US006046980A

United States Patent [19]

Packer

[11] **Patent Number:** 6,046,980

[45] **Date of Patent:** **Apr. 4, 2000**

[54] **SYSTEM FOR MANAGING FLOW BANDWIDTH UTILIZATION AT NETWORK, TRANSPORT AND APPLICATION LAYERS IN STORE AND FORWARD NETWORK**

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[73] Assignee: **Packeteer, Inc.**, Cupertino, Calif.

[21] Appl. No.: **08/977,642**

[22] Filed: **Nov. 24, 1997**

Related U.S. Application Data

[60] Provisional application No. 60/032,485, Dec. 9, 1996.

[51] **Int. Cl.^{7}** **G01R 31/08**
[52] **U.S. Cl.** **370/230**; 370/229
[58] **Field of Search** 370/229, 230, 370/231, 232, 235, 465, 466, 468

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[57] **ABSTRACT**

In a packet communication environment, a method is provided for classifying packet network flows for use in determining a policy, or rule of assignment of a service level, and enforcing that policy by direct rate control. The method comprises applying individual instances of traffic objects, i.e., packet network flows to a classification model based on selectable information obtained from a plurality of layers of a multi-layered communication protocol, then mapping the flow to the defined traffic classes, which are arbitrarily assignable by an offline manager which creates the classification. It is useful to note that the classification need not be a complete enumeration of the possible traffic.
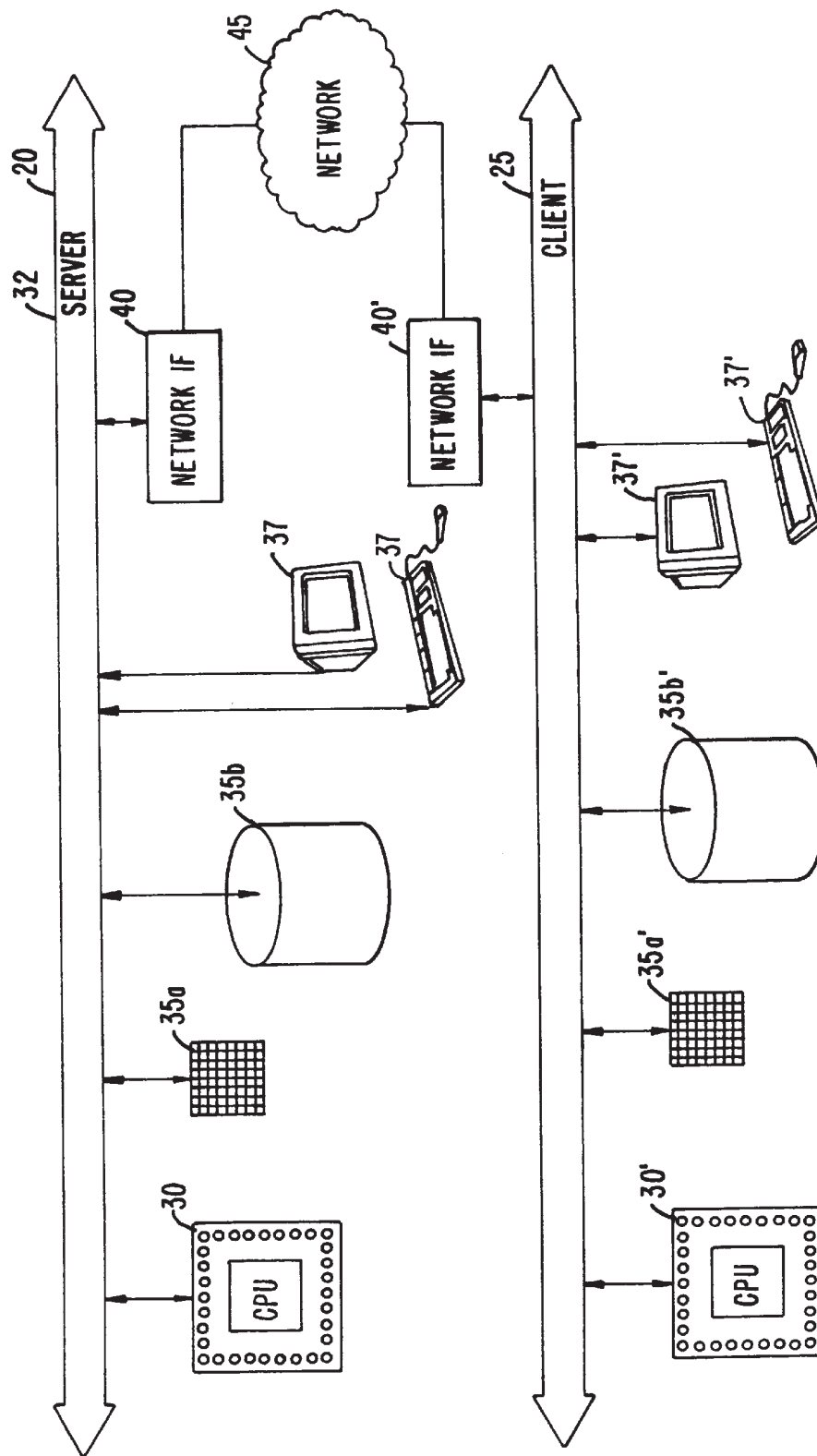
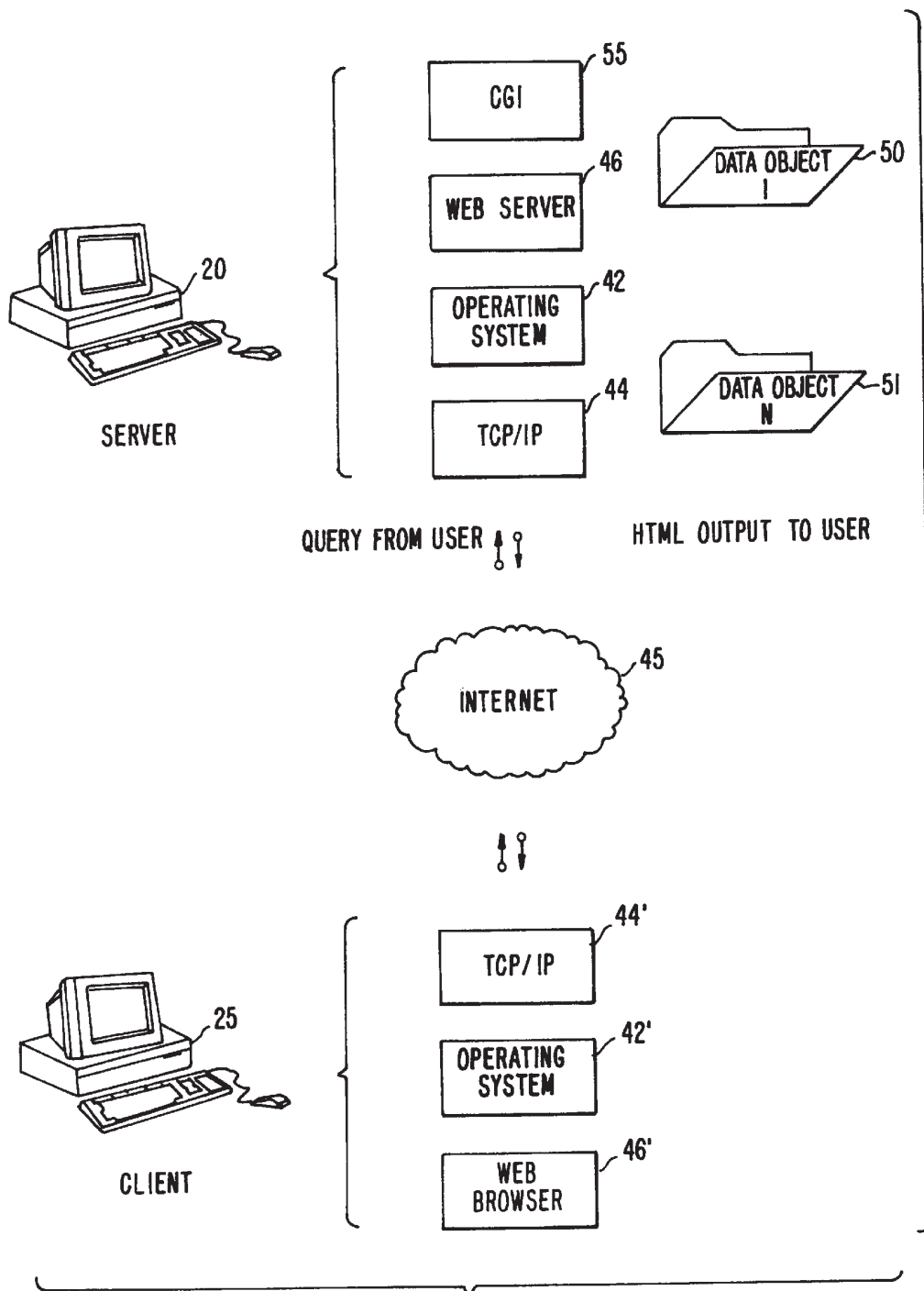**17 Claims, 20 Drawing Sheets**
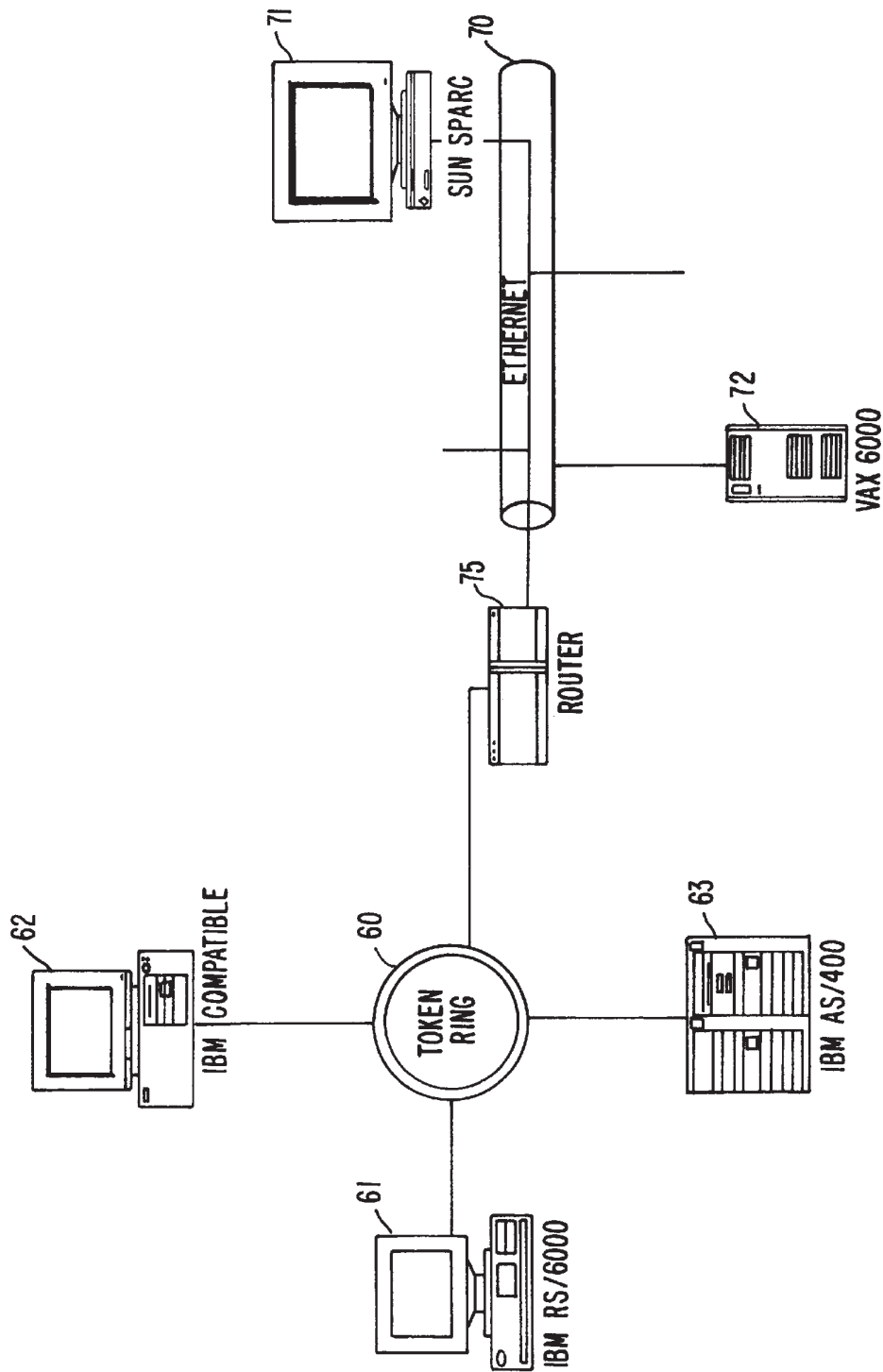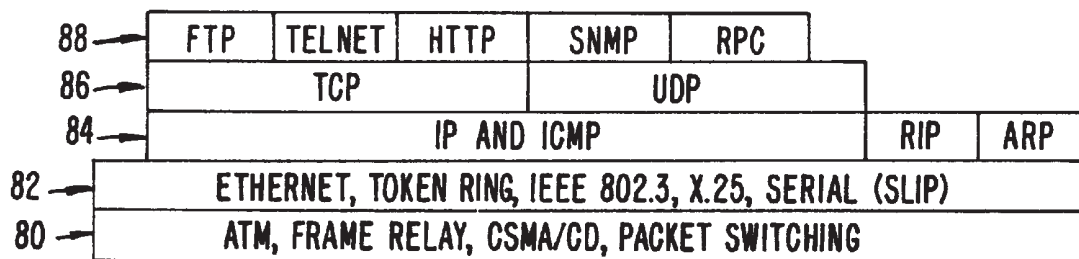
FIG. IA.
(PRIOR ART)

