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Chuah

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(54) **METHOD FOR OVERLOAD CONTROL IN A MULTIPLE ACCESS SYSTEM FOR COMMUNICATION NETWORKS**

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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 0 days.

This patent is subject to a terminal disclaimer.

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(22) Filed: **May 22, 1998**

Related U.S. Application Data

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(51) **Int. Cl.**[7] **H04Q 7/00**

(52) **U.S. Cl.** **370/329**; 370/347; 370/412; 370/442; 370/469

(58) **Field of Search** 370/252, 280, 370/281, 294, 295, 296, 329, 333, 336, 337, 469, 345, 347, 412, 442

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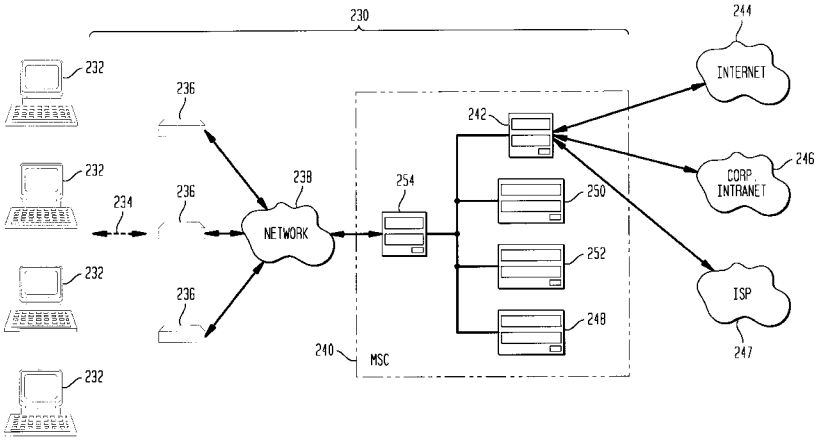
Primary Examiner—Alpus H. Hsu
Assistant Examiner—Roberta Stevens

(57) **ABSTRACT**

In the method for overload control in a wireless communications network employing On-Demand Multiple Access Fair Queuing, if the downlink/uplink buffer occupancy of the network has exceeded a high threshold, the base station determines if this is caused by a specific remote host or by a group of remote hosts. If caused by a specific remote host, the base station normally sends a flow control signal to the remote host to prevent it from sending more data, but may alternatively elect to disconnect other remotes if the remote experiencing bad performance is of a higher priority. The base station may additionally reduce the bandwidth shares allocated to any remote that have indicated tolerance for a variable allocated bandwidth. If the measured frame error rates for many remote hosts are increasing, then the base station may elect to disconnect those remote hosts that permit service interruption in order that more bandwidth may be allocated to the remaining users. If a majority of all associated remote hosts experience high uplink frame error rates, the base station may instead send a signal to a wireless hub which can coordinate the actions of other access points. Short packets queued up for so long at the base station that they exceed the time-to-live value allocated will be thrown away. The base station may also or alternatively elect to disconnect some users of a lower priority or redirect them to other nearby base stations that have a lower load. In a particular embodiment, an uplink Frame Error Rate (FER), an average uplink bit rate, a burstiness factor of uplink traffic, and a packet loss rate are measured at the base station for each remote host. Similarly, a downlink Frame Error Rate is measured at each remote host and then each FER is sent to the base station. If an overload condition exits, connections with a Frame Error Rate that has exceeded a threshold for a specified time and that have indicated that their connections can be interrupted are disconnected. Other combinations of the possible actions are suitable, with the exact combination being determined by the base station depending on the particular congestion conditions observed in the network.

