



US007012919B1

(12) **United States Patent**
So et al.

(10) **Patent No.:** US 7,012,919 B1
(45) **Date of Patent:** Mar. 14, 2006

(54) **MICRO-FLOW LABEL SWITCHING**

(56) **References Cited**

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Croke**, Palo Alto, CA (US)

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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 1069 days.

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(21) Appl. No.: **09/733,783**

(57) **ABSTRACT**

(22) Filed: **Dec. 8, 2000**

Related U.S. Application Data

(63) Continuation-in-part of application No. 09/552,278,
filed on Apr. 19, 2000, now Pat. No. 6,574,195.

(51) **Int. Cl.**
H04L 12/56 (2006.01)

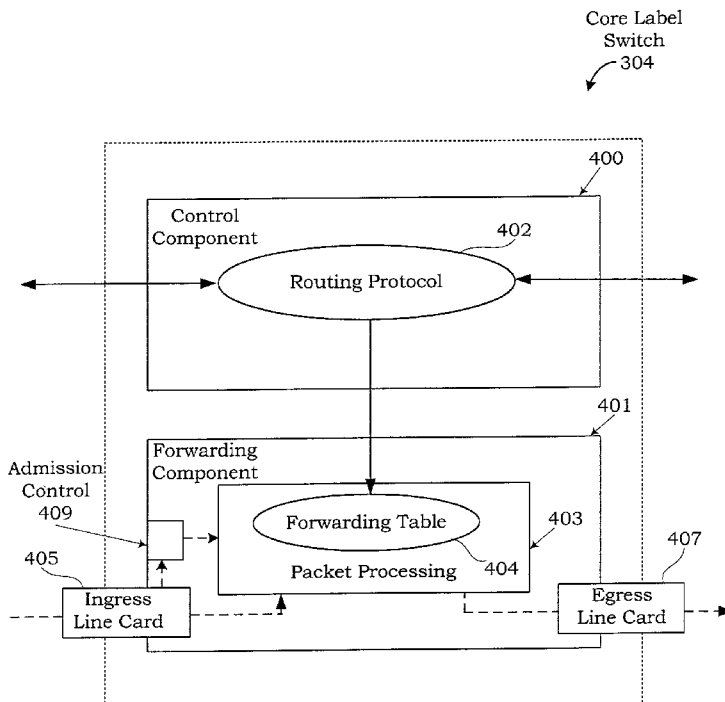
(52) **U.S. Cl.** **370/392; 370/235**

(58) **Field of Classification Search** 370/401,
370/229, 230, 231, 232, 233, 234, 235, 237,
370/411, 412–418, 465, 351, 352, 444, 503,
370/395.1, 395.52, 395.61, 395.4, 395.41,
370/395.21, 395.2, 395.42, 395.32, 384

See application file for complete search history.

An invention is provided for affording an aggregate micro-flow having intelligent load balancing. Initially, a set of label switched paths (LSPs) is defined for a network domain. Then, as the network receives a set of data packets, a micro-flow comprising the set of data packets is defined. In addition to the information included in each received data packet, the micro-flow includes a quality of service (QoS) type. A particular label switched path (LSP) is selected from the defined set of LSPs, based on the QoS type of the micro-flow, and the micro-flow is transmitted along the selected LSP.

29 Claims, 15 Drawing Sheets



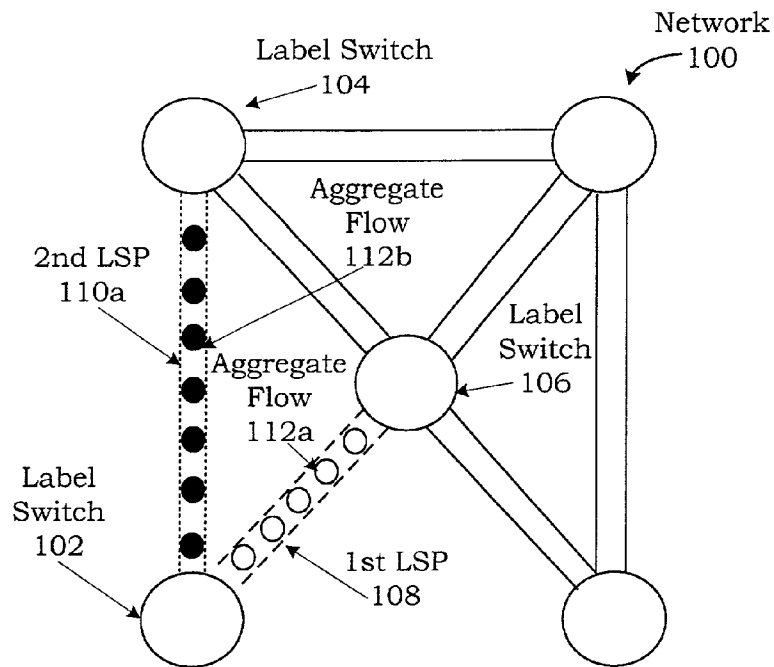


FIG. 1A
(Prior Art)

