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EFFICIENT FORWARDING INFORMATION BASE CACHING SYSTEM AND METHOD

The University of Memphis seeks a partner to commercialize a novel router Forwarding Information Base (FIB) caching system and scheme that selects and generates a minimal number of non-overlapping prefixes. This is for the FIB cache to improve computer-based network communications and operations efficiency, accuracy and speed. Since the cached prefixes do not cover any longer prefixes in the full FIB, the present invention thus avoids cache-hiding issues. The system further comprises a FIB caching updating component that systematically handles cache misses, cache replacement, and routing updates.

APPLICATIONS

» New Network Router/Switch Design
» New Memory Caching Mechanism
» Software Defined Network Applications

CAPABILITIES

» Efficient packet forwarding
» Systematically handling cache misses and cache replacements
» Dynamically adjusting forwarding table entries

ADVANTAGES

» Fully utilizing expensive packet forwarding memories to save hardware costs
» Low energy consumption
» Highly efficient in terms of cache hit ratio

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NOVEL ASPECTS OF THE INVENTION

- Quickly calculating a non-overlapping prefix to install it into the cache
- Avoiding cache-hiding issues in the cache due to the Longest Prefix Match (LPM) rule in prefix-based packet forwarding
- Incrementally and efficiently conducting routing updates: route additions, changes and withdrawals

THE TECHNOLOGY

This invention relates to a system and method for the efficient caching of routing forwarding table entries. More particularly, this invention relates to a system and method for efficiently caching routing forwarding table entries with minimal non-overlapping prefixes to improve computer-based network communications and operations efficiency, accuracy and speed. The present invention comprises a Forwarding Information Base (FIB) caching system and scheme that selects and generates a minimal number of non-overlapping prefixes for the FIB cache to improve computer-based network communications and operations efficiency, accuracy and speed. Because the cached prefixes do not cover any longer prefixes in the full FIB, the present invention thus avoids cache-hiding issues. The system further comprises a FIB caching updating component that systematically handles cache misses, cache replacement, and routing updates. As a result, the present invention results in a hit ratio higher than 99.95% with only 20K prefixes (or 5.36% of the full FIB) in the cache.

For more information concerning licensing this patent pending technology, please contact Hai Trieu, AVP of Technology Transfer.

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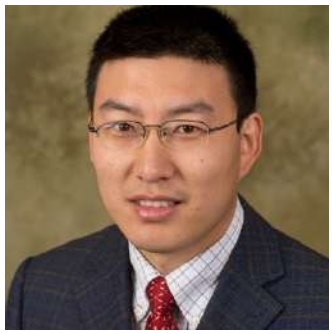
THE INVENTORS

Dr. Lan Wang is Professor and Chair of the Computer Science Department at the University of Memphis. Her research focuses on building scalable and secure Internet architecture and applications. In particular, she has been developing the new Named Data Networking (NDN) architecture to address the Internet's lack of support for security, mobility, and scalable data distribution. This collaboration among eight universities has received over $15 million in research funding. She has also worked on Internet routing, Denial-of-Service attacks, and wireless health monitoring systems. Her research projects have been supported by 10 grants from NSF, NIST, DARPA, and Cisco. She has published more than 70 peer-reviewed publications with over 6200 citations (according to Google Scholar) and received three US patents. Her team has developed open-source routing, forwarding, and data synchronization software deployed in the global NDN testbed, as well as emulation software used by the NDN research community.

Dr. Lan Wang

Dr. Yaoqing Liu received his Master's and PhD degrees from the University of Memphis in Computer Science. He is an Assistant Professor in Computer Science department at Clarkson University. His research interests are networked systems (security, routing, algorithm and measurement), currently focusing on Named Data Networks (NDN) and Blockchain applications. His publications appear in highly reputed conference proceedings and journals, such as IEEE INFOCOM, ACM SIGCOMM CCR and ACM/IEEE ANCS. He has been a TPC member and technical paper reviewer for IEEE conferences, journal magazines and transactions.



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