Efficiency of cache-replacement algorithms while retrieving data from a relational database and XML files in a web based system

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Abstract
Caching has been applied in Web based information systems in order to reduce the transmission of redundant network traffic and response latency by saving copies of the content obtained from the Web closer to the end user. The efficiency of caching is influenced to a significant extent by the cache replacement algorithms which are triggered when the cache becomes full and old objects must be evicted to make space for the new ones.

This paper presents a framework to simulate the performance of cache-replacement algorithms while data is simultaneously retrieved from a relational database and XML files in a web based environment, by a large number of end-users. Three replacement policies are considered: Least Recently Used (LRU), Least Frequently Used (LFU) and Lowest Latency First (LLF). The experimental results obtained from the framework show that data caching greatly improves the overall performance of web based systems, and the type of the applied cache replacement policy also plays an important role in the performance. In the scenarios considered in this paper, the LLF algorithm produced the best performance when retrieving data from a relational database, while the LFU algorithm was the most efficient algorithm when data was retrieved from an XML file.