Effects of Web Page Contents on Load Time over the Internet

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Abstract: *This paper focuses on the effects of web page components on web page load time and how they can be modified to reduce load time. Website speed measuring software tools (EValid and YSlow), online website monitoring tools and a mathematical model was used to make quantitative and qualitative analysis on web page load time in relationship to web page content. This research showed that university X's website loads slowly within an average of 9.766 seconds and may even fail to load as indicated by its average downtime of 9.32%. For application performance across the internet to improve, the website load time must be on average 8 seconds which increases the image of the site hence the perceived quality of services or products offered and thus increasing stakeholders' satisfaction. The findings of the study revealed that an increase in total size of web page content components is directly proportional to increase in response time and web page content components have different effects on web page load time. The evidence in this study shows that web page load time is mainly affected by its web page content characteristics. The study recommends web developers to measure web page response time against threshold values such as the 8 second rule during designing and implementation of a web page and adapt techniques identified which reduce load time.*

Keywords: Website optimization, EValid, YSlow, Web page load time, web page content.

1. Introduction

Websites play an important role in academic institutions especially in universities and colleges as they are used as a method of teaching and a means of online internationalization. Internet users demand the similar level of performance as they experience when connecting to applications via the LAN. Typically, websites on LAN load faster mainly because the web page content is stored locally requiring less load time [1]. Most universities have stakeholders globally dispersed who study at campuses or purse their studies online and they rely more on their websites as a tool to convey information. The load time of websites is one of the most important factors affecting its usability, most internet users will just skip a site altogether if it fails to load within an average of 8 seconds [2]. To increase its global market share the institute must standardize its web page load time. Information Communication Technology is a strategic goal of University X and now it relies more on its website and also its web portal. The website has e-learning facilities where students access their learning materials (notes, assignments, continuous assessments marks, module course outlines, and so on), a chat panel between student and lecturer, news and updates through a notice board for both staff and students. The university's degree programmes include conventional, parallel, block-release and visiting students. Block-release and visiting school students usually access their e-learning accounts out of campus since they are employees in different regions of SADC and abroad more so to international students during their holidays/potential international students hence they access the site over the internet so the load time of website needs to be analyzed. A second delay in web page response time leads to a 16% decrease in customer satisfaction [3].

University X's mission statement on exploiting ICT is being implemented and there is need to meet international standards as they use the website as a means of teaching, admission of international students, collaboration, e-learning and so on. The institute is in collaboration and is in the process of collaborating with different universities around the globe and national colleges who access the website over the internet. Various groups of students such as visiting and block-release access the site externally so the issue of web page load time is important since they claim the website response time is slow and it might fail to load completely. Having more diversified web users means there is need to meet more diversified user needs, which challenges the web developers and systems' capacity. This research seeks to determine how websites load time can be sped up, establish whether the number of HTTP requests has a direct relationship with latency, find out how web page objects such as images files affect website load time and how these objects can be optimized to reduce load time, investigate whether web page load time differ in two major browser technologies, Internet Explorer and Firefox and lastly examine how web page weight relate to web page uptime/downtime. This research will help to cement the institute's mission on how it can exploit Information Communication Technology (ICT) on websites. Also the Information Technology Services software development team will benefit from the recommendations to improve the site's performance globally. At many organizations, web-based applications are the backbone of business-critical processes such as ecommerce operations, financial transactions, and media. End users have direct connection to applications to initiate and complete transactions from their web browser, so the success or failure of web-based applications depends on a fast and reliable access conditions for the end users. This is particularly critical for e-commerce applications where even small differences in response times can have a dramatic effect on such metrics as page views, number of searches, and site revenue. Website optimization will help enhance the organization's image and increase stakeholder's loyalty. One of the benefits is helping to protect and even increase online revenue by preventing downtime for critical systems. Another related benefit of