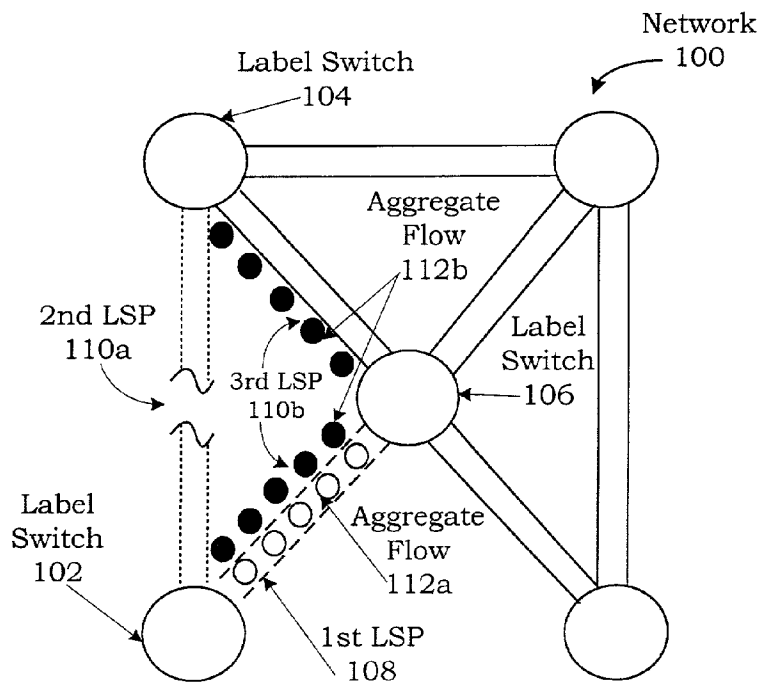


FIG. 1B
(Prior Art)

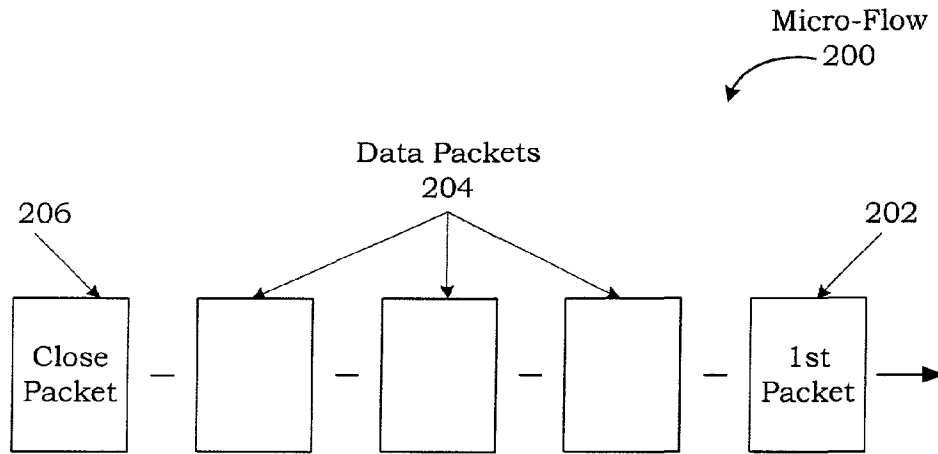


FIG. 2A

The table lists parameters for QoS 210. It is organized into two rows and three columns. Arrows point from labels 216, 218, and 220 to the top row, and from labels 222, 224, and 226 to the bottom row.

216 Packet Discard Time Limit (D)	218 Weighing Factor for Available Rate (W)	220 Guaranteed Rate (GR)
222 Micro-Flow Timeout Period (DT)	224 Available Rate (AR)	226 Delay Variation (Q)

