CS4331/5331: Wireless Networks and Mobile Computing

Fall 2021

Write a ONE-PAGE (10 font size and single space) summary using your own words:

• Homework number: 7

• Paper title: RandomCast: A Scalable Low-Latency Cache Invalidation Strategy for Mobile Environments

• Your name: Chen Zhang

Summary

Caching is a common way to improve performance on the client-side by storing copies of files in a cache in order to access them faster than fetch from remote. The author purposed an invalidation reports algorithm that improved mainly on two aspects compared to the traditional invalidation reports algorithm. The IR-based cache invalidation solution usually has two drawbacks, one is long query latency and the other one is fewer bandwidth utilizations. The IR-based cache invalidation algorithm that the author proposed can reduce the query latency and efficiently utilize the bandwidth. In this paper, the algorithm can cut the query delay by a factor of three and double the throughput compared to the TS algorithm.

Major Contribution

The main contributions of this paper can be summarized into two aspects, one is reducing the query latency. In this paper, the author proposed a technique in which a small fraction of the essential information related to cache invalidation is replicated a couple of times within an IR interval such that clients can answer a query without waiting for the next coming IR. Subsections related to reducing the query latency includes removing the redundant information in the IR and reducing the timestamp overhead of the UIR.

The second part is efficiently utilizing the bandwidth by intelligently broadcasting the data requested by clients. In most previous IR-based algorithms, updating hot data may result in bandwidth abuse and extra battery consumption. When the server receives a data request, it does not reply to the request immediately but saves the data in a list, after broadcasting the next IR, the server broadcasts the id list of the data. At the end of the IR, clients download the id list.

Weak Aspects

The weak aspect of this paper is mentioned at the end by the author, they only perform simulation studies of the TS algorithm and the proposed algorithm. Extending the algorithm and combining it with previous techniques to deal with client disconnections would be future work.