United States Patent [19]

Packer

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[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

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,870,641	9/1989	Pattavina .
5,315,586	5/1994	Charvillat .
5,347,511	9/1994	Gun 370/54
5,442,630	8/1995	Gagliardi et al. 370/85
5,506,834	4/1996	Sekihata et al. .
5,530,852	6/1996	Meske, Jr. et al. 395/600
5,583,857	12/1996	Soumiya 370/233
5,694,548	12/1997	Baugher 370/231
5,701,465	12/1997	Baugher 370/468
5,732,219	3/1998	Blumer et al. .
5,748,629	5/1998	Caldara 370/468
5,764,645	6/1998	Bernet 370/466

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Assistant Examiner—Ricardo M. Pizarro
Attorney, Agent, or Firm—Townsend and Townsend and Crew LLP; Kenneth R. Allen

[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.
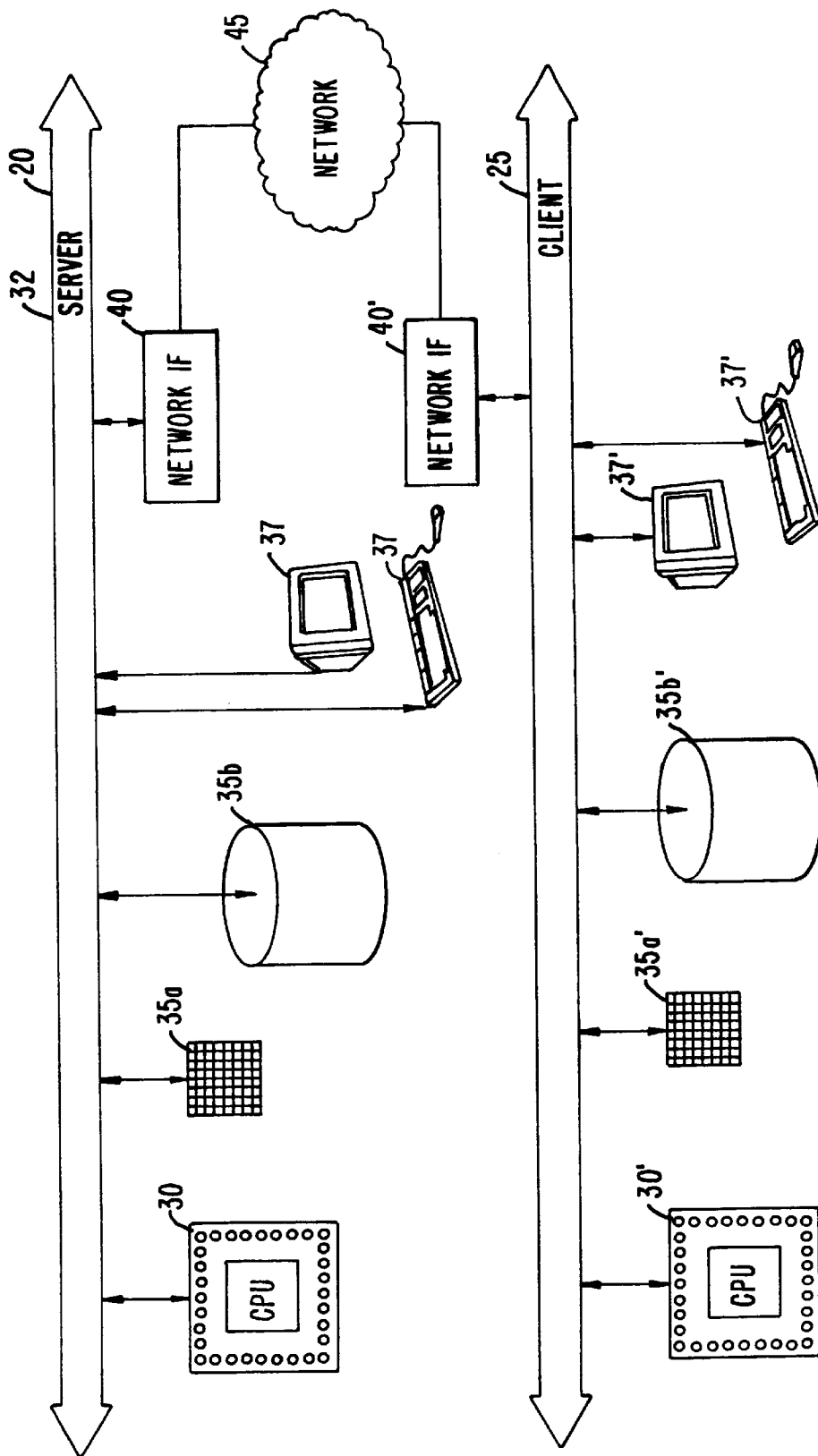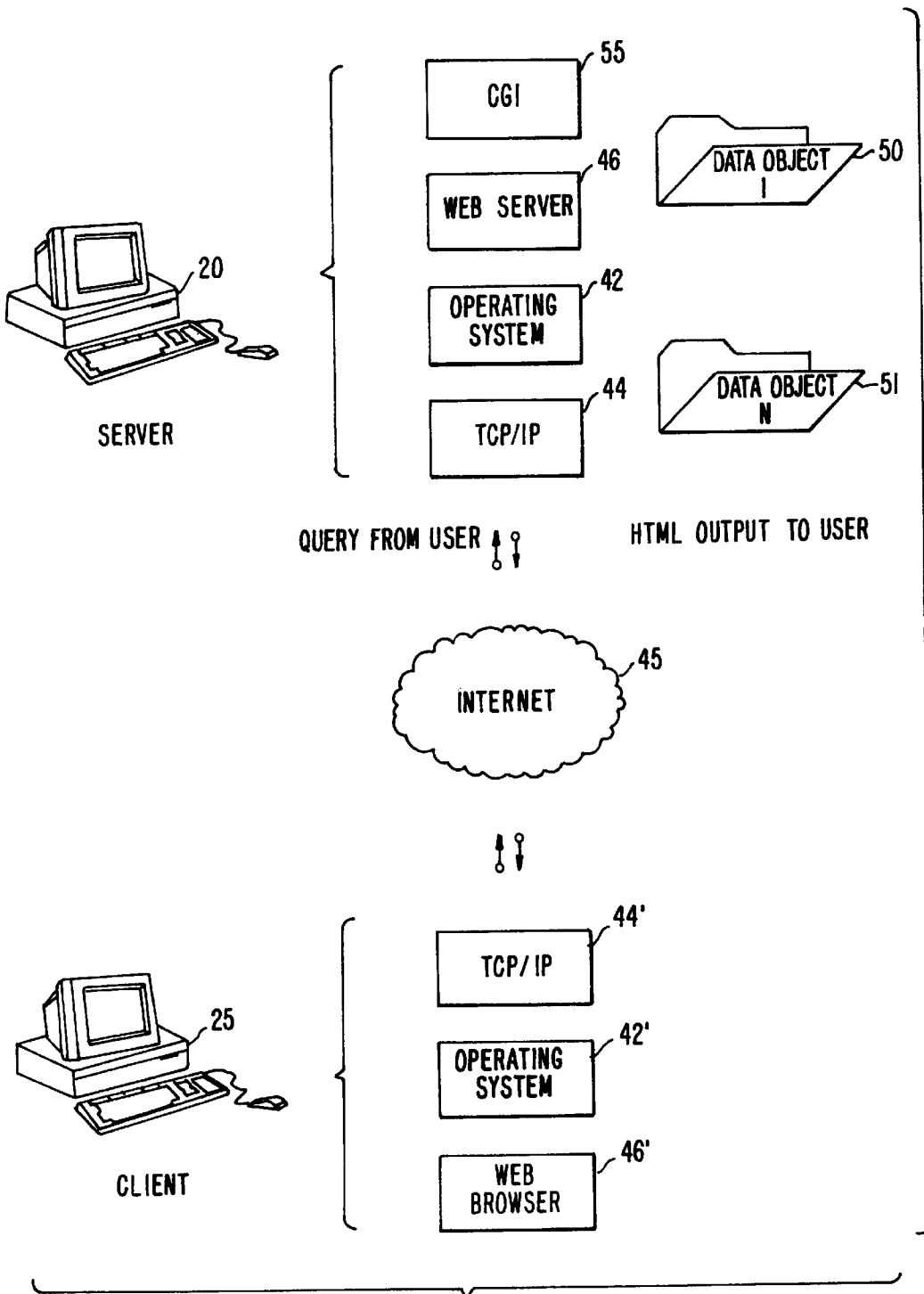
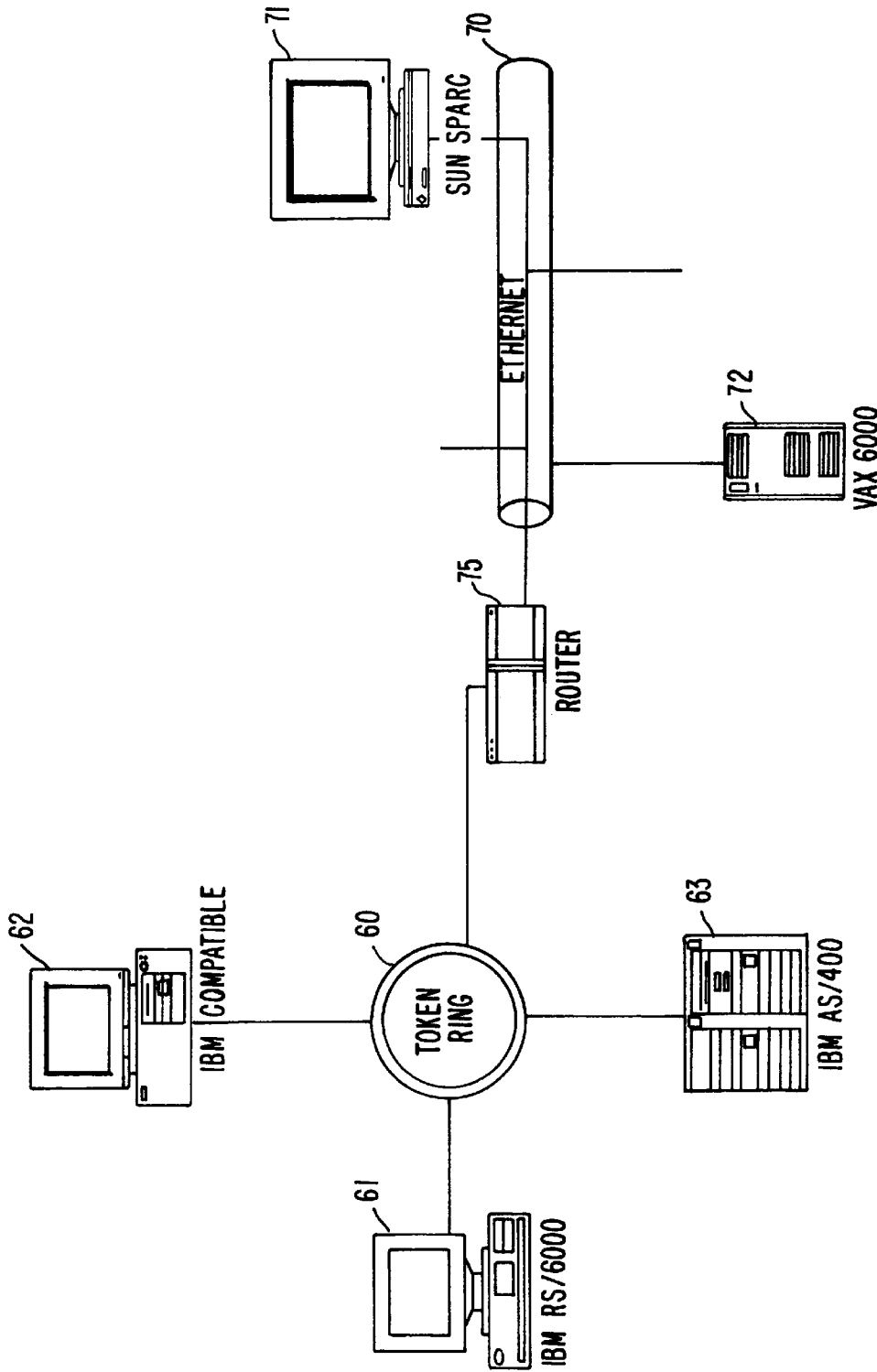**17 Claims, 20 Drawing Sheets**

