Optimization of Video Resource Access for Micro Learning Platform

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Abstract

In this paper, a new video resources access policy for micro learning platform based on user interest is presented. The video resource access process is simply analyzed. The optimized access scheme of video resources is depicted in detail and the implementation strategy is given. The method can improve the response speed and hit rate of users accessing interesting video resources.

Keywords

Micro Learning Platform, Video Resources, CDN.

1. Introduction

With the continuous development of computer network technology and communication technology, when users use the video playback system, the service quality standards should be improved accordingly. However, if a large number of users suddenly play video collectively at a certain moment, it may cause an overload problem on a certain server, leading to the unavailability of some services, while most of the servers are idle. Video playback system can not ensure the quality of service, resulting in uneven load[1,2].

Through the analysis of the characteristics of user interest, it is found that the user interest of the learners in the micro learning platform presents the characteristics of aggregation and periodicity, and the users in the system may have frequent access to the recommended resources. This paper studies the CDN based video resource optimization access method to provide solutions for the above problems[3-5].

2. Analysis of Video Resource Access Process

In a typical CDN architecture, a layer of intelligent virtual network is added to the existing Internet as a buffer, and then the content is published on the edge network node nearest to the user to improve the response speed of access. The process of resource access is divided into three levels, including user layer, content layer and network connection layer.

(1) User level: analyze the user's interest preferences and requirements characteristics in the system. It provides support for the allocation strategy of video resources and the design of content distribution network model.

(2) Content layer: describes the distribution and storage of video resources in the network. According to the user interest and habit obtained from the upper analysis, the paper proposes a reasonable access scheme and cache strategy for video resources.

(3) Network connection layer: the transmission layer of video resources, and the transmission path depends on the distribution of resources.

Through in-depth analysis of the above three levels, the conclusions are as follows:

(1) For example, students in Shenyang area are more likely to pay attention to the course videos that conform to the local syllabus of Shenyang, and the students who belong to the first grade of senior high school will not continue to be interested in the curriculum resources of senior one.

(2) According to the above analysis of user groups and user interests, the content layer allocates the video resources in line with user interests to the nearest cache server belonging to the same operator as the user. The user behavior rule recommendation strategy is stored in the server in advance.

(3) Network connection layer will plan video transmission path according to cache content, load and user location of cache server to reduce load and traffic.

3. Optimized access scheme of video resources

Based on the analysis of the access process of video resources, this paper proposes a CDN network architecture which combines the characteristics of users' interests and cache management allocation strategy to control the cache content in the cache server. By setting up an independent CDN cache policy server, it can quickly find the video resources that users request to access, and return the cache server address of the resources to the users. The specific work-flow of optimized CDN architecture is shown in Figure 1.

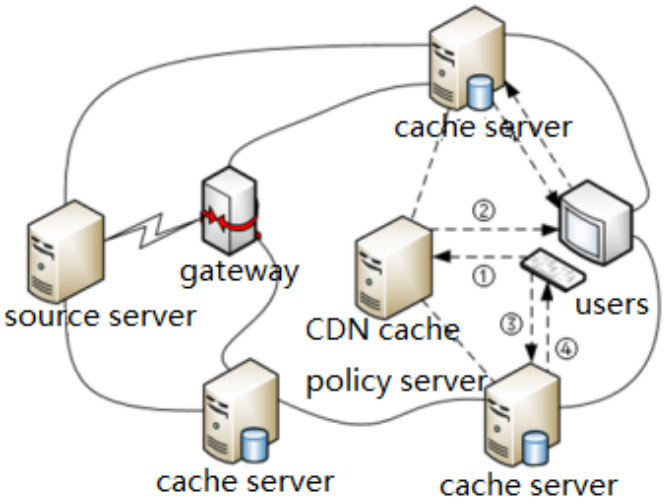

Fig.1 work-flow of optimized CDN architecture

After using the CDN cache policy server, the user's video resource access process is as follows:

(1) Users send out video access request, which is resolved by local DNS and sent to CDN cache policy server.

(2) The CDN cache policy server receives the request, uses appropriate policies according to the access content, finds out the cache server containing the content, and returns its address to the user.

(3) Redirect the user request and send the request to the cache server allocated in the previous step.

(4) The cache server finds the video resource that the user requests to access and returns it to the user.

Through the optimized CDN work flow, the CDN cache policy server can adjust the cache content of the cache server according to the user's interest in video resources, select the cache server that can respond to the user's request, and reduce the access delay and network traffic.

4. Cache Allocation Strategy Based on User Interest

In order to improve the hit rate of cache server requests when users request access to interested resources, and reduce the waiting time of users. First, the CDN cache policy server obtains the video resources in the target user interest set, and then the cache server obtains the popular video resources by counting the number of times the video resources in the cache server are accessed. In this step, the cache server needs to report the VOD of video resources to the cache policy server regularly, so that the cache policy server can summarize the information. Finally, the allocation of video resources in cache server is adjusted according to the interest video set composed of the above two parts. To sum up, the flow of cache allocation strategy based on user interest is shown in Figure 2.

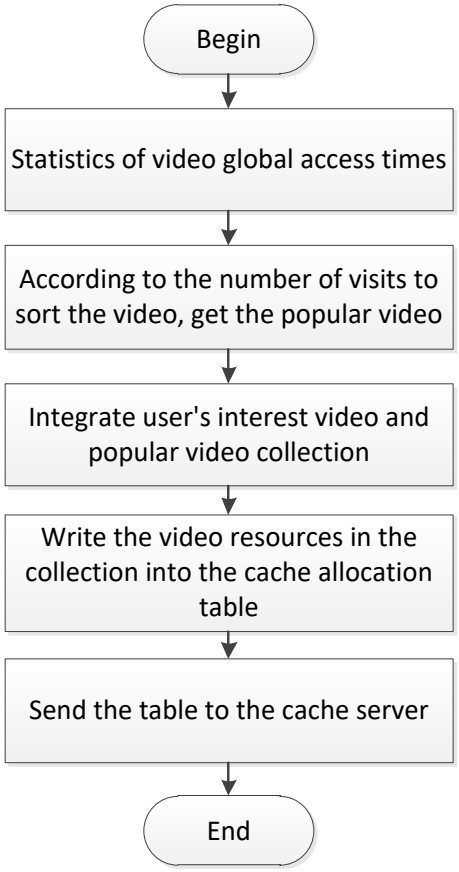

Fig.2 flow of cache allocation policy based on user interest

The cache server will submit the local cache allocation to the cache policy server on a regular basis, and the cache allocation policy will also be executed on the CDN cache policy server on a regular basis. After receiving the cache allocation table, the cache server will delete the video resources that are not in the table according to the records in the table. If there is a large amount of remaining storage space, it will obtain the local non stored interest video resources from the source server. Therefore, it greatly improves the hit rate of users accessing video resources and improves the service quality of the system.

5. Conclusions

This paper mainly studies the optimization strategy of video resource access based on CDN in micro learning platform. In order to improve the response speed and hit rate of users' interest video resources, an optimized CDN architecture video resource access scheme is applied in the micro learning platform.

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