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United States Patent [19]

Connery et al.

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[54] **OFFLOAD OF TCP SEGMENTATION TO A SMART ADAPTER**

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[51] **Int. Cl.**[6] **G06F 13/38**
[52] **U.S. Cl.** **395/200.8**
[58] **Field of Search** .... 364/DIG. 1, DIG. 2; 395/200.3, 200.36, 200.37, 200.48, 200.5, 200.53, 200.55, 200.6, 200.66, 200.8

[56] **References Cited**

U.S. PATENT DOCUMENTS

5,321,819	6/1994	Szczepanek	395/200.8
5,727,149	3/1998	Hirata et al.	395/200.8

OTHER PUBLICATIONS

Postel, J., "The TCP Maximum Segment Size and Related Topics", rfc879, dated Nov. 1983, printed from web site "http:// www.cis.ohio–state.edu/htbin/rfc", 10 pages.
Clark, D., "Window and Acknowledgement Strategy in TCP", rfc813, dated Jul. 1982, printed from web site "http:// www.cis.ohio–state.edu/htbin/rfc", 18 pages.
"Transmission Control Protocol: DARPA Internet Program Protocol Specification", rfc793, prepared by Univ. of Southern Calif., dated Sep. 1981, printed from web site "http:// www.cis.ohio–state.edu/htbin/rfc", 77 pages.

"Internet Protocol: DARPA Internet Program Protocol Specification", rfc 791, prepared by Univ. of Southern Calif., dated Sep. 1981, printed from web site "http:// www.cis.o-hio–state.edu/htbin/rfc", 42 pages.

Gilbert, H., "Introduction to TCP/IP", dated Feb. 2, 1995, printed from web site "http://pclt.cis.yale.edu/pclt/comm/tcpip.htm", 5 pages.

