set of logical connections is associated with one or more links of the physical topology;

[12.5] allocating a first bandwidth for the first data transmission service on each of the links in response to the first bandwidth requirements of the first set of logical connections and to the first mapping;

[12.6] generating a second mapping of the second connection topology to the physical topology, so that each of the second set of logical connections is associated with one or more links of the physical topology;

[12.7] allocating a second bandwidth for the second data transmission service on each of the links in response to the second bandwidth requirements of the second set of logical connections and to the second mapping; and

[12.8] summing the first and the second bandwidths to determine a total allocation for each of the links.

[13.0] The method according to claim 12,

[13.1] wherein the network comprises a ring network, and wherein the physical topology comprises a ring topology.

[14.0] The method according to claim 12,

[14.1] wherein the first connection topology comprises a hub-and-spoke topology and the second connection topology comprises a full mesh topology.

[15.0] The method according to claim 12,

[15.1] wherein at least one of the first and second data transmission services comprises a guaranteed bandwidth service.

[16.0] The method according to claim 12,

[16.1] wherein at least one of the first and second data transmission services comprises a class of service defined by a protocol under which the network operates.

[17.0] The method according to claim 12,

[17.1] and comprising multiplying at least one of the first and second bandwidths by a correction factor to determine a corrected bandwidth.

[18.0] The method according to claim 12,

[18.1] wherein generating the first mapping comprises generating a first bandwidth requirement for each of the links, and wherein generating the second mapping comprises generating a second bandwidth requirement for each of the links.

[19.0] The method according to claim 12,

[19.1] wherein the first parameters of the first service comprise respective first node-bandwidths required by each of the nodes to provide the first service, and wherein the second parameters of the second service comprise respective second node-bandwidths required by each of the nodes to provide the second service.

[20.0] The method according to claim 12,

[20.1] and comprising monitoring traffic generated in the network by the first and second data transmission services, and adjusting the total allocation in response to the traffic.

[21.0] The method according to claim 12,

[21.1] wherein the first data transmission service comprises a plurality of subclasses of traffic, and

[21.2] wherein allocating the first bandwidth comprises allocating a reserved bandwidth to one of the subclasses.

[22.0] The method according to claim 12,

[22.1] wherein the first connection topology is different from the second connection topology.

[23.0] The method according to claim 12, wherein summing the first and the second bandwidths to determine a total allocation for each of the links comprises:

[23.1] determining a first mapping bandwidth in response to the first bandwidth requirements of the first set of logical connections and to the first mapping;

[23.2] determining a second mapping bandwidth in response to the second bandwidth requirements of the second set of logical connections and to the second mapping; and

[23.3] comparing the first mapping bandwidth and the second mapping bandwidth with a full bandwidth determined by assuming all possible logical connections in the network are provided for.

[24.0] A method for assigning bandwidth in a ring network including nodes coupled by links, the method comprising:

[24.1] defining between the nodes a first set of logical connections

associated with a first data transmission service to be provided over the network, and a second set of logical connections associated with a second data transmission service to be provided over the network,

[24.2] the first set of logical connections having a hub-and-spokes

connection topology, the second set of logical connections having a full mesh connection topology;

[24.3] determining respective first bandwidth requirements for the first set of logical connections based on first parameters of the first data transmission service

and respective second bandwidth requirements for the second set of logical connections based on second parameters of the second data transmission service;

[24.4] generating a first mapping of the first connection topology to the ring network, so that each of the first set of logical connections is associated with one or more links of the ring network;

[24.5] determining a first bandwidth for the first data transmission service on each of the links in response to the first bandwidth requirements of the first set of logical connections and to the first mapping;

[24.6] generating a second mapping of the second connection topology to the ring topology, so that each of the second set of logical connections is associated with one or more links of the ring network;

[24.7] determining a second bandwidth for the second data transmission service on each of the links in response to the second bandwidth requirements of the second set of logical connections and to the second mapping;

[24.8] summing the first and the second bandwidths to determine a total bandwidth for each of the links; and

[24.9] allocating one of the first bandwidth, the second bandwidth, and the total bandwidth to each of the links in response to respectively providing the first service, the second service, and both services, over the network.

