

Group Address Recognition with Perfect Hashing Hardware

Extended Abstract

Douglas S. Reeves
Departments of Computer Science and
Electrical and Computer Engineering
Box 8206
North Carolina State University
Raleigh, NC 27695
reeves@adm.csc.ncsu.edu

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Local Area Network Interface Units (LANIU) for Ethernet provide a high degree of user connectivity by supporting a variety of communications protocols. These protocols occur both below and above the Logical Link Control (LLC) portion of the Data Link layer of the OSI reference model.

A particular protocol is supported by a LANIU if the LANIU's address recognition function can recognize the protocol's group (multicast) addresses in the Destination Address field of a received frame. Most Ethernet LANIUs support 64 group addresses. Typically, a protocol's group addresses are stored in the registers of the Media Access Controller (MAC) chip of the LANIU where the address recognition logic is also located. As the demand for group addresses grows, MAC complexity grows and a local (on LANIU) SRAM is used to store the protocol addresses which have to be recognized. In this approach, the MAC is only responsible for distinguishing protocol and non-protocol frames from the stream of received frames, based on the Frame Class, FC, and/or Frame Type fields of the frame. The MAC acts automatically on non-protocol frames. It stores received protocol frames on the receive queue of the LANIU communications co-processor. The co-processor micro-code then searches the group-address area of the SRAM with the contents of the Destination Address field of each frame in the receive queue. If a match occurs, the received frame belongs to a supported protocol and the co-processor forwards the frame to the protocol's receive queue in main memory, where it is handled by the protocol's software task and workstation processor.

In some microprogrammed communication co-processor subsystems the address recognition algorithm is based on hashing, with a bit-folding hash function and collision resolution with linked lists (buckets). The performance of this software-based address recognition technique is dependent on the size of the group address table. In Ethernet bridging applications [2], $19g+15$ clock cycles are required per search, where g is the location in the table where the group address is found. If 64 group addresses are stored sequentially in data memory space, for example, a worst case search will require 154 microseconds with an 8Mhz co-processor.

In the following, we propose a hardware-based address recognizer which implements an alternate hashing search technique. This allows us to reduce the search time to 1 microsecond regardless of where the address is located in the table. This recognizer is a single 3000-transistor chip which is currently in fabrication. We conclude with some discussion of other potential applications of this hardware technique.

Wireless Communication Ieee Paper Abstract

Julia Schneider



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International Workshop on Finite Elements for Microwave Engineering Roberto D. Graglia, Giuseppe Pelosi, Stefano Selleri, 2016-05-09 When Courant prepared the text of his 1942 address to the American Mathematical Society for publication he added a two page Appendix to illustrate how the variational methods first described by Lord Rayleigh could be put to wider use in potential theory Choosing piecewise linear approximants on a set of triangles which he called elements he dashed off a couple of two dimensional examples and the finite element method was born Finite element activity in electrical engineering began in earnest about 1968 1969 A paper on waveguide analysis was published in Alta Frequenza in early 1969 giving the details of a finite element formulation of the classical hollow waveguide problem It was followed by a rapid succession of papers on magnetic fields in saturable materials dielectric loaded waveguides and other well known boundary value problems of electromagnetics In the decade of the eighties finite element methods spread quickly In several technical areas they assumed a dominant role in field problems P P Silvester San Miniato PI Italy 1992 Early in the nineties the International Workshop on Finite Elements for Microwave Engineering started This volume contains the history of the Workshop and the Proceedings of the 13th edition Florence Italy 2016 The 14th Workshop will be in Cartagena Colombia 2018

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accepted for inclusion in the conference The main topics of the book include Network Technologies Mobile and Wireless Networking Security and Privacy Applications and Impacts The papers address state of the art research and applications of network technology arising from both the academic and industrial domains These proceedings should consequently be of interest to network practitioners researchers academics and technical managers involved in the design development and use of network systems Books and Periodicals Online ,2000 Emerging Trends in IoT and Computing Technologies Suman Lata Tripathi,Satya Bhushan Verma,2023-06-15 This book includes the proceedings of the International Conference on Emerging Trends in IoT and Computing Technologies ICEICT 2022 held at Goel Institute of Technology Management Lucknow India *Kokuritsu Kokkai Toshokan shozō kagaku gijutsu kankei Ōbun kaigiroku mokuroku* Kokuritsu Kokkai Toshokan (Japan),1997 World Meetings ,2001 Documentation Abstracts ,1997 *Index of Conference Proceedings Received* British Library. Document Supply Centre,1987 **Index of Conference Proceedings Received** British Library. Lending Division,1980 **MOBICOM ...** ,2005 Microwave Journal ,2005 **Library & Information Science Abstracts** ,2007 **Telecommunications Abstracts** ,1987

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