FIG. IB.

FIG. IC.
(PRIOR ART)

FTP	TELNET	HTTP	SNMP	RPC

88 →

TCP	UDP

86 →

IP AND ICMP	RIP	ARP

84 →

82 → | ETHERNET, TOKEN RING, IEEE 802.3, X.25, SERIAL (SLIP) |

80 → | ATM, FRAME RELAY, CSMA/CD, PACKET SWITCHING |
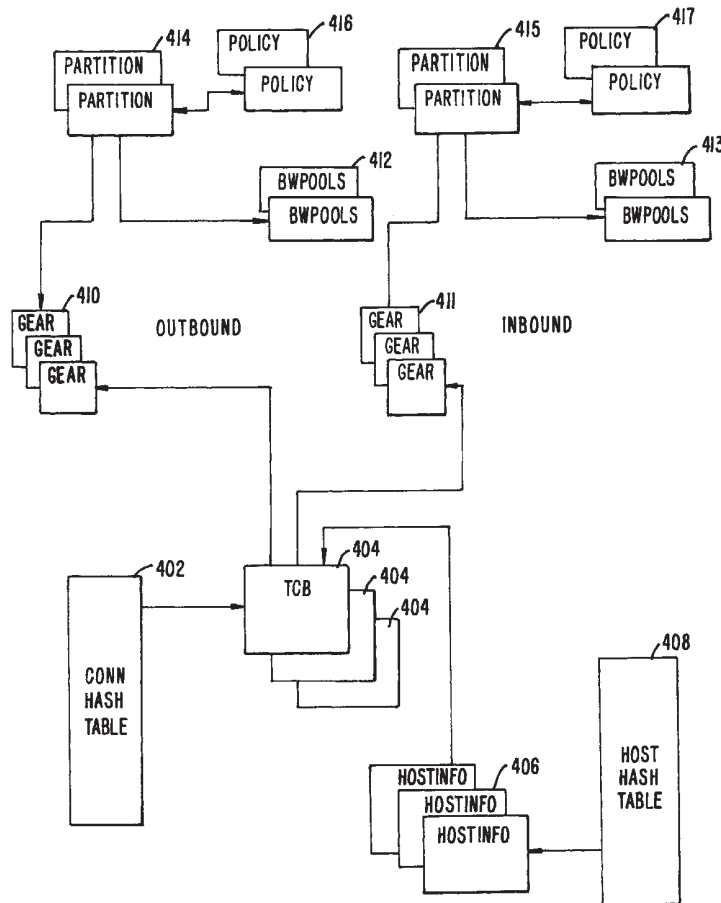
LEGEND
    88 SESSION/APPLICATION LAYER
    86 TRANSPORT LAYER
    84 NETWORK LAYER
    82 DATA LINK LAYER
    80 PHYSICAL LAYER

FIG. ID.

(PRIOR ART)

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