[25.0] Apparatus for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the apparatus comprising: [25.1] a controller which is adapted to:

[25.2] [a controller which is adapted to] receive a definition of logical connections between the nodes, the logical connections being associated with a data transmission service to be provided over the network,

[25.3] the logical connections having a connection topology different from the physical topology,

[25.4] [a controller which is adapted to] determine respective bandwidth requirements for the logical connections based on parameters of the service,

[25.5] [a controller which is adapted to] map the connection topology to the physical topology, so that each of the logical connections is associated with one or more links of the physical topology, and

[25.6] [a controller which is adapted to] allocate a bandwidth for the service on each of the links in response to the bandwidth requirements of the logical connections and to the mapping.

[26.0] Apparatus according to claim 25,

[26.1] wherein the controller is comprised in one of the nodes.

[27.0] Apparatus according to claim 25,

[27.1] wherein the controller is external to the network.

[28.0] Apparatus for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the apparatus comprising:

[28.1] a controller which is adapted to:

[28.2] [a controller which is adapted to:] receive a definition of a first set of logical connections, between the nodes, associated with a first data transmission service to be provided over the network, and a second set of logical connections, between the nodes, associated with a second data transmission service to be provided over the network, the first set of logical connections having a first connection topology, the second set of logical connections having a second connection topology,

[28.3] the first and second connection topologies being different from the physical topology,

[28.4] [a controller which is adapted to:] determine respective first bandwidth requirements for the first set of logical connections based on first parameters of the first data transmission service and respective second bandwidth requirements for the second set of logical connections based on second parameters of the second data transmission service,

[28.5] [a controller which is adapted to:] generate a first mapping of the first connection topology to the physical topology, so that each of the first set of logical connections is associated with one or more links of the physical topology,

[28.6] [a controller which is adapted to:] allocate a first bandwidth for the first data transmission service on each of the links in response to the first bandwidth requirements of the first set of logical connections and to the first mapping,

[28.7] [a controller which is adapted to:] generate a second mapping of the second connection topology to the physical topology, so that each of the second set of logical connections is associated with one or more links of the physical topology,

[28.8] [a controller which is adapted to:] allocate a second bandwidth for the second data transmission service on each of the links in response to the second bandwidth requirements of the second set of logical connections and to the second mapping, and

[28.9] [a controller which is adapted to:] sum the first and the second bandwidths to determine a total allocation for each of the links.

[29.0] Apparatus according to claim 28,

[29.1] wherein the controller is comprised in one of the nodes.

[30.0] Apparatus according to claim 28,

[30.1] wherein the controller is external to the network.

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105, the undersigned certifies that on the 25th day of January 2023, the foregoing was provided via Priority Mail Express or by means at least as fast and reliable as Priority Mail Express, postage prepaid, to the Patent Owner and its known representatives by serving the correspondence address of record for the U.S. Patent No. 7,330,431 holder and the patent holder's counsel:

Date of service	January 25, 2023
Manner of service	Federal Express
Documents served	Petition for Inter Partes Review Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104 of U.S. 7,330,431; Petitioner's Exhibit List; Exhibits 1001-1034.
Counsel for Patent Owner	May Patents Ltd. (attorney/agent of record) c/o Dorit Shem-Tov P.O. Box 7230 Ramat-Gan, -5217102 Corrigent Corporation (assignee of record) 291 Main St. C/O New England Intellectual Property West Newbury, Massachusetts 01985

BAKER BOTTS L.L.P.

/Eliot D. Williams/

Eliot D. Williams (Reg. No. 50,822)
Lead Attorney for Petitioner

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATION, TYPEFACE REQUIREMENTS, AND TYPE STYLE REQUIREMENTS

1. This Petition complies with the type-volume limitation of 14,000 words, comprising 13,998 words, excluding the parts exempted by 37 C.F.R. § 42.24(a).

2. This Petition complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman.

Respectfully submitted,

BAKER BOTTS L.L.P.

/Eliot D. Williams/

Eliot D. Williams (Reg. No. 50,822)
Lead Attorney for Petitioner

Date: January 24, 2023

700 K Street, N.W.
Washington, D.C., 20001-5692
Tel: 202-639-1334
Eliot.Williams@BakerBotts.com