FIG. 1A.
(PRIOR ART)

SERVER

CGI — 55

WEB SERVER — 46

OPERATING SYSTEM — 42

TCP/IP — 44

DATA OBJECT 1 — 50

DATA OBJECT N — 51

QUERY FROM USER

HTML OUTPUT TO USER

INTERNET — 45

CLIENT

TCP/IP — 44'

OPERATING SYSTEM — 42'

WEB BROWSER — 46'

FIG. IB.

FIG. IC.
(PRIOR ART)

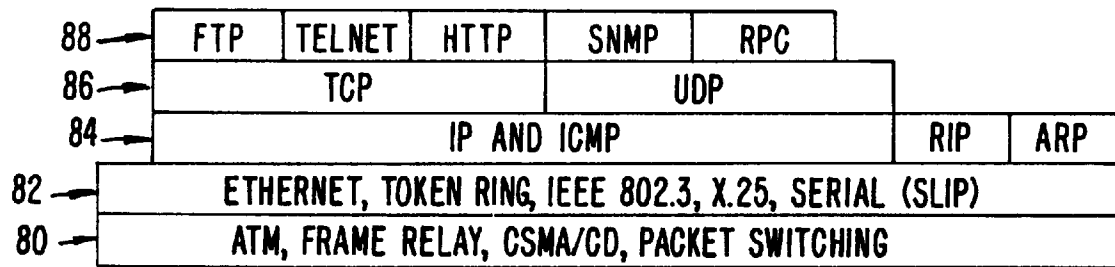| FTP	TELNET	HTTP	SNMP	RPC		
TCP			UDP			
IP AND ICMP					RIP	ARP
ETHERNET, TOKEN RING, IEEE 802.3, X.25, SERIAL (SLIP)						
ATM, FRAME RELAY, CSMA/CD, PACKET SWITCHING						

88 → (row 1)
86 → (row 2)
84 → (row 3)
82 → (row 4)
80 → (row 5)
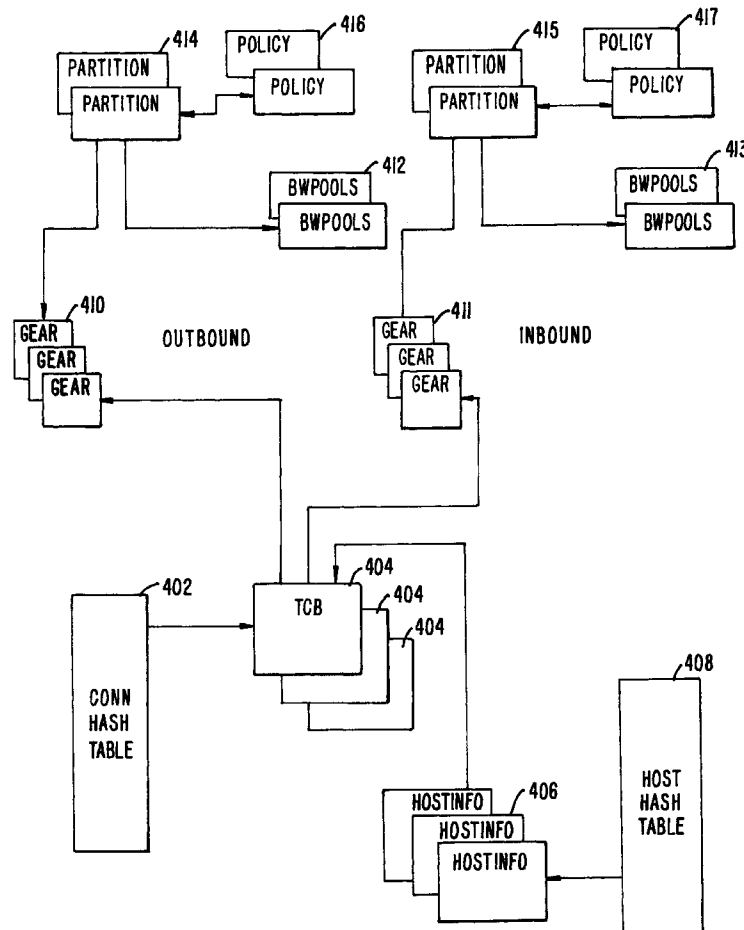
LEGEND
88 SESSION/APPLICATION LAYER
86 TRANSPORT LAYER
84 NETWORK LAYER
82 DATA LINK LAYER
80 PHYSICAL LAYER

FIG. ID.

(PRIOR ART)

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