17 Claims, 34 Drawing Sheets



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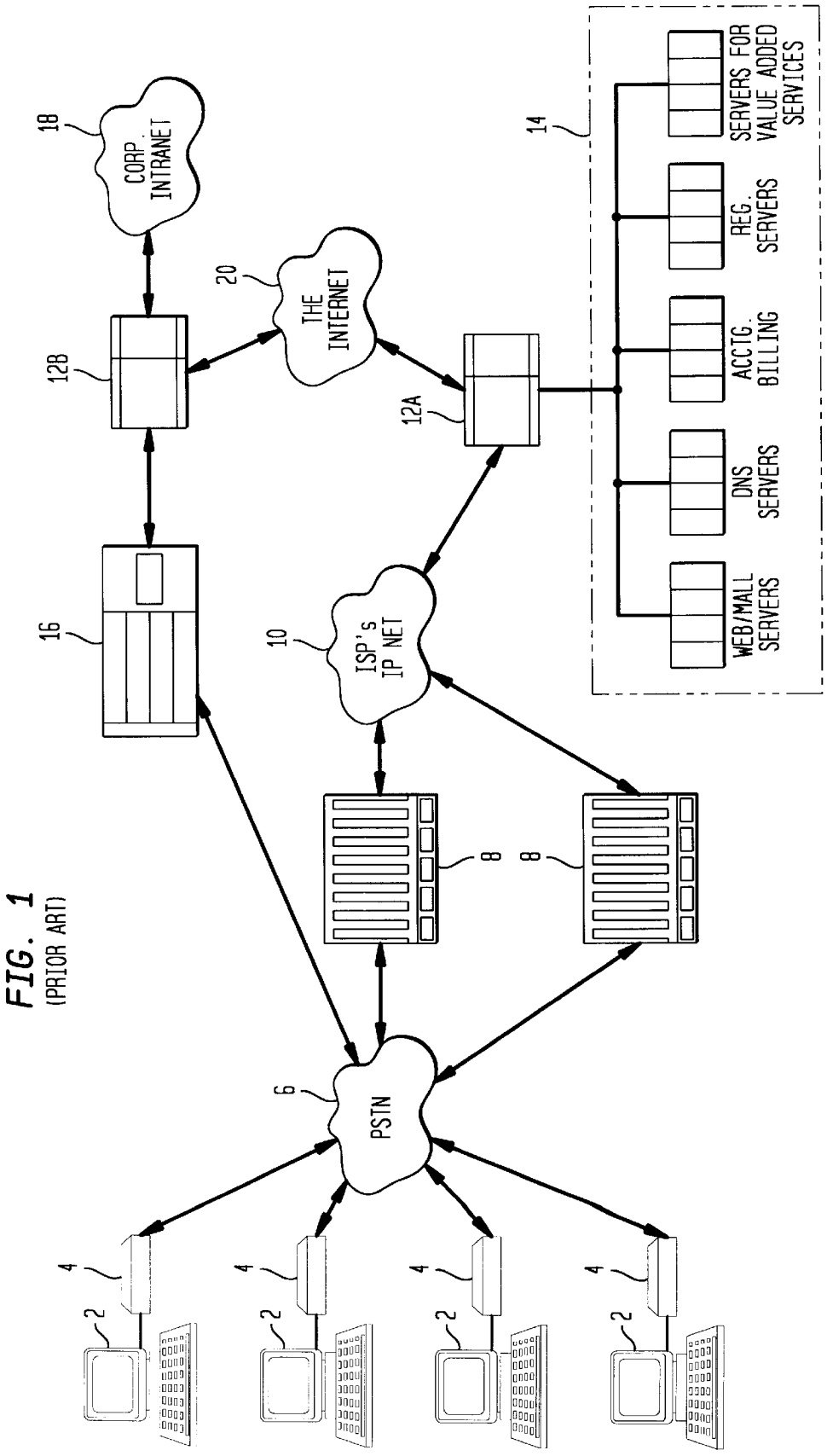


FIG. 1
(PRIOR ART)

