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Steele, Jr. et al.

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(54) **NETWORK RECONFIGURATION**

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(52) **U.S. Cl.** **370/254; 370/400**

(58) **Field of Search** 370/351, 242, 370/408, 402, 400, 254; 709/238, 293, 242, 246, 258

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 5,128,932 A 7/1992 Li
- 5,453,978 A 9/1995 Sethu et al.
- 5,602,839 A 2/1997 Annareddy et al.
- 5,680,116 A 10/1997 Hashimoto et al.
- 5,721,819 A 2/1998 Galles et al.
- 5,740,346 A 4/1998 Wicki et al.
- 5,751,710 A * 5/1998 Crowther et al. 370/423
- 5,751,967 A 5/1998 Raab et al.
- 5,768,501 A 6/1998 Lewis
- 5,781,546 A 7/1998 Sethu
- 5,812,549 A 9/1998 Sethu
- 5,859,981 A 1/1999 Levin et al.
- 5,874,964 A 2/1999 Gille
- 5,884,047 A 3/1999 Aikawa et al.
- 5,914,953 A 6/1999 Krause et al.
- 5,970,232 A * 10/1999 Passint et al. 395/200.68

- 6,005,860 A 12/1999 Anderson et al.
- 6,031,835 A 2/2000 Abali et al.
- 6,055,618 A 4/2000 Thorson
- 6,064,671 A 5/2000 Killian
- 6,097,718 A 8/2000 Bion
- 6,137,781 A 10/2000 Goto et al.
- 6,230,252 B1 5/2001 Passint et al.
- 6,243,760 B1 6/2001 Armbruster et al.
- 6,256,295 B1 7/2001 Callon
- 6,295,573 B1 9/2001 Bailey et al.
- 6,437,804 B1 8/2002 Ibe et al.

FOREIGN PATENT DOCUMENTS

EP 817097 A2 1/1998

OTHER PUBLICATIONS

Whay C. Lee, "Topology Aggregation for Hierarchical Routing in ATM Networks." Apr. 1, 1995, pp. 82-92, Computer-Communication Review.

(List continued on next page.)

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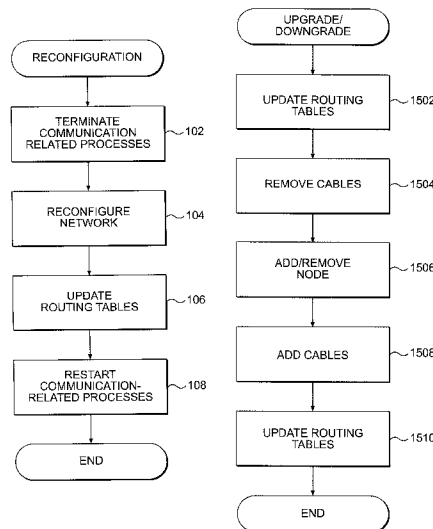
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(57) **ABSTRACT**

In accordance with methods and systems consistent with the present invention, an improved technique for reconfiguring networks is provided. By using this technique, a network administrator can reconfigure their network while it remains operational. As a result, users can continue to utilize the network during reconfiguration. Additionally, in accordance with methods and systems consistent with the present invention, a number of network topologies are provided that are designed to facilitate reconfiguration. When using one of these topologies, the network can be reconfigured with a minimal amount of recabling, thus reducing the amount of time required for reconfiguration.

86 Claims, 15 Drawing Sheets



OTHER PUBLICATIONS

IBM, "Clustering Algorithm for Computer Network Management Graphics", Jun. 1988, pp. 71-79, IBM Technical Disclosure Bulletin, vol. 31, No. 1.

Percy, M. et al., "Distributed Algorithms for Shortest-Path, Deadlock-Free Routing and Broadcasting in Arbitrarily Faulty Hypercubes," International Symposium on Fault Tolerant Computing Systems (FTCS), US, Los Alamitos, IEEE Comp. Soc. Press, vol. Symp. 20, Jun, 26, 1990, pp. 218-225.

