

Research on the Study of Evolution of Websites

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Abstract: The purpose of this paper is to study the evolution of website. In the majority of research work the study of different version of same website has been neglected. Website performance is directly linked to user experience. User experience is that what keeps people on your website. The objective of this paper is to analyze the different versions of same website called Tech Team and find the changes in each version with respect to period of time. The Web analytics tools used in the research are GTMetrix, pingdom, Website pulse.

Keywords : Web Analytics, Page Speed, Throughput, Connect Time, First Byte .

1. Introduction

Website is defined as a collection of web pages. Web site and web pages are different terms. Website is composed of web pages and Web pages are individual HTML document. Web pages are translated by web browser and they are written in HTML (hypertext markup language). Web pages are of two types: static or dynamic. Static web pages are that web page which shows the same content each time when they are viewed. Dynamic page pages are that which shows different content always when it is accessed. Website designing is the process of developing websites. Website consists many components like graphic design, content production, and Webpage layout. In the web technology field, generally assessment of the different qualities attributes of a website or a use of various categories is very essential and also hard to tune the same for highest efficiency. There are 150 million Web users from dozens of countries around the globe, the Web has an enormously different viewers. As websites has developed both in interface and functionality, they have altered form just being static document-oriented pages to dynamic application-oriented pages. Visitors of any web page or user of any web application are belonging to diverse societies with dissimilar purposes and method of page walk through. The theoretical structure of quality for a web page has included the quality of resources, processes and products using diverse metrics. The web has had major effects on all aspects of our civilization, from industry, education, administration, entertainment sectors, engineering, to our individual life. The main reward of adopting the web for producing software products include (1) no installation expenses, (2) regular improvement with new features for all users, (3) worldwide access from any machine linked to the Internet and (4) being independent of the operating system of customers.

Website Versioning: Website versioning is defined as the evolution of websites. In other words, the changes in websites design over a period of time. With the passage of time, each website wants to update the design so that the

visitors, customers more interact and connect with the website. Websites can constantly update their audience about their latest activities and offerings and collect feedback in the same time.

Keywords: Website Version, Evolution, Performance Grade, Load Time

2. Literature Review

R. Kumar et al. [1] (2010) they considered the evolution of structure inside of vast online social organizations, in particular Flickr and Yahoo! 360. They exhibited a progression of estimations of two such systems, together containing in abundance of five million individuals and ten million friendship connections, expounded with metadata catching the time of each occasion in the life of the system. Their estimations expose a surprising division of these systems into three locales: singletons that don't take part in the system; confined groups which overwhelmingly show star structure; and a giant part secured by an all around associated center district which perseveres even without stars. A. Ntoulas et al. [2] (2004) concentrated on parts of potential enthusiasm to search engine designers: the evolution of connection structure over the time, the rate of making of new pages and new unmistakable content on the Web, and the rate of progress of the content of existing pages under pursuit driven measures of level of progress. Their findings show a fast turnover rate of Web pages, i.e., high rates of birth and death, combined with a much higher rate of turnover in the hyperlinks that unite them. They found that current pages are being expelled from the Web and replicated by new ones at an extremely quick rate. Nonetheless, new pages have a tendency to "obtain" their content intensely from existing pages. The minority of pages that do continue over augmented times of time commonly display almost no substantive change (albeit numerous experience shallow changes). For the remarkable pages that change essentially over their lifetimes, the level of change has a tendency to be

exceptionally unsurprising in light of past level of change. On the other hand, past frequency of change does not have all the earmarks of being a decent all-around indicator of level of change. L. Backstorm et al. [3] (2006) they said that the challenge of gathering and examining expansive scale time determined information on social gatherings and groups has left most essential inquiries regarding the evolution of such gatherings to a great extent uncertain: what are the basic elements that impact whether people will join groups, which groups will become quickly, and how do the covers among sets of groups change over the long time? S. Dogan et al. [4] (2014) focused on web application testing. They used a method in which review the body of knowledge related to functional testing of web application through a systematic literature review (SLR) study. This SLR is a follow-up and complimentary study to a recent systematic mapping (SM) study that we conducted in this area. As part of this study, they posed three sets of research questions, define selection and exclusion criteria, and synthesize the empirical evidence in this area. K. Kritikos et al. [5] (2006) concentrated on rich semantic QoS-based WSDM (Web Service description model). The reason of this paper is to investigate the necessities for a rich semantic QoS-based WSDM. The standard WS techniques, (for example, WSDL and UDDI) neglect to acknowledge dynamic WSDi (Web Service discovery), as they depend on static portrayals of service interfaces and other non-practical service properties for distributed and discovering WSs. Therefore, syntactic WSDi components return results with low exactness and review. WSs. R. Ortiz et al. [6] (2012) investigated the impact of utilizing a more reasonable dynamic workload on the web execution measurements. To this end, we assess a run of the e-business situation and analyze the outcomes acquired utilizing diverse levels of dynamic workload rather than conventional workloads. They divided the performance metrics into two parts based upon resource evaluation that are client side and server side. J. Cardoso et al. [7] (2004) introduced a prescient QoS model that makes it

