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Bruckman

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(54) **MULTIPOINT TO MULTIPOINT COMMUNICATION OVER RING TOPOLOGIES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 700 days.

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H04L 12/26 (2006.01)

(52) **U.S. Cl.** **370/232**; 370/231; 370/235

(58) **Field of Classification Search** 370/229–235, 370/237–238, 395.2–395.21
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,235,593	A	8/1993	Grow et al.	
5,461,611	A	10/1995	Drake et al.	
5,581,703	A	12/1996	Baugher et al.	
5,706,516	A	1/1998	Chang et al.	
5,854,903	A *	12/1998	Morrison et al.	709/249
5,933,422	A	8/1999	Kusano et al.	
6,021,263	A	2/2000	Kujoory et al.	
6,157,654	A	12/2000	Davis	
6,169,783	B1	1/2001	Brooks et al.	
6,256,292	B1	7/2001	Ellis et al.	
6,262,976	B1	7/2001	McNamara	
6,339,488	B1	1/2002	Beshai et al.	
6,370,121	B1	4/2002	Hausman	
6,400,681	B1	6/2002	Bertin et al.	
6,442,134	B1	8/2002	Mitchell	
6,456,407	B1	9/2002	Tammela et al.	
6,486,988	B1	11/2002	Lewis et al.	
6,507,577	B1	1/2003	Mauger et al.	370/356
6,510,141	B1	1/2003	Ramfelt et al.	370/254
6,522,627	B1	2/2003	Mauger	370/230
6,560,231	B1	5/2003	Kawakami et al.	
6,580,693	B1 *	6/2003	Chernyak et al.	370/248
6,584,535	B1	6/2003	Ouellet et al.	
6,624,917	B1	9/2003	Paschal et al.	

(Continued)

OTHER PUBLICATIONS

Moy, "OSPF", Version 2, published as Request for Comments (RFC) 2328 of the Internet Engineering Task Force (IETF) Network Working Group, Apr. 1998.

(Continued)

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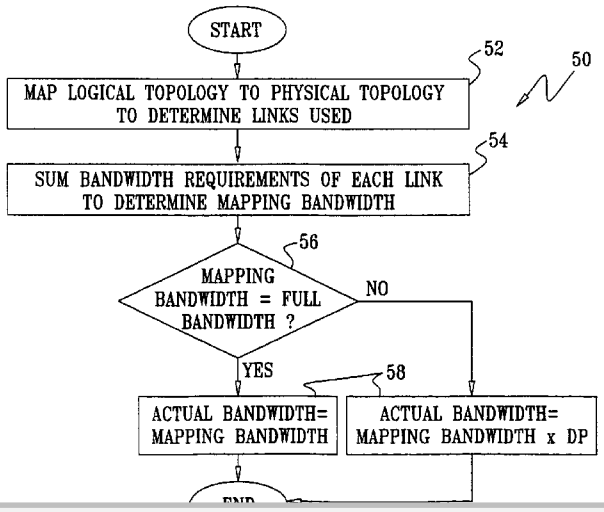
(57) **ABSTRACT**

A method for assigning bandwidth in a network including nodes coupled by links arranged in a physical topology, the method including: defining between the nodes logical connections associated with a data transmission service to be provided over the network, the logical connections having a connection topology different from the physical topology, and determining respective bandwidth requirements for the logical connections based on parameters of the service. The method further includes 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 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.

