



US007953082B2

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

(10) **Patent No.:** **US 7,953,082 B2**
(45) **Date of Patent:** **May 31, 2011**

(54) **METHOD AND SYSTEM FOR PACKET CLASSIFICATION WITH REDUCED MEMORY SPACE AND ENHANCED ACCESS SPEED**

7,586,851 B2 * 9/2009 Panigrahy et al. 370/252
7,619,983 B2 * 11/2009 Panigrahy 370/252
7,697,518 B1 * 4/2010 de Wit 370/389

(75) Inventors: **Sheng-Hsun Cho**, Taipei (TW);
Sheng-De Wang, Taipei (TW)

(73) Assignee: **National Taiwan University**, Taipei (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 116 days.

(21) Appl. No.: **12/147,916**

(22) Filed: **Jun. 27, 2008**

(65) **Prior Publication Data**
US 2009/0185568 A1 Jul. 23, 2009

(30) **Foreign Application Priority Data**
Jan. 21, 2008 (TW) 97102150 A

(51) **Int. Cl.**
H04L 12/28 (2006.01)

(52) **U.S. Cl.** **370/389; 370/395.31**

(58) **Field of Classification Search** 370/389,
370/395.31
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,508,825 B2 * 3/2009 Jason, Jr. 370/389
7,525,958 B2 * 4/2009 Kumar et al. 370/386

OTHER PUBLICATIONS

Li, Ji, et al. "Scalable Packet Classification Using Bit Vector Aggregating and Folding", 2006,139-144, Paralec, International Symposium on Parallel Computing in Electrical Engineering, Cambridge, MA, USA.

Baboescu, Florin, et al. "Scalable Packet Classification", 2005, 2-14, vol. 13(1), IEEE Press, Piscataway, NJ, USA.

Srinivasan, T., et al. "Scalable and Parallel Aggregated Bit Vector Packet Classification Using Prefix Computation Model", 2006, 139-144, IEEE Computer Society Washington, DC, USA.

* cited by examiner

Primary Examiner — Dang T Ton

Assistant Examiner — Brian O'Connor

(74) *Attorney, Agent, or Firm* — Pearne & Gordon LLP

(57) **ABSTRACT**

A method and system for packet classification is proposed for applications such as firewalls, intrusion detection, policy-based routing, and network service differentiations, within network systems such as Internet or intranet/extranet systems. The proposed method and system is characterized by the use of protocol-oriented rule rearrangement, the probable bit vector (PBV) based on the aggregated bit vectors (ABV) and folded bit vectors (FBV), an ABV-FBV index table dataset whose data structure is based on a featured split full-tree schema, and a DCBV (Don't-Care Bit Vector) dataset for packet classification. The combination of these features allows the packet classification to be implemented with a reduced amount of memory and access time during operation.

20 Claims, 15 Drawing Sheets