conceivable to measure the quality of service for work processes naturally in light of atomic undertaking QoS properties. They likewise introduced the usage of our QoS model for the METEOR work process framework. They depicted the segments that have been changed or included, and talk about how they collaborate to empower the services of QoS. M. Kent et al. [8] (2011) focused on web analytics. They demonstrated that Web Analytics are measured by program that tracks site guests' mouse clicks and requests of data. The information is stored on Google and can be contrasted over time to help Web administrators to enhance the efficiency of sites, and managers take decisions about campaign efficiency.

3. Experimental Setup

3.1 Pseudo code:

- a) Make a Website – 1st version
- b) Use pingdom tool, GTMetrix tool, Websitepulse tool to analyze the various parameters like total load time, response time, first byte, last byte, waiting time, total number of requests, number of

failed requests, performance grade, page speed of website.

- c) Update the 1st version website by making changes – 2nd version and repeat the step b
- d) Update the 2nd version of website – 3rd version and repeat the step b
- e) Update the 3rd version of website – 4th version and repeat the step b
- f) Update the 4th version of website – 5th version and repeat the step b
- g) Evaluate the differences of parameters value in all versions of website

3.1.1 Versions of website

First version of Website: First we make a website Tech Team. Tech Team is a leading provider of online technical support service to consumers and small business across a wide range of computing and communication devices and software.

First version of website has home page that includes a little bit information of company, Email box for sending queries.



Figure 1: Home page of Tech Team (1st version)

Tech Team has About page that includes the information of company.

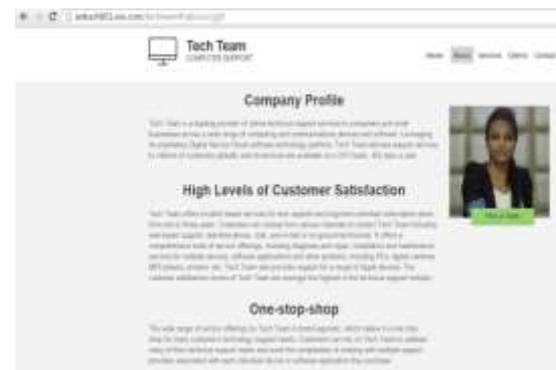


Figure 2: About page of Tech Team (1st version)

Services page of Tech Team includes the information of services provided by the company.



Figure 3: Services page of Tech Team (1st version)

Clients page of Tech Team includes the information of clients that connects with the company.

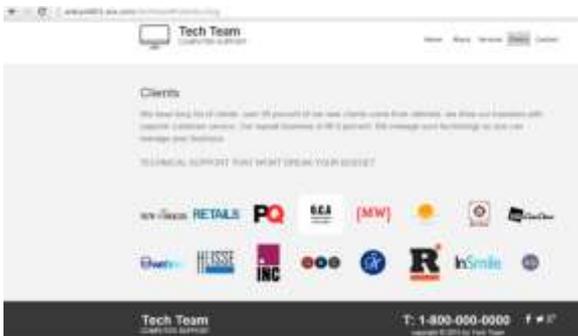


Figure 4: Clients page of Tech Team (1st version)

Contact page of Tech Team includes the information of contact like phone number and address.



Figure 5: Contact page of Tech Team (1st version)

Now, we make changes in the first version of Tech Team to update the website so that second version of Tech Team runs.

New Features in second version of website are appearance change like colors and site map on contact page.

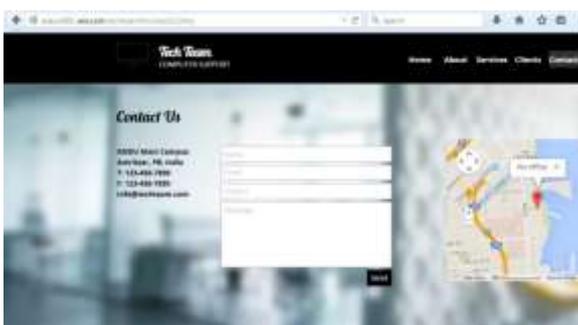


Figure 6: Site Map on contact page (2nd version)

Now, we make changes in the second version of website so that third version of Tech Team runs. New features in Third version are Slide show on home page, Social media interaction like facebook, google+, twitter, you tube on each page of website.