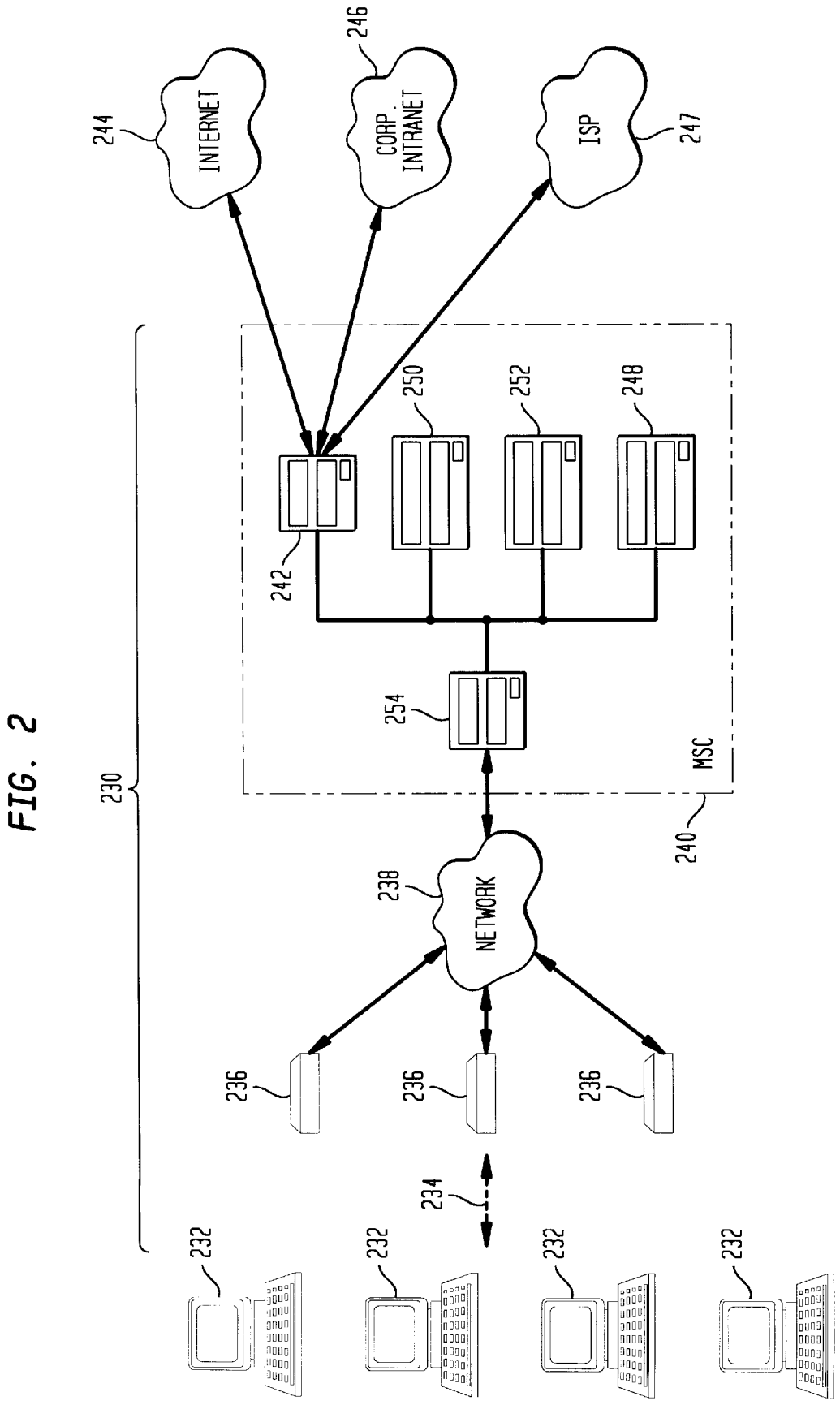


FIG. 2

FIG. 3

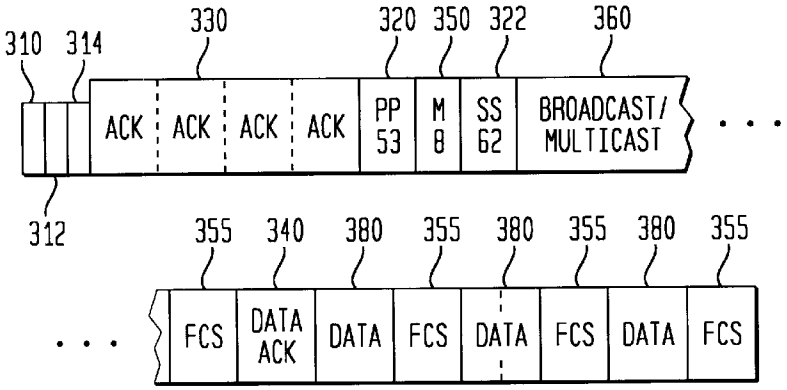


FIG. 4

