ISSN 2395-1621

A Survey On Cache Management And Scheduling Policies

[#1]Ashwinee S. Chavan, [#2]Prof. Vilas S. Gaikwad

[1]ashwinichavan7@gmail.com
[2]vilasgaikwad11@gmail.com

[#1]Department of Computer Engineering
[#2]Prof. Department of Computer Engineering

JSPM Narhe Technical Campus,
Savitribai Phule Pune University, Pune
India.

ABSTRACT

This paper presents the review of the different papers on scheduling policies and caching policies. First paper presents the video aware scheduling policy for radio access network. Few of the later paper present the scheduling algorithms for video and audio streams. This paper also discusses the channel aware and deadline aware scheduling policies. The paper also addressed the problem of cache replacement for multimedia object caching using the minimal access cost of caching. This paper present the overview of some popular web caching replacement algorithms such as Least recently used (LRU), Least frequently used (LFU), SIZE. Paper discussed techniques for prefetching a cache on the basis of profiles expressed in the framework for basic and pre-emptive prefetching

ARTICLE INFO

Article History

Received: 4th January 2016

Received in revised form :

6th January 2016

Accepted: 7th January, 2016

Published online :

11th January, 2016

Keywords: **caching, scheduling policies, cache replacement.**

I. INTRODUCTION

This paper addressed the issue of streaming pre-encoded video from a server to multiple users in a wireless network. System assume that transcoding of the streams. The media server is only able to adapt the rate for each user by pruning the video sequence. At the media client, a decoder buffer compensates small variations in the received rate by adding a fixed initial delay to the play out process [1].

Web caching is a technology used to reduce the transmission of network traffic. Main focus of web caching is to enhance accessibility to the Web [6]. It can be beneficial to a wide spectrum of users including those dependent on slow network connection as well as those relying on faster internet connections [7]. The word, caching refers to the process of saving documents for future use. Web caching, to reduce traffic load, saves copies of content, obtained from the Web, closer to the end user, in order to improve accessibility to the content [7]. Some of the main reasons for which a user would opt for Web caching include the following:

To increase the bandwidth availability by curbing the

1. transmission of redundant data,
2. For reducing network congestion,
3. For improving response times and
4. For achieving savings in terms of cost.

The fundamental question in Web caching is how we know if something can be cached or perhaps cannot be cached. It is not hard to guess that certain types of content may not be worth caching. It would be desirable to cache some of these (if it was possible to do so)for the sake of efficiency, by adopting some means or the other [3]. It may of course be worthwhile to cache content that is requested often. On the other hand, it may not be beneficial to cache content that is not likely to be requested frequently.

II. LITERATURE SURVEY

A. Video-Aware Scheduling and Caching in the Radio Access Network:

This paper introduces distributed caching of videos at the base stations of the Radio Access Network (RAN) to significantly improve the video capacity and user experience of mobile networks [1]. To ensure

effectiveness of the massively distributed but relatively small-sized RAN caches [1], unlike Internet content delivery networks (CDNs) that can store millions of videos in a relatively few large-sized caches. This paper proposes RAN-aware reactive and proactive caching policies that utilize User Preference Profiles (UPPs) of active users [1]. System also proposes video-aware backhaul and wireless channel scheduling techniques that, in conjunction with edge caching. This ensures maximizing the number of concurrent video sessions that can be supported by the end-to-end network while satisfying their initial delay requirements and minimizes stalling [1].

B. Priority Scheduling For Multipath Video Transmission In Wmsns

Multimedia Sensor Networks (WMSNs) have been employed for multimedia communication within a sensor network [2]. WMSNs are able to retrieve multimedia content such as video and audio streams.
There are many challenges need be addressed to support video communication over sensor networks [2]. Decreasing delay in real-time video streaming is a crucial problem. Large amount of bandwidth is needed for video transmission. Routing protocol plays an important role for optimizing network throughput, efficient bandwidth usage and decreasing end to end delay [1,2].

C. Deadline-Aware Scheduling For wireless Video Streaming:

This paper presents an algorithm for deadline-aware scheduling of video streams over a wireless shared channel. This algorithm requires the computation of a single metric per user and transmission slot [3]. The side information about the video stream structure and the future channel behaviour in the scheduling algorithm [3].Proposed approach outperforms previous methods by reducing transmission speed of streams to users with favourite channel conditions until their deadline [3]. This approach leads to a fairer distribution of the achievable video quality among all users.

This paper presented an algorithm for deadline-aware scheduling of video streams over a wireless shared channel. This algorithm requires the computation of a single metric per user and transmission time slot [3].Along with the side information about video system needs some implicit or explicit signalling by a media-aware gateway. Other required information is the channel state distribution which can be availed easily [3].

D. Backhaul-Aware Caching Placement For Wireless Networks

With increased capacity demands of mobile applications the backhaul network is becoming a bottleneck. Content caching at base stations (BSs) is a promising approach to reduce the backhaul burden and reduce user-perceived latency [4]. This paper considered a wireless caching network in which all the BSs are connected to a central controller via backhaul links.

