

A Survey on An Effective and Efficient Approach for Low Network Bandwidth Users

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Abstract— The World Wide Web is a huge information repository. It is being used for various purpose such as communication, social networking, business, education and entertainment, the user increasingly demand web content to be delivered without delays. Its popularity is resulting in heavy traffic in the internet which causes long latency as user experience. Potential source of latency are Web servers heavy load, network congestion, low bandwidth and propagation delay. Web caching and Web perfecting are two important techniques used to reduce the noticeable response time. In this paper we have presented survey on recent different web caching and prefetching techniques solutions. We identified and compared their advantages and weaknesses.

Keywords/Index Term— Web caching, Prefetching, Web latency

I. INTRODUCTION

With the increased use of Internet for various purpose such as communication, social networking, business, education and entertainment, the user increasingly demand web content to be delivered without delays. In addition, modern web pages are complex and include contents from various sources [3]. In addition, they contain web contents of different types such as JavaScripts, images, audio, video, stylesheets, advertisements, etc. Such high bandwidth content often congests network access and increases perceived delay of users. This degrades overall user experience and waste network bandwidth in loading unwanted content.

Motivation: Existing technique proposed in Integration of Web Caching and Pre-fetching Algorithm [1] fetch web pages for users before they request them. However, this increases bandwidth requirement, network delay and network congestion for low bandwidth users. In addition, existing study [4] shows that there is an increase in the unsuccessful search sessions. Unsuccessful search session means users are directed to a random website when they are searching for something, however they do not find the intended information on the redirected site by the search engine. This leads to the wastage of the network bandwidth of the users.

This paper focuses on importance of network bandwidth issues, which will reduce unnecessary loading the web content in which user might not interested. This rest paper is organized as follows. Section II describes literature survey about different Web caching, Pre-fetching techniques, and Web latency. Section III describes about Objective of the Work and Proposed system. And finally we conclude in section IV.

II. RELATED WORK

The author Wei-Guang Teng, Cheng- Yue Chnag and Ming –Syan Chen has attracted both Web caching and Pre-fetching techniques researchers to work on this problem. There are some methods which focused on this problem.

Wei-Guang Teng and his colleagues used integration of Web caching and Web Pre-fetching, these two techniques complement each other, where Web caching technique provide temporal locality, whereas Web Pre-fetching techniques utilizes the spatial locality. The author proposed an innovative cache replacement algorithm, which not only consider the caching effect in the web environment, but also evaluate the Pre-fetching rules provided by various Pre-fetching schemes.

Yagish H K and his colleagues have proposed a novel approach that makes use of ARTINN Clustering and Pre-fetching techniques to fetch the pages for the user before request them.

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Table 1
Comparison of various Papers

Paper Topic	Author Name	Year of Publics	Weakness	Algo.
Integrating Web Caching and Web Prefetching in Client –Side Proxies	Wei-Guang Teng, Cheng-Yue Chnag and Ming –Syan Chen <i>Member, IEEE</i>	2005 IEEE	Normalized profit function not fit for non-implies object	Integration of Web caching and Web Prefetching(IWCP), Cache Replacement with Normalized profit function (NPF)
Analysis of Search and Browsing Behavior of Young Users on the Web	Sergio Duarte Torres, Ingmar Weber and Djoerd Hiemstra	March 2014 ACM Transactions	Transaction log analysis	Link based age rank algorithm work on non-internet system such as online public access catalog
A Novel ARTINN Clustering and Prefetching Technique for Reducing Web Latency	Yogish H K and G. T. Raju	2013 IEEE Computer society	Wastage of network bandwidth	Content Distribution Network(CDN) and Cache Pre-Fetching (CPF)
Measuring the Visual Complexities of web pages	Ou Wu, Weiming Hu and Lei Shi	2013 ACM Transactions	Complex function of feature extraction	VisComp (visual complexities) of web page algorithm
Distributed Local Area Content Delivery Approach with Heuristic based Web Pre-fetching	L.R.Ariyasinghe, C.Wickramasingh, P.M.A.B Samarakoon,U.B. P Perera,	ICCSE 2013	Time & Cost	Prefetching, Caching, Distributed local area content delivery