FIG. 2C

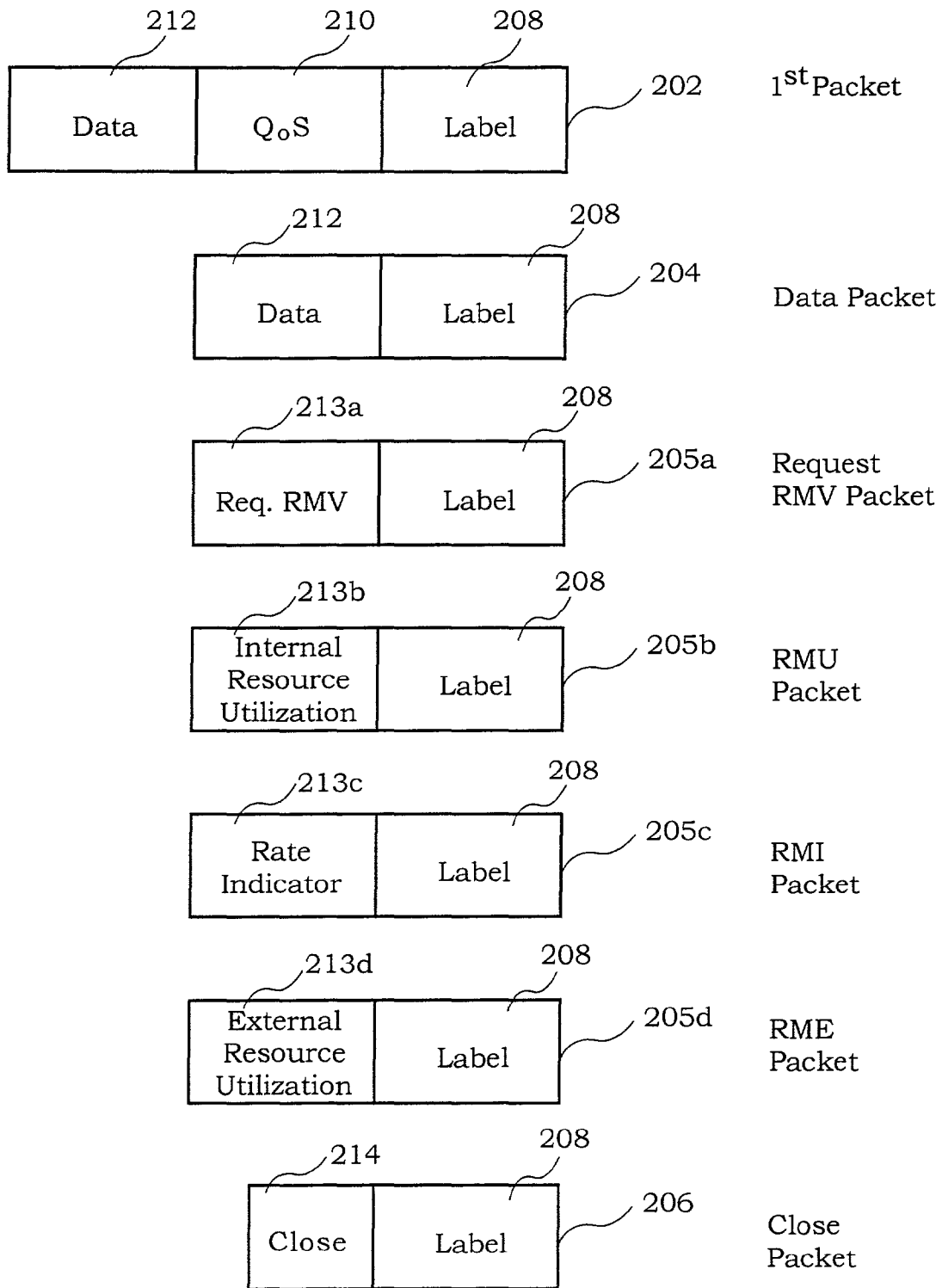


FIG. 2B

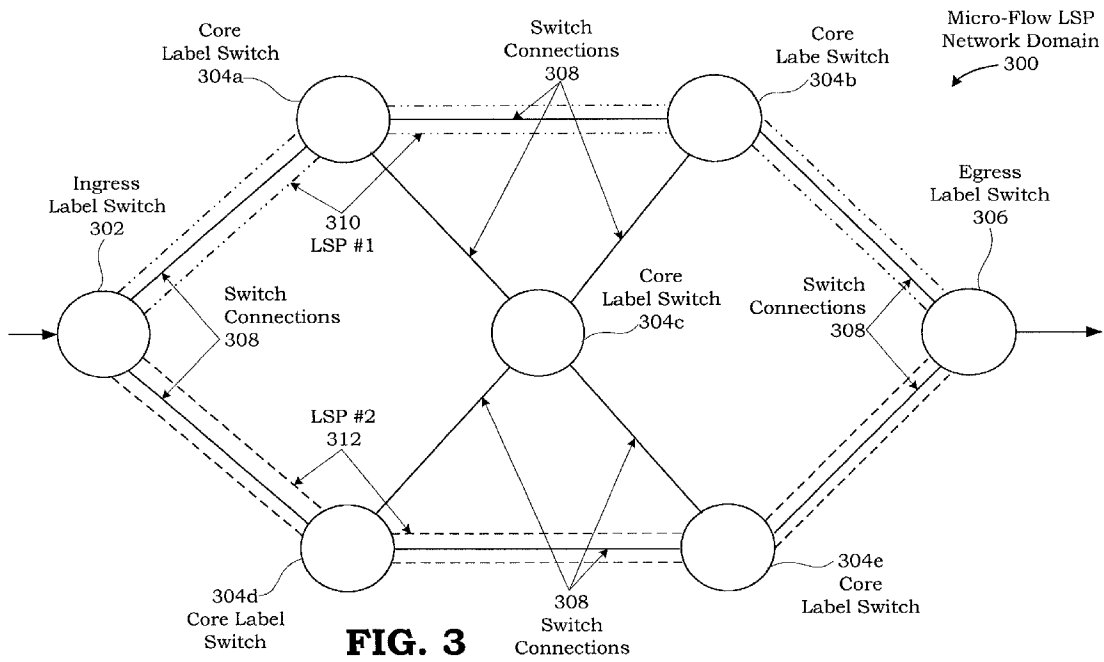


FIG. 3

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