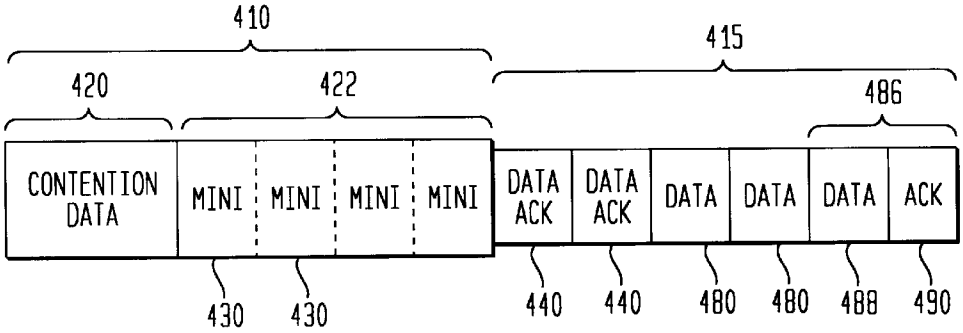
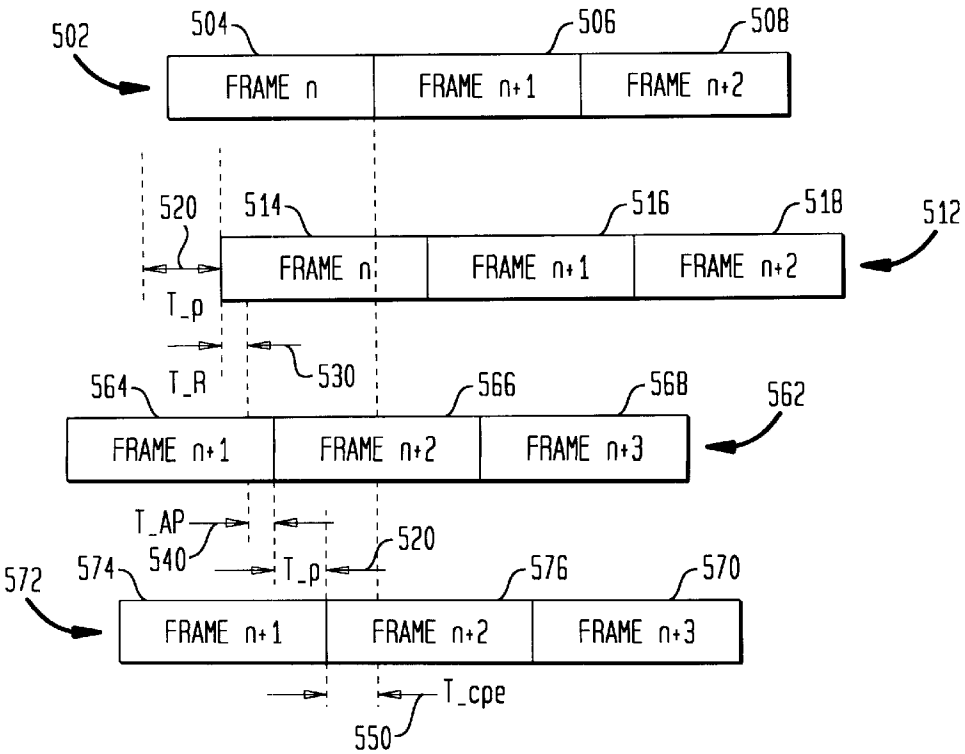


FIG. 5



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