Figure 7: Slide show on home page (3rd version)

Now, we make changes in the third version of website so that fourth version of Tech Team runs. New feature in fourth version is Hit Counter on each page that shows the total number of visitors that visits the website and three features of company with images on About page.



Figure 8: Hit Counter and Company Feature with Image on about page (4th version)



Figure 9: Company feature with image on about page (4th version)

Now, we make changes in the fourth version of website so that fifth version of Tech Team runs. New feature in fifth version is Information of services with images on Services page.



Figure 10: Information of services with images on Service page (Fifth version)



Figure 11: Slideshow on Service page (Fifth version)

All the above images show the different versions of same website Tech Team. Now the next step is to use the web analytics tools to find the values of different parameters of each version of website.

3.1.2 Tools used in the Research:

GTmetrix Tool: GTmetrix tool is used to analyze page speed, Page Load Time (Total Time), Total Page Size (Total size), Total Number of Requests (Total elements), and Page Speed. GTmetrix tool is also used to compare the performance of two websites at a same time. GTmetrix tool tells the reasons why our website performs slow and recommended some suggestions that help in improving the speed of website.



Figure 12: GTmetrix Website Speed Test

Pingdom Tool: Pingdom tool is used to analyze Performance Grade, Number of requests, Load time, page

size, page speed, waiting time of website. Pingdom tool also suggests some suggestions to improve the speed of website.



Figure 13: Pingdom Website speed test



Figure 14: Pingdom Website speed test

Website pulse tool: This tool is used to analyze the waiting time, connect time, first byte, last byte, response time.



Figure 15: Website pulse website speed test

4. Results and Discussions

After analyzing the performance of each version of website by GTmetrix, pingdom, website pulse tool. The following graphs obtain:

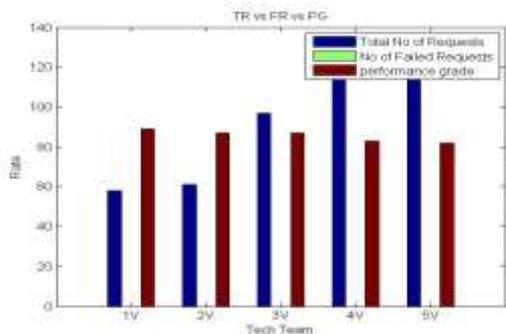


Figure 16: Performance grade, total number of requests, number of failed requests of all versions of Tech Team
In above graph 1V, 2V, 3V, 4V, 5V stands for first, second, third, fourth, fifth respectively versions of Tech Team website.

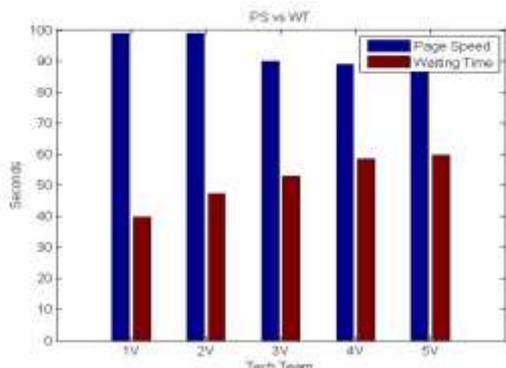


Figure 17: Page speed and Waiting time of tech team website

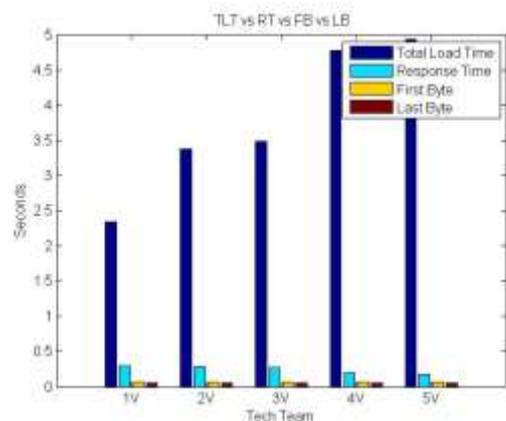


Figure 18: Total Load time, Response time, first byte, last byte of Tech Team website

Table 1 shows the features of each version of website and depicts how the changes occur in the response time, total load time, waiting time, Number of requests, failed requests, first byte, last byte, performance grade, page speed. After analyzing the performance of all version of website the results shows that:

Total Number of Requests: Research shows that the number of requests, in other words the total elements like images, style sheets, scripts, CSS files in the

Website is increasing from First version to last version of website. Increasing HTTP requests directly affect the loading time, response time of website.

