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MEANS OF ACCELERATING THE LOADING SPEED OF WEB PAGES AND REDUCING THE RESPONSE TIME TO CUSTOMER REQUESTS

Abstract. *The paper examines the problem of optimisation of loading web-pages and reducing response time for client requests. Examined impact of using a CDN, analyzed effectiveness of hashing, optimizing for mobile users and low speed connection. Examined impact of using asynchronous loading of content. This work helps to improve the overall speed of web application.*

Keywords: CDN; hashing; web-pages.

1. INTRODUCTION

The modern Internet plays an important role in the life of people and business. More and more aspects of our daily lives are moving online, and website accessibility and performance are becoming critical factors. Web page loading speed and response time to customer requests affect user experience and user satisfaction.

According to research, most users will leave a website if the page does not load within the first few seconds. This means that a poor website performance can result in lost visitors and therefore lost business and possible profits.

In addition, given the diversity of devices and internet connections, it is necessary to have tools to optimize web pages for mobile devices and low-speed internet connections. Mobility is becoming increasingly important, and websites must provide fast and convenient access to information regardless of the type of device or the quality of the Internet connection.

Therefore, the relevance of the research topic lies in the need to develop and improve means to improve the speed of loading web pages and reduce the response time to client requests, which has a direct impact on the user experience and the effectiveness of the web presence.

The problem statement. Research and development of web page optimization methods to increase loading speed and reduce response time to client requests. Consideration of CDN technologies, caching, optimization for mobile platforms and low-speed Internet connections, as well as the use of asynchronous loading of resources and scripts.

Today, a significant number of computerized systems are created in the form of web applications, when the client is a web browser that interacts with a web server. This architecture is implemented by numerous computerized management systems, business process management systems, and websites. One of the main tasks that arise during the operation of web systems is to ensure its speed.

Analysis of recent studies and publications. A review of current research and publications related to web page loading speed and optimization was conducted. The presented work examines modern approaches and technologies that affect the performance of websites.

2. RESEARCH METHODS

Formulation of recommendations

Practical recommendations for improving the performance of websites and network systems are offered based on the research findings.

Impact of page size and its resources

The size of a web page and the amount of resources that must be downloaded to display it are some of the key factors that affect download speed. This section explores the importance of these factors and provides recommendations for optimizing them.

Most users expect a web page to load quickly. A large page size may cause loading delays, especially on slow connections.

Images are often the largest elements on a web page. Using optimized formats (eg WebP for images) and compression help reduce their size without losing quality. Also, you can use "lazy loading" to load images only when they are needed for the visible part of the page.

Server infrastructure and hosting

Server infrastructure and hosting largely determine how fast a web page can be loaded by a user. This point discusses important aspects of server infrastructure and hosting provider selection to improve web page loading speed.

Data caching.

One of the most common ways to solve this problem is data caching — placing data in an intermediate buffer for faster access. There are different approaches to data caching and means of their implementation.

CDN service network

A CDN is a distribution network of servers located in different geographical regions, which are aimed at accelerating the delivery of web content to end users. The main purpose of a CDN is to reduce the loading time of web pages and resources for users, improving the speed and performance of websites.

CDN includes servers located in different parts of the world. When a user opens a web page or requests a resource, the request is automatically routed to the nearest CDN server, reducing the time it takes to transfer data across the network. CDN also caches copies of web pages, images, videos and other resources on its servers. This allows CDN servers to serve content directly to users without burdening the original web server. Many CDNs optimize content delivery for mobile devices, ensuring optimal cross-platform performance and low-bandwidth speeds. CDNs usually provide performance analysis and monitoring tools, including download speed statistics.

3. THE RESULTS AND DISCUSSION

Impact of loading speed on user experience

The loading speed of web pages has a significant impact on user experience and users' decisions about using a particular website.

The loading speed of a web page determines the first impression of the user. If the page loads slowly, the user may lose interest and leave the site. Responding to requests quickly creates a positive first impression, as users have a limited tolerance for waiting for pages to load. A slow page can cause them to lose interest and switch to another resource.

As an example, you can compare the first download for a web application to a large project where many files need to be downloaded. The comparison was made using the simulation of slow Internet (throttling) and asynchronous data loading was tested. Such conditions may be relevant for people with limited access to high-speed Internet or people far from large cities.

Table 1

Comparison of download speeds

Test number	Without asynchronous download (ms)	With asynchronous download (ms)
1	10.8	9.7
2	10.79	9.52
3	10.91	9.54
4	10.85	9.67

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