Bandwidth-Adaptive, Hybrid Cache-Coherence Protocol

University of Wisconsin–Madison

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an adaptive hybrid protocol that improves the performance of computers with multiple processors.

OVERVIEW

Large computer software applications require computation beyond what can be provided by a single microprocessor. A popular solution to this problem is to share memory between several microprocessors. Each processor is typically provided with a cache memory into which blocks of shared memory may be loaded. The cache allows faster memory access, but must be monitored using coherence protocols to ensure that the cache's contents accurately reflect the contents of the shared memory. Two of these coherence protocols are called "snooping" and "directory." Because systems with more than one processor often experience varying levels of memory traffic, selecting between snooping and directory protocols results in sub-optimal performance.

THE INVENTION

UW-Madison researchers have developed an adaptive hybrid protocol that dynamically selects between a snooping-like and a directory-like protocol, allowing the system to choose the best mechanism for communicating cache coherence messages based on the bandwidth available.

APPLICATIONS

- Computers with multiple processors

KEY BENEFITS

- Improves performance of computers with multiple processors
- Outperforms snooping during periods of high bandwidth demand
- Outperforms directory systems during periods of low bandwidth demand
- Outperforms both snooping and directory systems during periods of intermediate

THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.

bandwidth demand

ADDITIONAL INFORMATION

Tech Fields

Information Technology - Computing methods

CONTACT INFORMATION

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842.