30 Claims, 4 Drawing Sheets



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U.S. PATENT DOCUMENTS

6,625,155	B1	9/2003	Dziong	
6,639,893	B1	10/2003	Chikenji et al.	
6,639,896	B1	10/2003	Goode et al.	
6,647,008	B1	11/2003	Galand et al.	
6,678,241	B1	1/2004	Gai et al.	
6,680,912	B1	1/2004	Kalman et al.	
6,711,125	B1	3/2004	Walrand et al.	
6,731,597	B1	5/2004	Batchellor et al.	
6,757,286	B1	6/2004	Stone	
6,763,025	B2	7/2004	Leatherbury et al.	
6,778,494	B1	8/2004	Mauger	370/230
6,795,394	B1	9/2004	Swinkels et al.	
6,801,506	B1	10/2004	Dey	
6,820,210	B1	11/2004	Daruwalla et al.	
6,826,147	B1	11/2004	Nandy et al.	
6,826,158	B2	11/2004	Seaman et al.	
6,922,394	B2	7/2005	Kajiwara	
6,934,259	B2	8/2005	Klincewicz et al.	
6,952,397	B2	10/2005	Mor et al.	370/223
6,965,612	B2	11/2005	Chohan et al.	
6,992,975	B1	1/2006	Daniel et al.	370/222
7,035,279	B2	4/2006	Bruckman	370/460
7,042,846	B2	5/2006	Bauer	
7,058,008	B1	6/2006	Wilson et al.	
7,158,486	B2	1/2007	Rhodes	
7,161,899	B2	1/2007	Limaye et al.	
7,184,402	B1	2/2007	Sharma et al.	
2002/0133756	A1*	9/2002	Jain	714/43
2002/0181479	A1	12/2002	Okuno	
2002/0186661	A1	12/2002	Santiago et al.	
2003/0002443	A1	1/2003	Basso et al.	
2003/0055920	A1	3/2003	Kakadia et al.	
2003/0145108	A1	7/2003	Joseph et al.	
2003/0158930	A1	8/2003	Mc Bride	
2003/0223428	A1	12/2003	Blanquer et al.	
2004/0052274	A1	3/2004	Wang et al.	
2004/0071089	A1	4/2004	Bauer et al.	
2004/0076176	A1	4/2004	Kfir	
2004/0105459	A1	6/2004	Mannam	
2005/0030948	A1	2/2005	Wyatt	

OTHER PUBLICATIONS

Awduche, et al., "Requirement for Traffic Engineering Over MPLS", published as IETF RFC 2702, Sep. 1999.

Blake, S. et al., "Architecture for Differentiated Services", Internet Engineering Task Force, Network Working Group, RFC 2457, Dec. 1998.

Seddigh, N. et al., "An Assured Rate Per-Domain Behaviour for Differentiated Services", Internet Engineering Task Force, Network Working Group, Jul. 2001.

D. Tsiang et al., Request for Comments (RFC) 2892 of the Internet Engineering Task Force (IETF), Aug. 2000.

Braden, et al., in IETF RFC 2205, "Resource ReServation Protocol (RSVP)—Version 1 Functional Specification", Sep. 1997.

Andersson, et al., in IETF RFC 3036, "LDP Specification" Jan. 2001.

Yavatkar et al., RFC 2814 "A Protocol for RSVP—Based Admission Control Over IEEE 802-Style Networks", May 2000, pp. 1-56.

Official Action dated Nov. 28, 2005, which issued during the prosecution of US Assignee/Israeli Applicant's U.S. Appl. No. 10/054,845, filed Jan. 25, 2002.

Office Action dated Mar. 21, 2006 which issued in Applicant's U.S. Appl. No. 10/128,454, filed Apr. 24, 2002.

An Official Action dated Sep. 29, 2006, which issued during the prosecution of Applicant's U.S. Appl. No. 10/211,066.

Dziong, et al., "A Framework For Bandwidth Management In ATM Networks—Aggregate Equivalent Estimation Approach", IEEE/ACM transactions on networking, vol. 5, No. 1, Feb. 1997.

Inverse Multiplexing over ATM, Strategic Technologies Group, Jul. 12, 2001.

The PPP Multilink Protocol (MP) Standard, RFC 1990, The Internet Engineering Task Force, www.ietf.org, Aug. 1996.

