

Caching in Networks: Non-Uniform Algorithms and Memory Capacity Constraints

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Abstract

In recent years, large computer systems connected by networks have become part of our everyday life. A good example is the widespread use of the Internet and Internet-related applications such as the World Wide Web (WWW). A basic functionality in these systems is the interactive use of shared data objects that can be accessed from each computer in the system. Examples for these objects are files in distributed file systems, cache lines in virtual shared memory systems, or pages in the WWW.

The dramatic growth of computer systems necessitates more and more an intelligent management of shared data objects. The daily congestion in the Internet is a clear evidence that the network becomes more and more a bottleneck as the size of the system increases. The same effect can be observed in other distributed systems. The traditional management of shared data objects based on centralized mega-servers with special hardware meets its technical and economical limits. This thesis deals with the design and analysis of new distributed management strategies that guarantee the free flow of the shared data objects in the system.