LOADING SPEED OPTIMIZATION OF A WEBSITE

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Abstract— **Every website that we use needs to be loaded for us to begin using it and the speed at which the website loads depends on various factors such as the format of the images that are used in the website, the content delivery network that was used in order to access the website, the media files that exists within the website, the key words that is used within the website, the size of the landing page of the website and many such factors. Any optimization of the above mentioned factors would result in a website with the least loading speed which is the basic criteria considered by search engines in order to rank websites based on which the websites are displayed in the search results. Any website that satisfies the above mentioned criteria would result in the top in search results of a search engine. Any existing website is optimized by starting with the images and other media content of the landing page followed by the size optimization of the website and then the use of a content delivery network that helps the user to fetch the data from the closest server available thereby minimizing the time required to fetch the data from the central servers.And other such optimization are performed in order to increase the ranking of the website.**

Keywords— **Content Delivery Network, Search engine Optimization, Image optimization, Data caching,**

1. INTRODUCTION

In the ever growing world of technology that we live in, the growth of websites for it's commercial and personal uses have been on the rise ever since it's invention in 1991. Websites have now become an essential part of our daily life that they suit every rightful need of this technologically advanced world. With the rise of fast and reliable sources of information, maintaining a website that is fast in itself is an essential need. For a website to be fast the landing page or the home page of the website must be of a size that's globally accepted as small thereby making it easy to load the contents of that particular website. The lesser the size of the home page of a website the faster it loads for a user. The size of a website plays a major role in the speed the website loads and this size can be reduced based on several mechanisms that corresponds to the process of optimisation of a website. This optimisation is an essential process when it comes to the ranking of a site in a search engine. Every search engine ranks the websites available around the world wide web with certain specified criteria and this includes the size of the landing page of a website. Initially the size of a website is reduced to match the requirements and this process of reduction in size involves the optimisation of the image files that resides within the landing page of a website and the other media files such as the video files and GIF files that resides in the website. Initially the Images that are used in the website is analysed and any media file that isn't used in the site but resides in the media library is removed permanently from the library thereby reducing the size of the website. Followed by which the images that are used in the website but are not of the right size are found out with the help of tools that analyses websites such as GT Metrix. Once they are found the corresponding images are resized and then the existing images are replaced with the newly resized images. With such optimisation the misfit images of the website are replaced thereby reducing the size of the website considerably with minor changes made to the website.Followed by which the use of a CDN is implemented and a CDN does the process of fetching the data from the web host and then storing it in several data centres around the world. And when a user tries to access the website the data from the nearby data centre is fetched for the user instead of accessing data from the web host. Followed by which the process of caching the data at the user end is done. This process of content caching occurs the first time the user accesses the website. Every time the user revisits the website the cached data of the website stored in the user's browser is fetched instead of accessing the web host thereby reducing the time taken to load the website. With the need for ever growing websites in the world we live in a fast loading website is an essential that must be met for users to consider visiting the website and this can only be achieved with the updated content of the existing websites to its optimized form with the

help of the recommended optimization strategies. The proposed system tries to meet the specified requirements.

The absence of a Content Delivery Network for the site increases the time required to fetch the data from the web host every time a user tries to access the website and the existing images of the website that doesn't correspond to the required dimensions of that specific size pose a threat to the speed at which the website loads. The existence of unused images in the site increases the size of the website thereby affecting the load time. The increased number of requests sent from the browser to the web servers increases the time taken for the website to load.

2. Related Work

Considering the existing system, the website lacks a Content Delivery Network[1] that could load the website's data in data centers for easy and fast access[2]. The site consists of unused media files that clogs up the size of the website and contains images with improper dimensions and a common Jpeg format that takes time to load within the website. The number of HTTP requests[4] from the browser is high causing the time taken to access the complete data of the website longer. The absence of a content caching mechanism[7] within the site affects the loading time of the website for revisiting users. The website currently loads at a speed of 7 seconds with minor variations each time depending on the factors such as the speed of the internet connection, the number of requests sent from the browser[12] to the server in order to access the data that corresponds to the website.
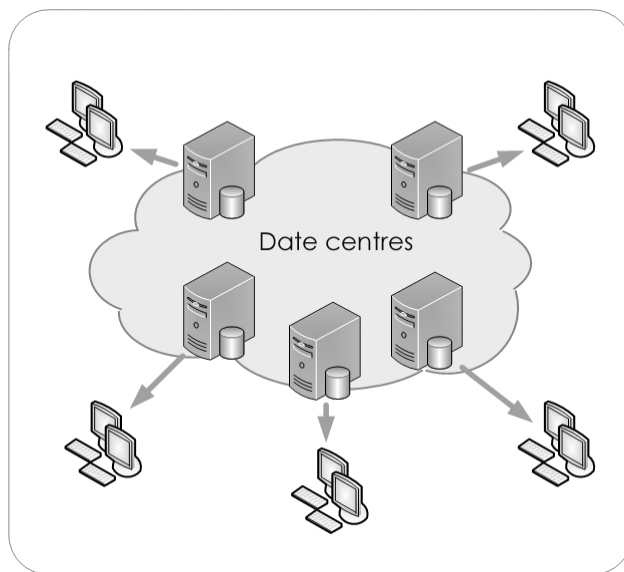
3.ProposedSystem Architecture

Fig. Working of a CDN

The optimization of a website from its current state to the optimized version starts with the adoption of a Content Delivery Network that helps to store the data from the web host to multiple data centers around the world that helps in the process of easy retrieval of data from the closest data centre for the user at times of need. Optimization of the images present in the website along with the other media files in the central library that results in the reduced page size of the website. The adaptation of a caching system that would store the website information in the local browser the first time a user visits the website and displays the saved content when the user revisits the website increasing the load speed of the website. Reducing the number of HTTP requests sent from the browser to the server thereby limiting the communication between the browser and the server and hence making the process of accessing website data from the web host shorter than the current access time. The above mentioned processes are executed resulting in the optimized form of the current website that would load under 3 seconds.

Experimental Result &Analysis:

The resulting website is a product of Content Delivery Network implementation with an optimized version of the images along with the media files present in the central library of the website with removal of certain large sized files from the existing system. This finally resulted in a optimized version of the website that loaded under 3 seconds with minor variations in the load time of the site depending upon the location, the speed of the internet connection and other external sources. The implementation of a caching mechanism with the website managed to cache the contents of the website to embed within the local storage of the user's browser thereby limiting the time required to fetch the data from the web host every time a user tries to revisit the website. Scaling the images to the required size and the considerable change in the images resulted in a decreased size of the website's landing page and this made the website to load faster with an increase in the load speed by 1 second. This finally resulted in the optimized version of the website which was initially at a load speed of 7 seconds which was then optimized to 3 seconds.

Conclusion& Future Enhancements

In the proposed paper, the consideration for an optimized version of the provided website was the goal which was met under the stipulated time and the final product, the optimized version of the website was able to load under 3 seconds as proposed and any further enhancements of the website would include a better Content Delivery Network strategy and the

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development of an image format that retains the quality of the image yet reducing the size of the image drastically which would have an noticeable impact on the size of the website thereby resulting in a website with a reduced size and a faster loading speed or a better caching mechanism that would save the content cache within the user's browser providing easy and fast access to the website at times of revisiting. These are the possible enhancements that could be done in order to increase the time taken to load a website.

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