* cited by examiner

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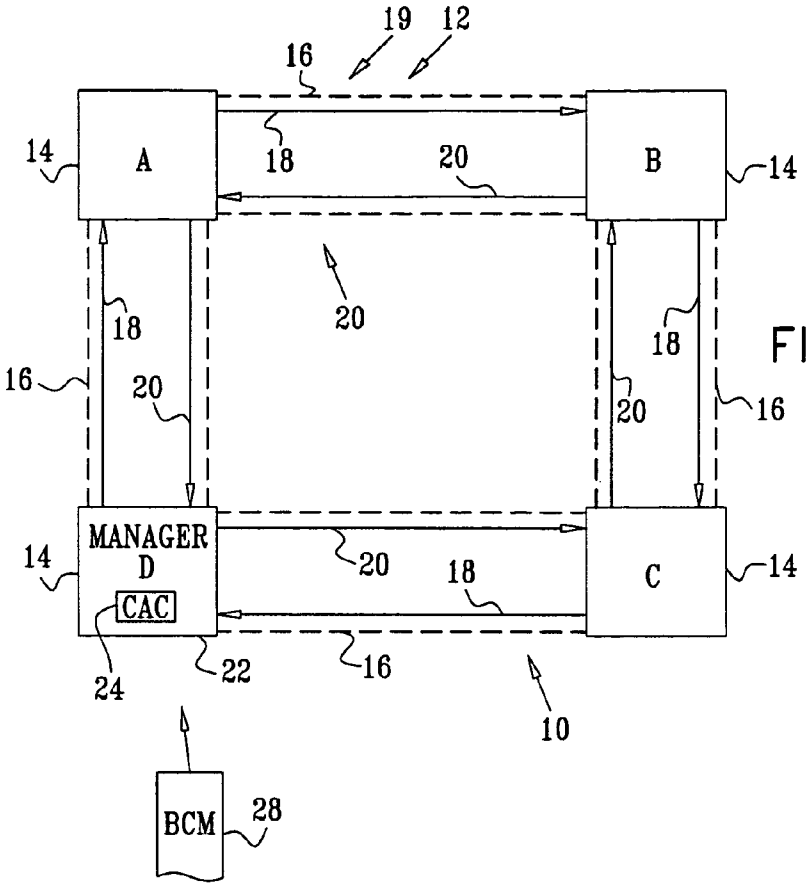