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[57] **ABSTRACT**

A method is provided for sending data from a data source executing a network protocol such as the TCP/IP protocol stack, which includes a process for generating headers for packets according to the network protocol. The method includes sending such data on a network through a smart network interface. The network protocol defines a datagram in the data source, including generating a header template and supplying a data payload. The datagram is supplied to the network interface. At the network interface, a plurality of packets of data are generated from the datagram. The plurality of packets include respective headers, such as TCP/IP headers, based on the header template, and include respective segments of the data payload. The network interface supports packets having a pre-specified length, and the data payload is greater than the pre-specified length, such as two to forty times larger or more. Thus, the higher layer processing specifies a very large datagram, which is automatically segmented at the network interface layer, instead of at the TCP layer.
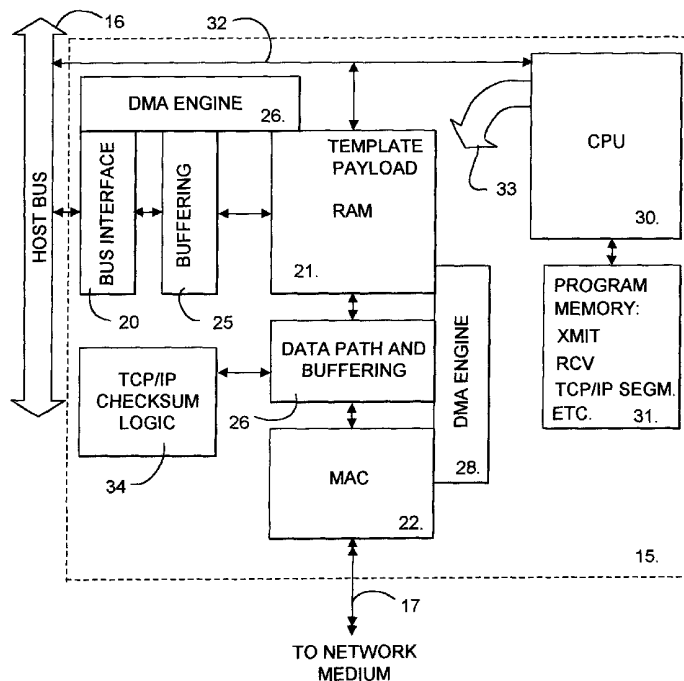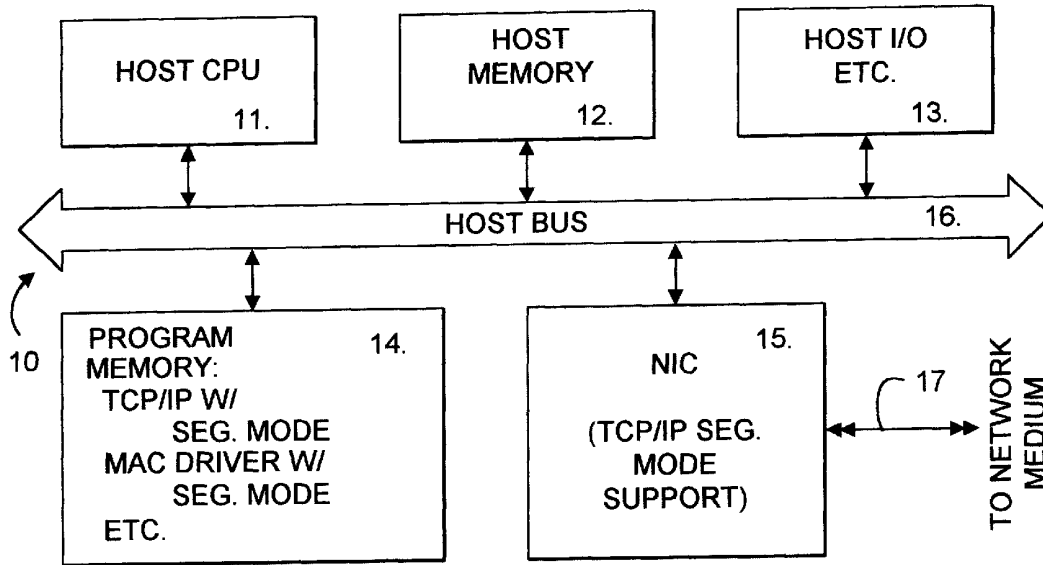
83 Claims, 6 Drawing Sheets
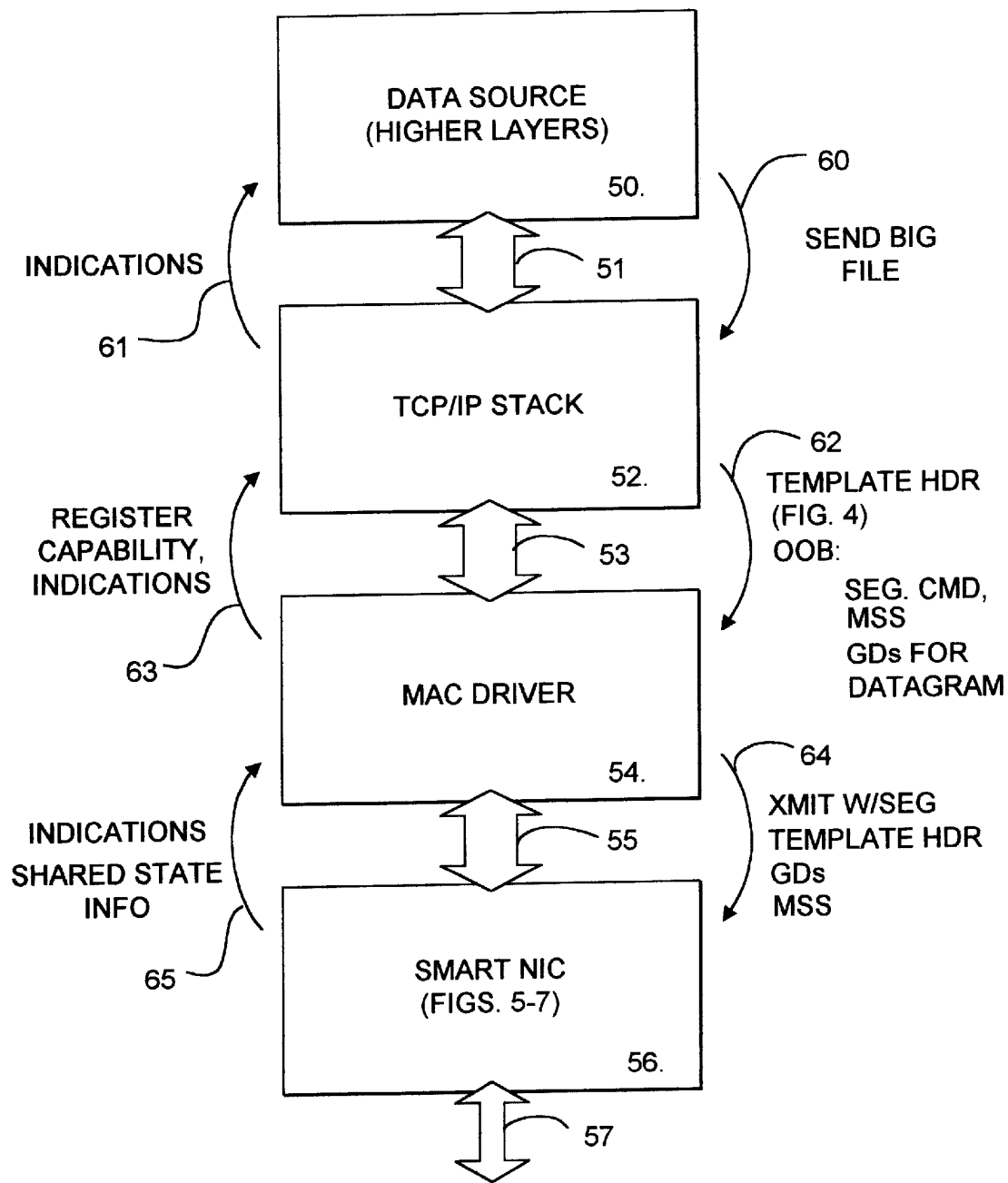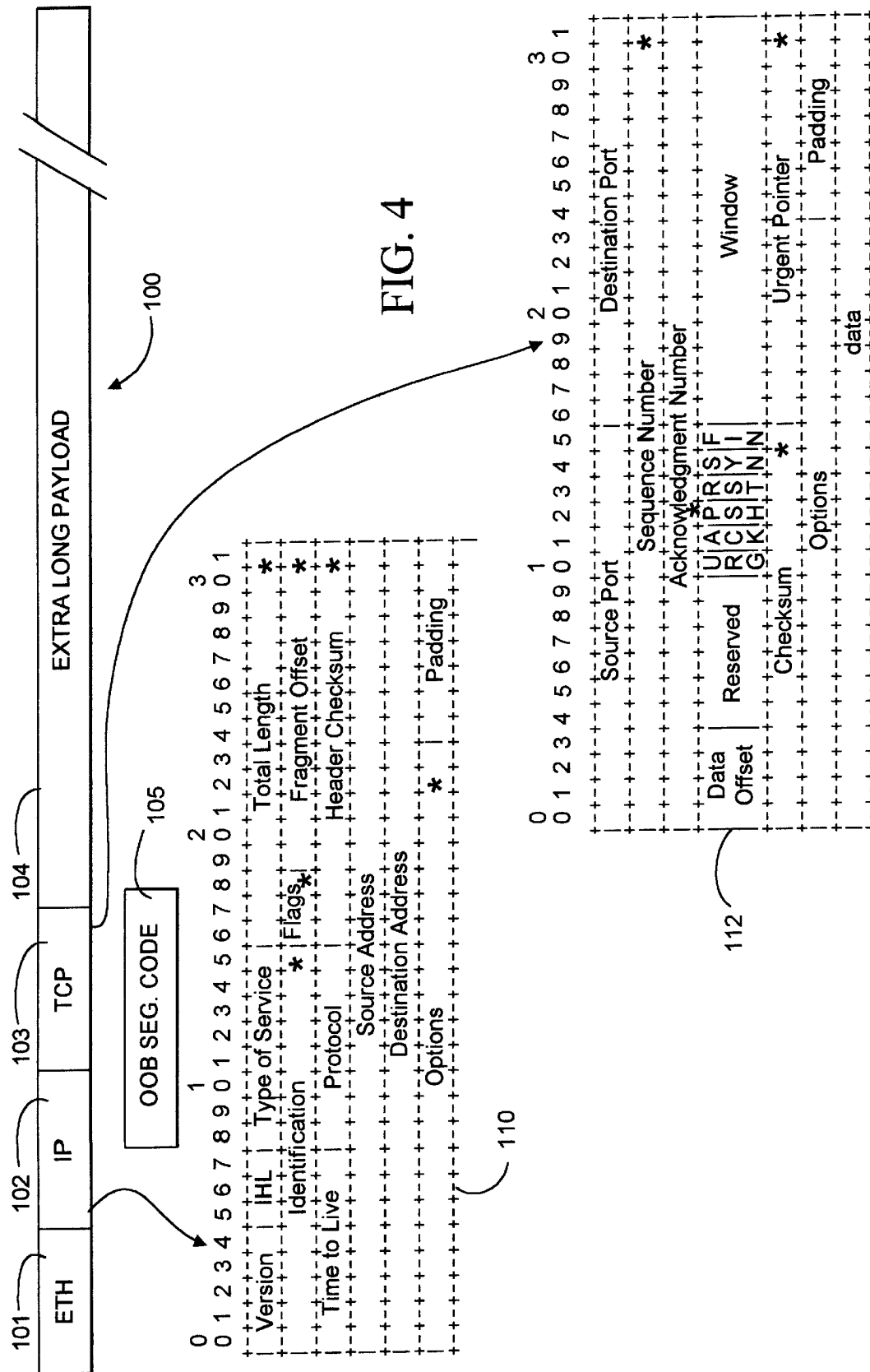
FIG. 1

