Chapter 4

HTTP Traffic Model for Web2.0 and Future WebX.0

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ABSTRACT

This article presents a method of estimation for HTTP traffic quality service parameters mean delay and lost packets percentage. This method, based on statistic measurements, includes simulation and analytical modeling. Statistical HTTP traffic models presented earlier take into account typical features of WEB2.0 Internet traffic, which were used for the simulation model. Developed universal simulation models make it possible to research service quality parameters under setting network conditions over a wide range considering Internet development. The presented analytical method based on batch packet arrival model allows an accuracy estimation of mean HTTP-packets delay in Core Router by simple calculations. Objective results of HTTP traffic quality service parameters can be used in QoS standard development for WEB traffic and model QoE standard development.

INTRODUCTION

The modern IAPs provide a complex service including data transfer, VoIP, IPTV etc. There are standards, which normalize the main transfer packet parameters for a real-time traffic. Up to these days there are no such standards for a data traffic generated during Web browsing (access to web resources).

Web resource organization concept WEB2.0 was spread in modern networks. It helps users to get information access more quickly and use information put on a website by other users. According mentioned concept it can be built portals with dynamic pages or pages with aggregated newsletters from different sites. Thus using certain WEB2.0 concept changes not only user’s relations to web access but HTTP-traffic structure in whole.

On one hand, network development leads to HTTP traffic change: transfer traffic volume...
increasing and data loading acceleration at the expense of parallel sessions. On the other hand, users, who have the access to new interactive services, want a provider to standardize the quality of their placing. The method presented solves both marked problems. Firstly, with the help of suggested method it is possible to simulate different HTTP traffic including typical characteristics of WEB2.0 traffic. Secondary, simulation and analytical modeling allow estimating HTTP packets service objective parameters such as packet delay in the queuing system and the percent of loss. These parameters estimation may be useful for the standard development, which regulate the HTTP traffic QoS.

The second part of the article devotes to an explanation how the HTTP-traffic statistical model was obtained and comparison of obtained results with other works. The third part of the article presents the simulation modeling results. The analytical modeling results are presented in the fourth part. The article conclusion contains resume and references.

RELATED WORKS

The analytical and simulation models in the article are based on statistic results described in Deart (2009). The measuring complex was presented and based on the open program components and database, which helped for traffic measurements in the provider access network. Deart (2009) showed how these results were processed and how it helped to get the statistical HTTP traffic model.

The developed model is possessed of some advantages in comparison with the model in the work of Shuai (2008). So far as interval approximation are used for a distribution of HTTP response size, HTTP responses are modeled more accuracy. Therefore, it could be shown the lower and tail range of values completely.

The obtained model takes into account the network HTTP traffic WEB2.0 features better by introduction of dependent generation mechanism of TCP sessions, which simulates a user work, and influence on TCP sessions opening of the user browser.

This statistical model is more accurate if it is compared with Mah (1997), Choi (1999), and Padhye (1998) as far as it describes the modern Internet web traffic and ties also amount of HTTP traffic with intensity of TCP sessions. The main parameters of HTTP traffic statistical model in Deart (2009) are opening TCP session intensity, quantity of GET requests in one TCP session, intervals between GET requests, GET request size in bytes and HTTP response size in bytes. Selected parameters are defined unambiguously a HTTP traffic generator according to a session principle and allow to use it in simulations. The modeling network topology is presented in Figure 1.

**Simulation Model**

HTTP-traffic simulation model was built with use of NS2 simulator and PackMIME module (Fall, 2010; Wiegle, 2007). The local network is presented by multiple clients simulating data exchange from Web servers. All users present

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**Figure 1.** Modeling network topology
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