FIG. 1

FIG. 2

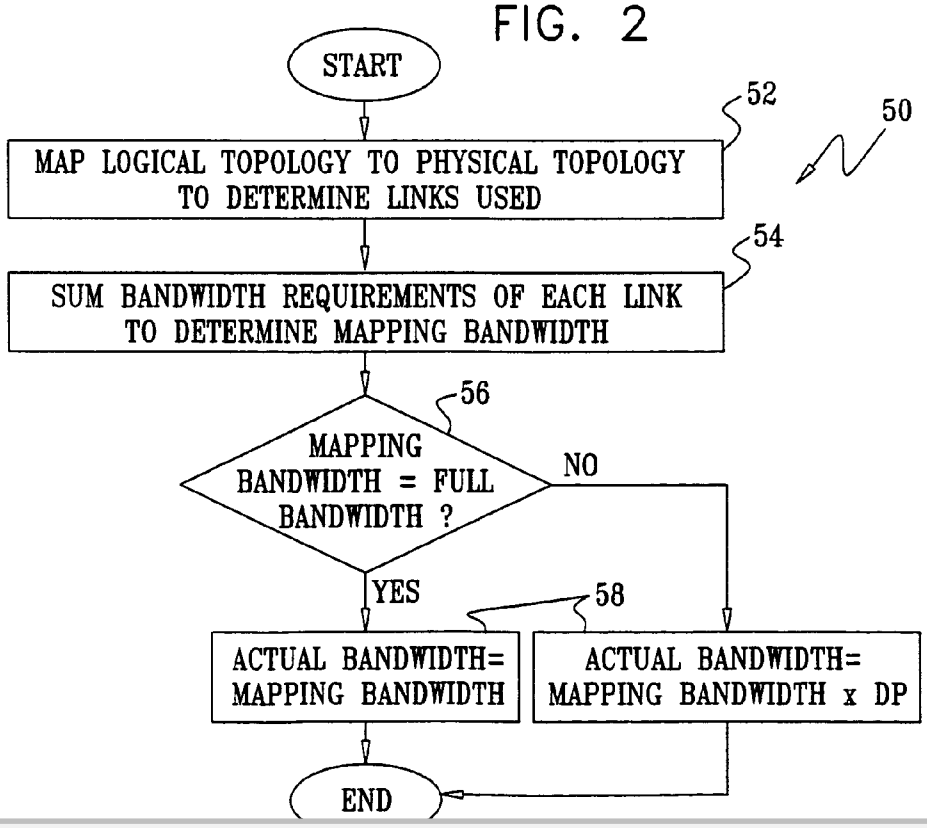

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FIG. 3

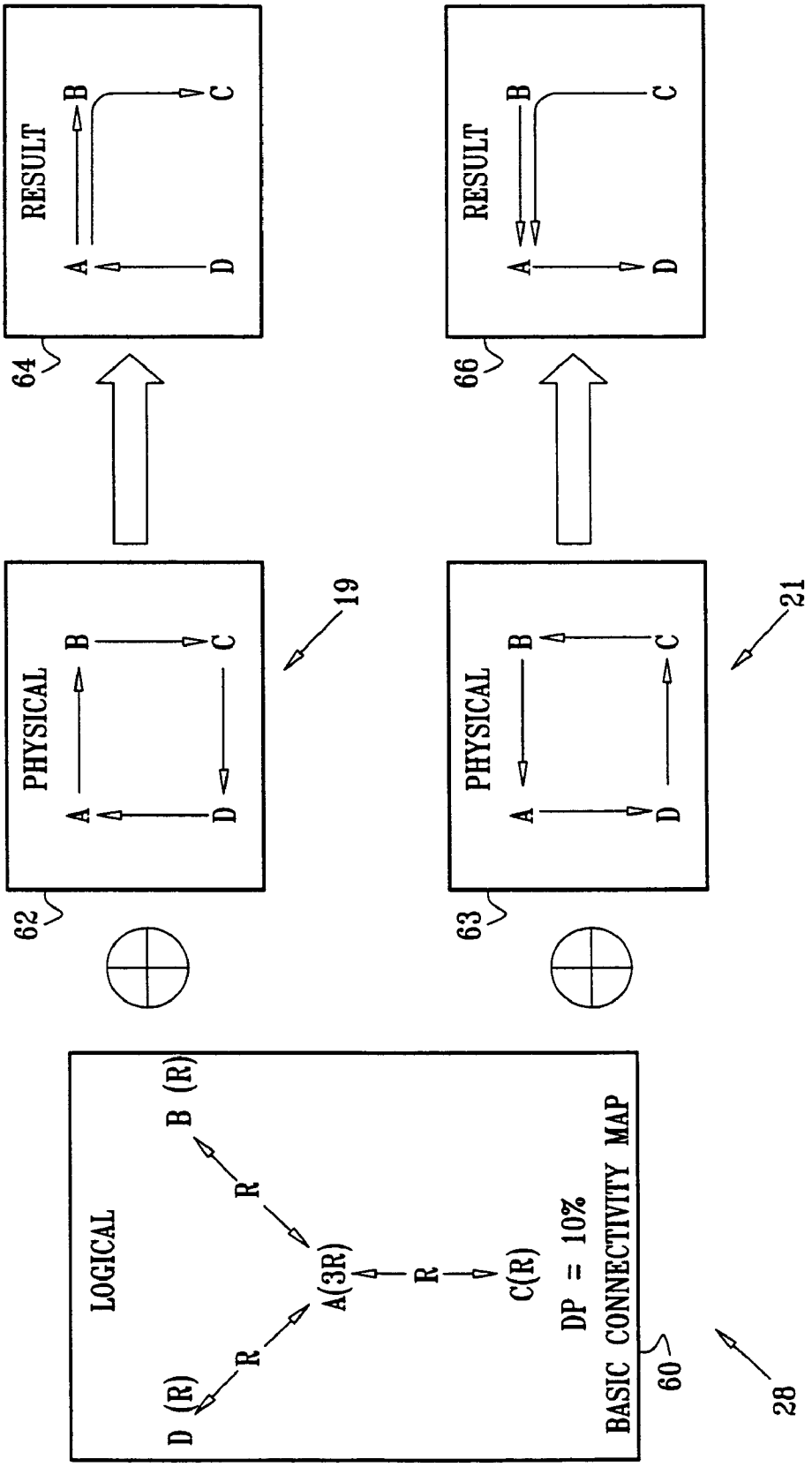