In backhaul networks users can obtain the required data from candidate BSs if the data are pre-cached [4]. In other cases user data need to be first retrieved from the central controller to local BSs this causes the extra delay in backhaul network. To reduce the download delay, the caching placement strategy needs to be optimized [4]. Authors of the paper formulated design to minimize the average download delay over user requests. The design problem is a mixed integer programming problem and is highly complicated. This paper proposes alow-complexity algorithm [4]. This paper presented a framework to minimize the average download delay of wireless caching networks.

The proposed low-complexity algorithm can achieve comparable performance to exhaustive search. paper demonstrated that the backhaul propagation delay will greatly influence the caching placement [4].

E. Channel, Deadline, And Distortion (Cd2) Aware Scheduling For Video Streams Over Wireless:

This paper proposed scheduling of multimedia traffic on the downlink of a wireless communication system. Multimedia packets are associated with strict deadlines and are considered as lost packets after deadline. Paper presents a scheduler which minimizes the aggregate distortion cost over all receivers [5].Authors leverage properties to design a low-complexity Channel, Deadline, and Distortion. Schedulers like earliest deadline first (EDF) and best channel first. The proposed CD2can achieve performance gains by using the knowledge of packet deadlines, channel conditions etc [5].
This paper examined the problem of scheduling multiple video streams across a shared wireless channel. Authors proposed the Channel, Deadline, and Distortion (CD2) aware scheduling algorithm. This algorithm provides a unified and systematic way to enhance system performance. The proposed CD2 can obtain the best schedule based on channel characteristics, delay deadlines [5].

F. An Efficient Cache Replacement Algorithm For Multimedia

OBJECT CACHING:

Multimedia object caching by which the same multimedia object can be adapted to diverse mobile appliances through the technique of transcoding [6]. This is a technology for improving the scalability of web services. This paper addressed the problem of cache replacement for multimedia object caching using the minimal access cost of caching. Authors presented an optimal solution for calculating the minimal access cost of caching object and its extensive Analysis [6].

The objective of proposed method is to minimize the total access cost by considering both transmission cost and transcoding cost. Authors proposed an efficient cache replacement algorithm for multimedia object caching [6]. This paper addressed the problem of cache replacement for multimedia object caching.

G. Performance Improvement Of Web Caching Page Replacement Algorithms:

With the increased use of world wide web, number of users also grows, which increased the network and server load. The caching can reduce the both loads by placing the server files closer to the client location. Several types of caching are used over the Internet. It includes client caching, server caching, proxy caching etc [7]. This paper present the overview of some popular web caching replacement algorithms such as Least recently used (LRU), Least frequently used (LFU), SIZE [7].
In future, work can be done on performance improvement of size algorithm using tertiary key. As we seen in our implementation result, size algorithm is not able to maintain the frequency of objects in cache [7].

H. Profile-Driven Cache Management:

In this paper authors propose to use application-level knowledge expressed as profiles to manage the contents of caches. Paper propose a simple, rich profile language that permits high-level expression of a user's data needs for the purpose of expressing desirable contents of a cache [8]. This paper proposes a techniques for prefetching a cache on the basis of profiles expressed in the framework for basic and pre-emptive prefetching [8].

System show that for a large shared cache, multiple clients' profiles can be combined into a single super profile which is representative of them all [8].

III. CONCLUSION

Paper presents the review of the papers based on the scheduling algorithm, cache management policies. Also it presents the user preferences to prefetch the contents from the CDN. In this paper cache replacement algorithms are also discussed.

REFERENCES

[1] Hastiahlehagh And Sujitdey,"Video-Aware Scheduling And Caching In The Radio Access Network", IEEE/ACM TRANSACTIONS ON NETWORKING, VOL. 22, NO. 5, OCTOBER 2014.

[2] Elhamkarimi And Behzadakbari,"PRIORITY SCHEDULING FOR MULTIPATH VIDEO TRANSMISSIONIN WMSNS", International Journal Of Computer Networks & Communications (IJCNC) Vol.5, No.6, November 2013.

[3] G¨Untherliebl , Mark Kalman, Bernd Girod ,"DEADLINE-AWARE SCHEDULING FORWIRELESS VIDEO STREAMING", In Proc. ICIP 2005, Genua,Italy, Sept. 2008.

[4] Xi Peng, Juei Chin Shen†, Jun Zhang And Khaled B. Letaief, "Backhaul-Aware Caching Placement For Wireless Networks",Commun. Mag., Vol. 51, No. 4, Pp. 142–149, Apr. 2013.

[5] Aditya Dua, Carri W. Chan, And Nicholas Bambos, "Channel, Deadline, And Distortion (CD2) Aware Scheduling For Video Streams Over Wireless", IEEE Wireless Commun. Mag., Vol. 9,No. 5, Pp. 76–83, Oct. 2012.

[6] Keqiu Li, Takashi Nanya, Hong Shen,"An Efficient Cache Replacement Algorithm For Multimedia Object Caching", IEEE Signal Processing Magazine, Vol. 20, No. 2, Pp. 18-29, 2003.

[7] Deepak Sachan, Dhawaleshwar Rao Ch,"Performance Improvement Of Web Caching Page Replacement Algorithms", International Journal Of Computer Science And Information Technologies, Vol. 5 (3) , 2014.

[8] Mitch Cherniack, Eduardo F. Galvez, Michael J. Franklin, "Profile-Driven Cache Management", Proceedings Of 26th International Conference On Very Large Data Bases, September 10-14, 2010,