Number of failed requests: Research depicts that there is no failed request in any version of website. It means all the versions of Tech Team are highly reliable.

Performance Grade: Performance grade is the overall performance of website. Performance grade of website depends upon factors such as caching, Cookieless, Switch to a faster web host. Research depicts that the performance grade gradually decreases from first version to Fifth Version.

Page speed: Page speed of website depends upon the number of elements in the website. The first version of website has less number of elements so the page speed of first version is low than second version and so on. The Fifth version has highest number of

Elements as a result the page speed of that version is high than other versions. It means the first version of website has high availability than other versions.

Waiting time: It is when the request is being processed by the server and before the response begins to download. Research depicts that the waiting time gradually increases from first version to fifth version.

Load Time: It is the total time to load the website. Website having lowest load time is called good website. As number of elements increases from first to fifth version, as a result the time to load the website is gradually increases from first to fifth version.

Response Time: Expected time between the moment a request is sent and a response is received. Research shows that the response time is gradually increases from first version to fifth version.

First and last byte: It is the time when first byte of the HTML file has successfully traveled from the server to the visitor's browser. Last byte is the time when the HTML file has been fully downloaded.

Tech Team versions	Features of website	Total load time (sec)	Response time (sec)	First byte (sec)	Last byte (sec)	Total No of requests	No of failed requests	Performance grade	Page Speed (%)	Waiting time (%)
1 st version	Home page-a little bit information about company, Email box for sending queries. About page- Company information Service page- Services provided by company Client page- Information about	2.34	0.304	0.068	0.055	58	0	89	99	39.70

	clients connects with company Contact page- contact information, Contact number in the footer on every page									
2 nd version	Sitemap on contact page, appearance change like colors	3.37	0.286	0.066	0.056	61	0	87	99	47.39
3 rd version	Slide show on home page, Social media interaction like facebook, google+, twitter, you tube on each page	3.49	0.276	0.068	0.054	97	0	87	90	52.93
4 th version	Hit Counter on Each page, Three features of company with images on about page	4.77	0.198	0.069	0.055	123	0	83	90	58.57
5 th version	Information of services with images on service page	4.93	0.175	0.067	0.054	132	0	82	89	59.80

Table1: All Versions of Tech Team website and the values of the parameters

5. Conclusion

The objective of this paper is to analyze the performance of different versions of same website. After analyzing all the versions of Tech Team Website, the research shows that as the number of elements increasing from first version to fifth version. The load time, waiting time gradually increases. The page speed, response time, performance grade gradually decreases from first version to fifth version. The research also shows that all versions of Tech Team has high reliability because no failed request in any version of website.

References

- [1] Kumar, Ravi, Jasmine Novak, and Andrew Tomkins. "Structure and evolution of online social networks." In *Link mining: models, algorithms, and applications*, pp. 337-357. Springer New York, 2010.
- [2] Ntoulas, Alexandros, Junghoo Cho, and Christopher Olston. "What's new on the web?: the evolution of the web from a search engine perspective." In *Proceedings of the 13th international conference on World Wide Web*, pp. 1-12. ACM, 2004.
- [3] Backstrom, Lars, Dan Huttenlocher, Jon Kleinberg, and Xiangyang Lan. "Group formation in large social networks: membership, growth, and evolution." In *Proceedings of the 12th ACM SIGKDD international conference on Knowledge discovery and data mining*, pp. 44-54. ACM, 2006.
- [4] Dogan, Serdar, Aysu Betin-Can, and Vahid Garousi. "Web application testing: A systematic

literature review." *Journal of Systems and Software* 91 (2014): 174-201.

- [5] Kritikos, Kyriakos, and Dimitris Plexousakis. "Requirements for QoS-based web service description and discovery." *Services Computing, IEEE Transactions on* 2, no. 4 (2009): 320-337.
- [6] Peña-Ortiz, Raúl, José A. Gil, Julio Sahuquillo, and Ana Pont. "Analyzing web server performance under dynamic user workloads." *Computer Communications* 36, no. 4 (2013): 386-395.
- [7] Cardoso, Jorge, Amit Sheth, John Miller, Jonathan Arnold, and Krys Kochut. "Quality of service for workflows and web service processes." *Web Semantics: Science, Services and Agents on the World Wide Web* 1, no. 3 (2004): 281-308.
- [8] Kent, Michael L., Bryan J. Carr, Rebekah A. Husted, and Rebeca A. Pop. "Learning web analytics: A tool for strategic communication." *Public Relations Review* 37, no. 5 (2011): 536-543.