



LEAP - Improved Data Lookup for High-Speed Routers

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WARF: P120239US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a packet processing engine using a tile-based architecture that is efficient and flexible.

Overview

Networks allow data exchange between linked computers. Data messages are divided into packets, which are able to navigate complex and changing networks. A router, or switch, reads packet addresses and steers them through the links to a destination.

All the functions of a router require it to look up packet addresses in memory, and to perform rapidly and repeatedly. The effectiveness of a router is largely a function of how quickly memory lookups can be completed. High-performance routers may use a type of whole-memory searching to save time, but this involves more power and heat.

Current methods of packet processing are unlikely to meet the needs of increasingly complicated networks.

The Invention

UW-Madison researchers have developed LEAP (Latency, Energy and Area Optimized Lookup Pipeline), an improved tile-based approach for routing data packets in a network.

The router has a series of ports for receiving and transmitting packets, and communicating with a general-purpose processor. The router's packet processing engine receives data and conducts memory lookups. The engine includes a set of connected computational tiles. Each tile has a set of functional units with inputs and outputs for processing arguments, and a store for holding instructions. Also, the tiles have a programmable multiway switch for communicating with the functional units and act according to the stored instructions.

The functional units may access a lookup memory holding packet data while interconnection circuitry manages communication of data between tiles.

Applications

- High-speed network routing

Key Benefits

- Router merges performance and flexibility.
- Simple hardware elements produce sophisticated lookup functions.

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- Low latency processing with extremely fast functional units
- Versatile

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- Provides programmability and a variety of high-speed functions

Additional Information

For More Information About the Inventors

- [Karthikeyan Sankaralingam](#)

Related Technologies

- [WARF reference number P09094US describes a Pipelined LookUp Grid \(PLUG\) architecture that addresses the energy efficiency and performance requirements of network devices.](#)

Tech Fields

- [Information Technology : Hardware](#)
- [Information Technology : Networking & telecommunications](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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