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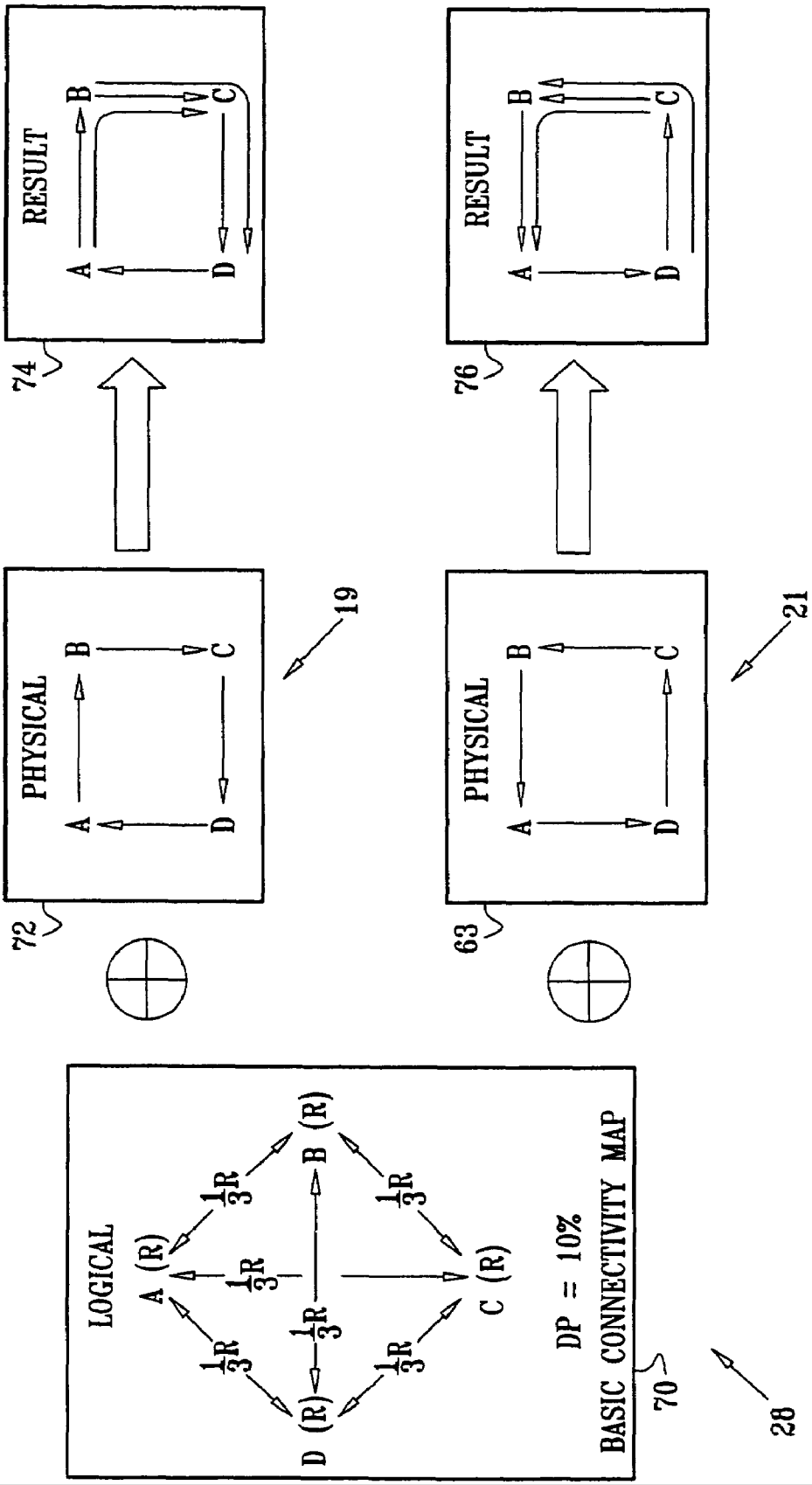
FIG. 4



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