Fleury, E. et al., "A General Theory for Deadlock Avoidance in Wormhole-Routed Networks," IEEE Trans. on Parallel and Distributed Systems, IEEE Inc., NY, vol. 9, No. 7, Jul. 1, 1998, pp. 626-638.

Pifarre G. D. et al., "Adaptive Deadlock-and Livestock-Free Routing in the Hypercube Network," IEEE Trans. on Parallel and Distributed Systems, IEEE Inc., NY, vol. 5, No. 11, Nov. 1, 1994, pp. 1121-1138.

* cited by examiner

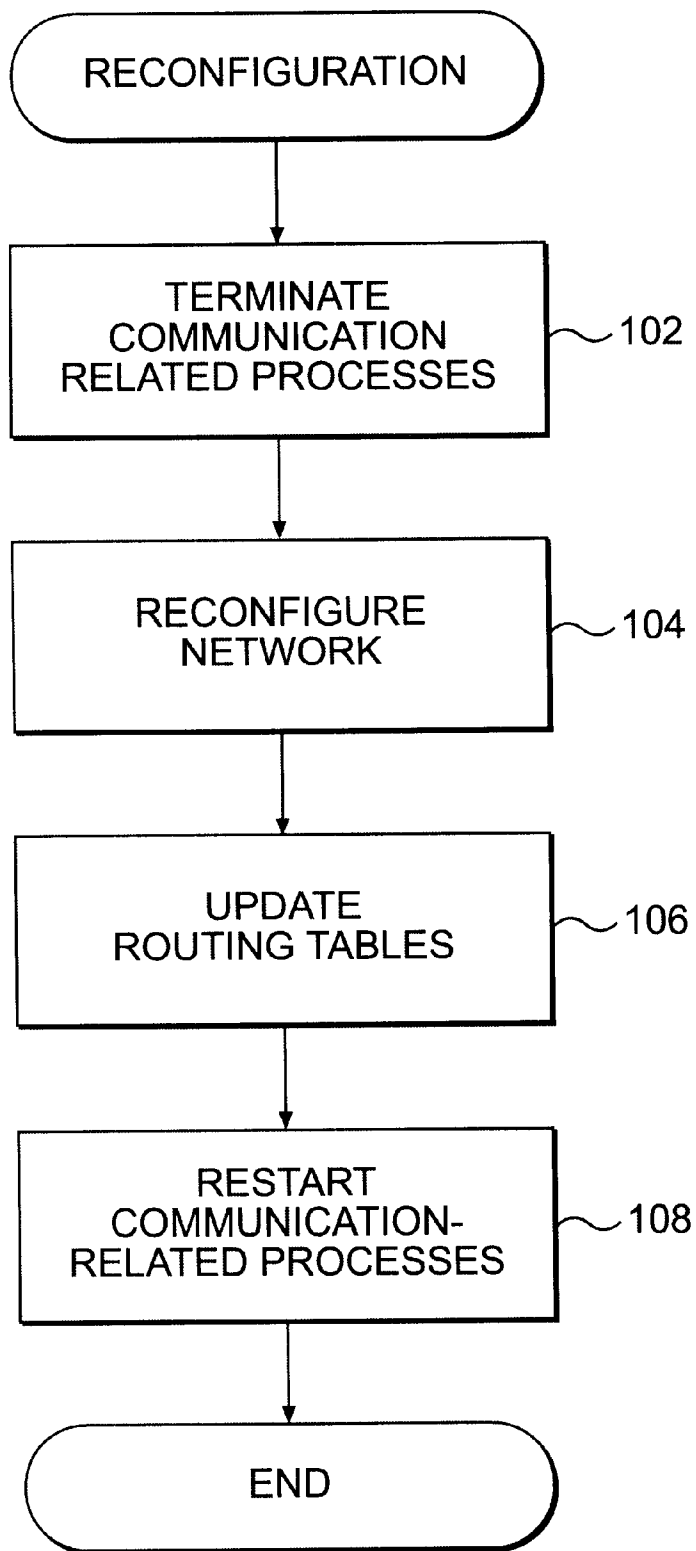


FIG. 1

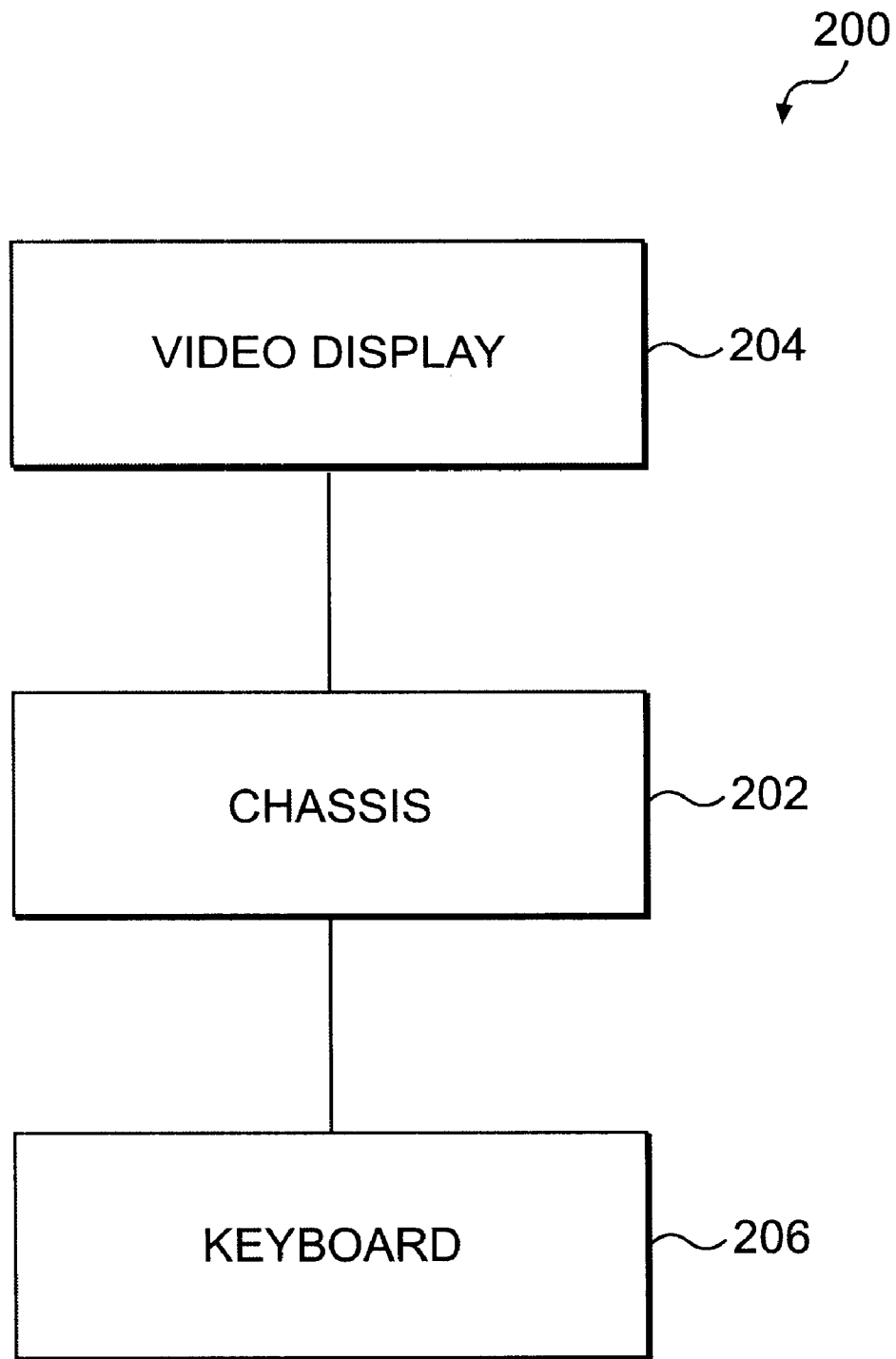


FIG. 2

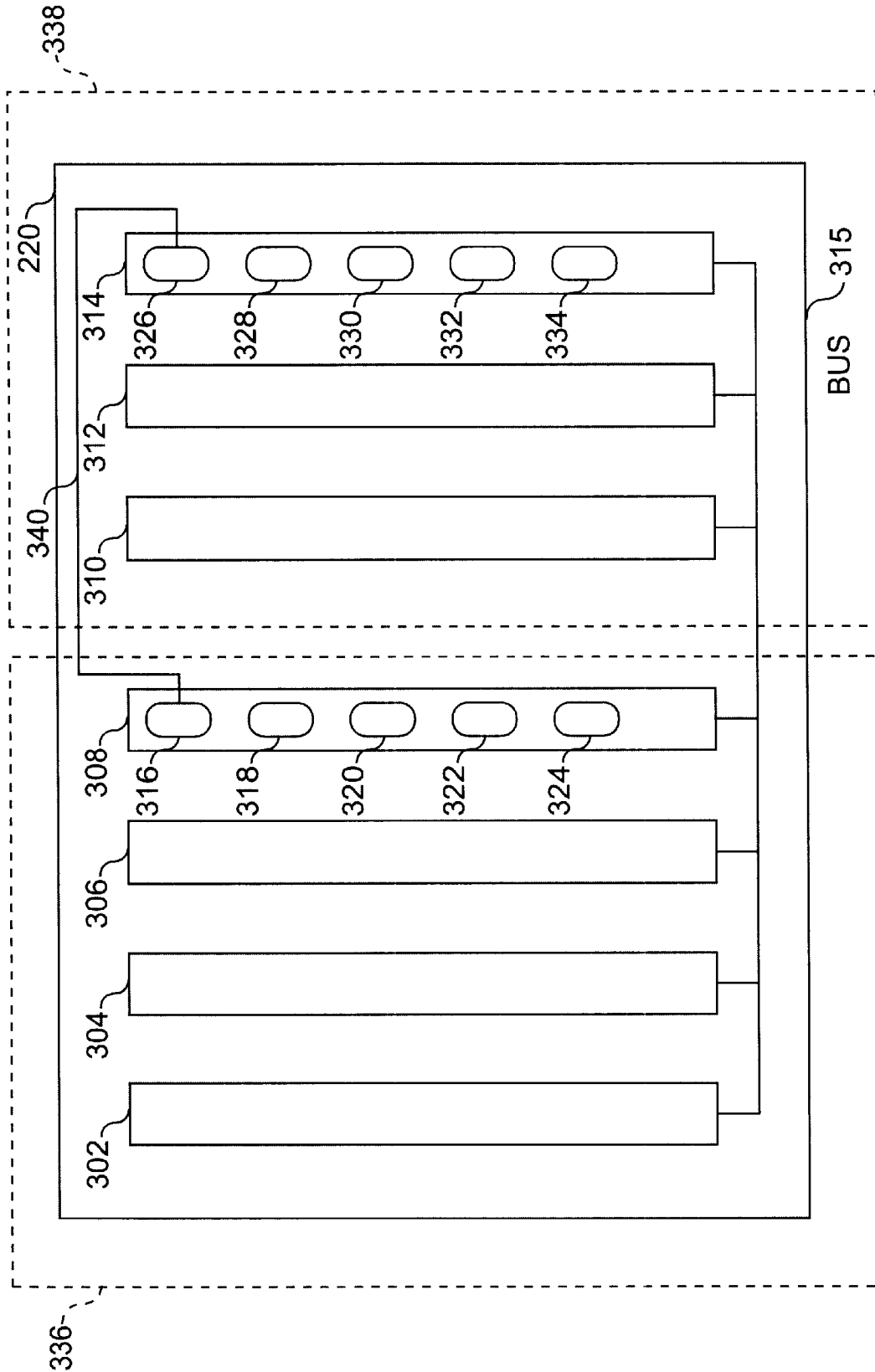


FIG. 3

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