	R.A.Prabhath Buddhika and M.N.Wijesundara			approach
Reducing User Latency in Web Prefetching Using Integrated Techniques	Naveed Ahmad Owais Malik, Mahmood Hassan, Muhammad Shuaib Qureshi, and Asim Munir	2011 IEEE	Calculate frequency of each page	Sequential rank based selection algorithm, Web page prefetching mechanism work on server site
A framework for predictive web prefetching at proxy level using Data Mining	Jyoti Pandey, Amit Goel and Dr A K Sharma	June 2008	Centralise System	Dependency Graph (DG), Prediction by Partial Match (PPM)
Optimizing Web servers using Page rank prefetching for clustered accesses	Victor Safronov and Manish Parashar	Dec 2003	Web page cluster	Computational complexity of the page rank prefetching algorithm

III. SOLUTION/NEED/IMPORTANCE OF THE STUDY PROBLEM STATEMENT/OBJECTIVES

Our Observations: It is crucial to efficiently utilize the network bandwidth. To achieve that, it is important to perform object prioritization and reordering. For example, a website might include advertisements to generate revenue, social media to increase its publicity, images to improve its visual looks, etc. However, users do not have any control on the prioritization of web objects. As a result network bandwidth is wasted.

Moreover, web pages of some websites are long that do not fit on the visible area of the web browsers. Many users do not scroll down to see the complete loaded web page and navigate away from the site. But, network bandwidth is wasted in the loading entire content of the web page. It is necessary to load only on-screen web object and delay the

loading of off-screen object. However, modern web browsers lack to provide a facility that can allow loading of off-screen objects only if user scrolls down. This feature will effectively utilize network bandwidth of users.

Furthermore, web object reordering helps to increase the web page loading time. For example, web objects such as text, scripts and stylesheets are smaller in size as compared to the images, audio and video. These objects could be loaded faster to allow users to check whether a website contains data of their interest. If not users can simply close the website or navigate away from the website and prevent wastage of network bandwidth by loading the web resources such as images, audio, video. Thus, reordering of web objects can help to reduce the consumption of network bandwidth.

Objectives of the Proposed Work: To achieve above mentioned goal we have set following objectives:

1. Develop a technique to save network bandwidth of low bandwidth users.
2. Develop a technique to decrease perceived delay of page loading by users.
3. Reorder and prioritize web objects to reduce processing and network delay.
4. Develop a technique suitable for low bandwidth users that can overcome disadvantages of pre-fetching.

IV. HYPOTHESIS

The most of the research work carried out is based on web environment i.e., the size, fetching delay, reference rate, and invalidation rate and invalidation frequency of web object. In our idea we will work with two algorithms namely web Object prioritization and web object reordering.

V. METHODOLOGY

This paper will present a new web object reordering and prioritization algorithm, which is based on the idea of providing high priority of text content of same-origin instead of visual contents as well as cross-origin content. For each web page, browsers associate origins with web page objects. Two pages have the same origin if the protocol, port (if one is specified), and host are the same for both pages. The

proposed dissertation aims to automatically reorder loading of web objects at run-time using heuristics approaches as well as supporting user profiling.

A website can include resources from its own domain as well as from other web sites such as advertisement networks, analytics objects, social media, etc. Web objects included from its own domain are known as same-origin resources and objects included from other domain are known as cross-origin resources. This paper also aims to prioritize loading of same-origin objects before fetching cross-origin objects.

Moreover, per site user profiling support provided by the proposed approach ensures that bandwidth usage adjustments are made according to user preferences because per site user's choice of loading the content would differ.

Furthermore, this paper also aims to perform a large scale study on real-world web-sites to measure the impact on the web page loading time with or without our proposed approach. We also aim to perform a comparative study and analysis of the proposed approach on the web latency and size of data loaded using a large set of real-world websites.

VI. RESULT & DISCUSSION/EXPERIMENTAL/ ANALYSIS/IMPLEMENTATION

Analysis of the web object reordering algorithm by measuring the impact on the web page loading time with or without web object reordering algorithm. In particular, this module focuses on evaluation of web object reordering algorithm on real-world website.

We are going to test it on real world website, web latency and size of data loaded. We are also going to compare the size of data fetched from the network with and without our web object prioritization algorithm.

VII. RECOMMENDATIONS/SUGGESTIONS

The bandwidth saving system has been a major research area because of increased use of internet. In this paper we proposed a novel approach for loading only that web object as user requested.

VIII. CONCLUSION

In this Paper, We surveyed different recent prefetching and caching methods or solutions presented by researchers. We have given weaknesses of particular solution, depth of accuracy of various solutions, Factors affecting the detection of such methods...etc. So, as the era of internet Environment

is growing faster, we need more general solution against one of the serious issues of low network bandwidth users.

IX. SCOPE FOR FURTHER RESEARCH

Our current approach is work on web object reordering according to user request and web object are prioritization is done.

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