FIG. 2

FIG. 3

FIG. 4
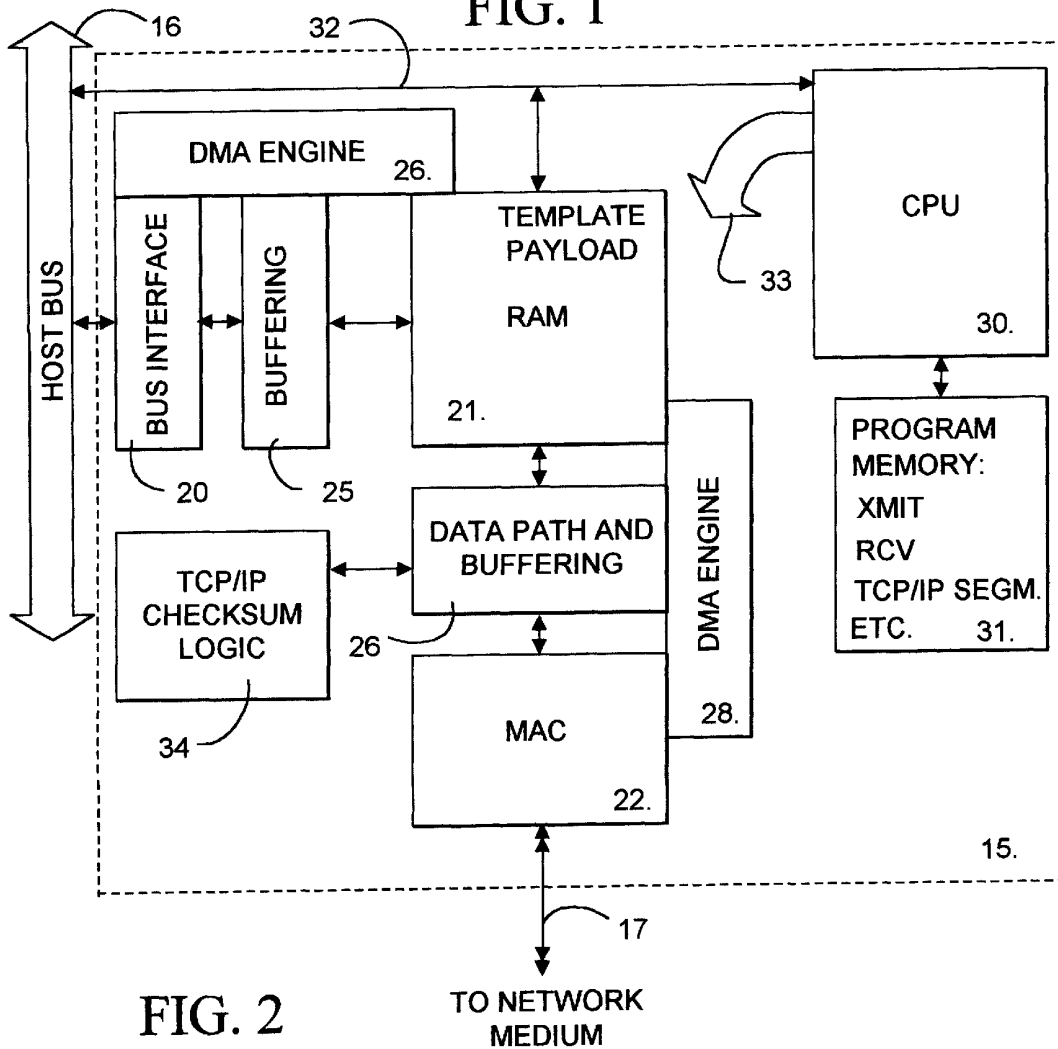
FIG. 5

DOCKET ALARM
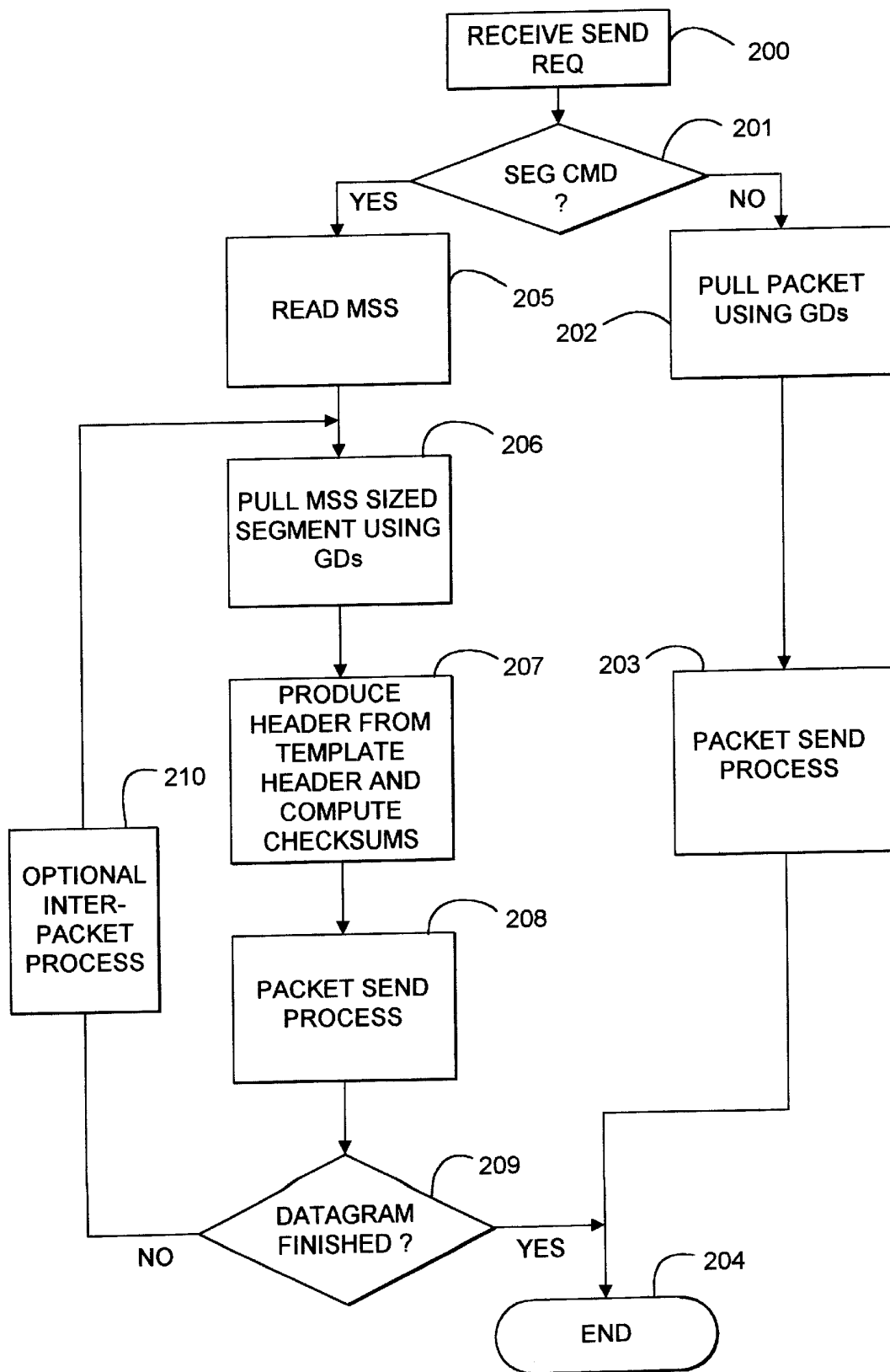
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