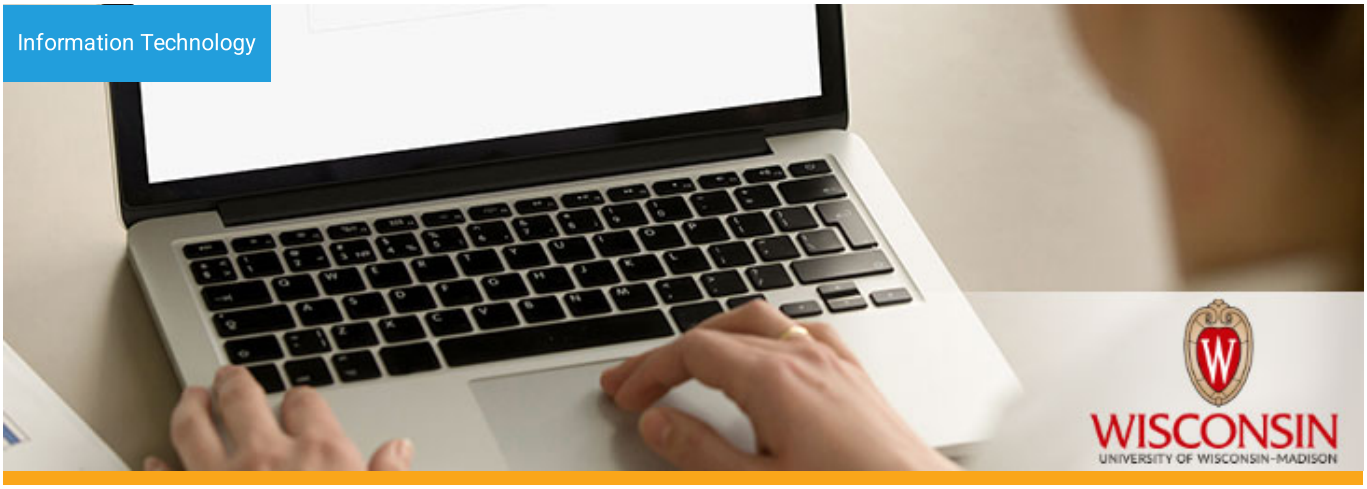
Information Technology



SmartRE: A Framework for Coordinated Network-Wide Caching

View U.S. Patent No. 8,509,237 in PDF format.

WARF: P09290US

Inventors: Srinivasa Akella, Ashok Anand, Vyas Sekar

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a caching framework to increase effective network bandwidth within computer networks.

Overview

The bandwidth of a computer network is a measure of the rate of data transfer. Limits on bandwidth may result from physical limitations of the media as well as processing limitations. Increasing bandwidth by methods such as adding additional links between nodes or adding faster hardware can be costly. Alternative ways to increase bandwidth efficiency of existing networks are needed.

Application-independent Redundancy Elimination (RE) identifies and removes repeated content from network transfers and has been used successfully for improving network performance on enterprise access links. RE involves resource-intensive tasks and is difficult to support while operating under tight resource constraints.

The Invention

UW-Madison researchers have developed an apparatus for efficiently reducing redundant network transmissions in a network. This new caching framework supports RE operations while conserving resources and improving load sharing across the network.

Throughput of redundancy-aware devices can be increased by intelligently allocating compression and decompression responsibilities across a network. The apparatus avoids repeated compression-decompression actions along a series of routers using an implicit coordination scheme, which reduces the resources used by the operation. Resource conservation is magnified in that each decompression saves the transfer of content across several routers in the network.

Applications

- Reducing congestion and improving network performance in data centers and wireless networks
- Increasing bandwidth in computer networks
- Supporting IP-layer RE in core routers
- Employing RE inside data centers to alleviate congestion
- Improving cooperative caching schemes in multi-hop wireless networks

Key Benefits

- Supports network-wide RE operations effectively while operating under resource constraints
- Achieves four to five times greater compression benefits than link-by-link approaches to RE using the same amount of resources
- Allows RE service to be introduced in an incremental, backward-compatible manner

Stage of Development

Click software prototypes of the coordinated caching framework have been built.

The development of this technology was supported by WARF Accelerator. WARF Accelerator selects WARF's most commercially promising technologies and provides expert assistance and funding to enable achievement of commercially significant milestones. WARF believes that these technologies are especially attractive opportunities for licensing.

Additional Information

For More Information About the Inventors

- Srinivasa Akella

Tech Fields

- Information Technology : Networking & telecommunications

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