A Survey on Performance Improvement in Media file using CDN Cloud Computing

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***Abstract* - Cloud Computing becomes a popular tendency in recent years. Content delivery network has been used for many years to distribute content over the world. The relative between Cloud computing and content delivery network is exciting. In this paper, we discuss about the content delivery network architectures and advantages of it. Then discuss about P2P architectures and grouping of both. We proposed a cloud based content delivery network. It provides better performance and elastic web serving platform. Content providers could place content to nearest node from the end user. Thus Cloud-CDN and hybrid cloud will become the next generation of content distribution network.**

***Keyword* - Content Delivery Network, P2P, Cloud**

I. INTRODUCTION

With the rapid development of the Internet, Some problems such as latency, package loss, network congestion occurs when they access the internet. To solve the problem Content distribution technology appears. So it can optimize the network performance, such as maximizing bandwidth, improving accessibility, maintaining correctness, by distributing the replication to edge cache server located closest to user.

The reminder of this paper is organized as follows: in the second and third part, we analyze the architecture of CDN and P2P, and conclude the advantages and disadvantages of them. And in the fourth part we discuss CDN-P2P hybrid architecture. Finally we introduce the concept of CDN-Cloud. And it will be the next generation of content distribution network.

II. CDN ARCHITECTURE

A CDN, or Content Delivery Network, is a means of distribution that both large-scale and small-scale websites incorporate into their website's data transfer structure. This technology allows content, usually website files, to be replicated on various data centers around the world. This is, essentially, a means of caching files close to the visitor's physical location.

The Typical functionality of CDN is: 1) Request redirection service- To redirect a request to end user that are closest to CDN cache server. 2) Content delivery service- To deliver a replicas of content to the end user through the origin server. 3) Content distribution service- content are distributed to web servers from the origin server. 4) Management service- To manage network content, to handle accounting, and to monitor content usage.

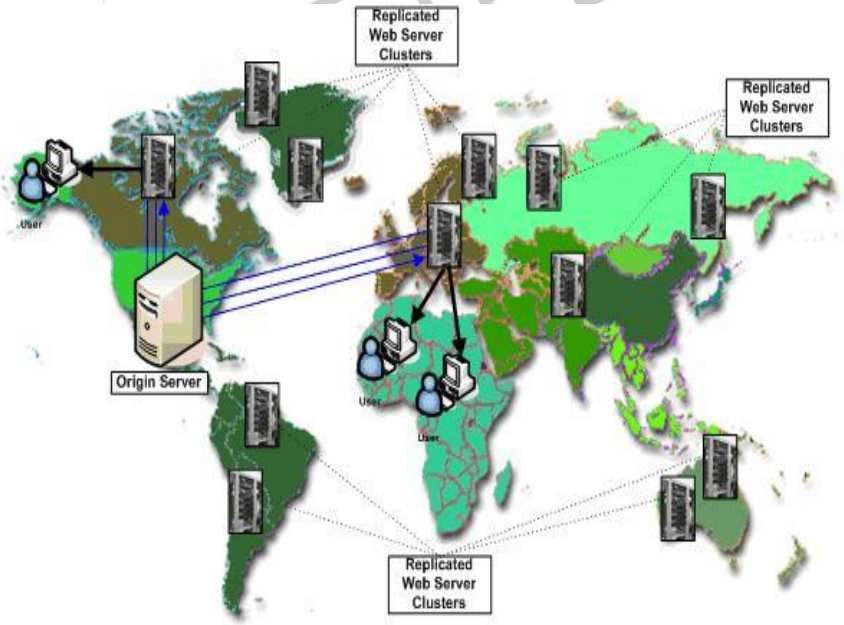

Fig.1 Abstract architecture of content delivery network[3]

A CDN providers installs their servers at key location across the internet. Each server contains large amount of local storage plus copies of its data with other servers on the content network through a process called replication. These servers acts as data caches. In order to apply caches data to client around the world most efficiency, CDN providers install their servers at geographically- dispersed edge location places that directly connected to internet, typically in the data centers near large Internet Service Providers (ISPs)[5].

The principle of CDN is: replicate the desired content to some mirrored servers which are strategically placed in different locations, therefore users are redirected to the nearest servers in order to fetch the required content. This approach can efficiently optimizing network bandwidth and improving content delivery performance. And also reduce user's response time.

Benefits of CDN:

- It can improve publisher's quality of service.
- Client users enjoy much faster downloads for CDN enable content like videos and much more. And generally better responsive for internet applications.
- It can improve network latency and greater response time.

III. P2P ARCHITECTURE

Peer-to-Peer Architecture (P2P Architecture) is commonly used computer networking architecture in which each node has the same capability and responsibility.

P2P networks has many applications, but most common is content distribution. This includes content delivery, media streaming, software distribution, which all are on-demand content delivery.

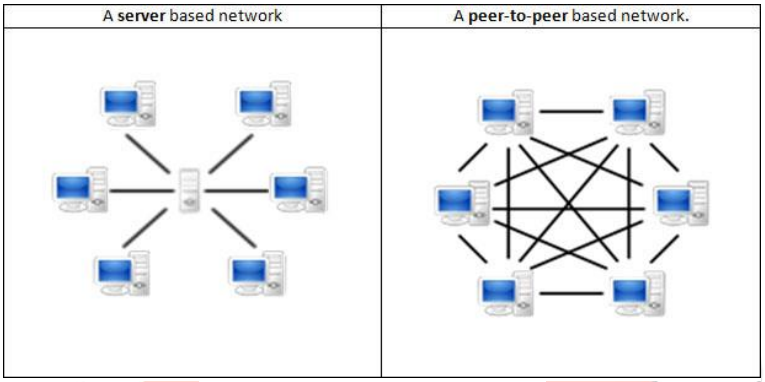

Fig 3. P2P network Architecture[6]

There are three models of unstructured P2P computer network architecture, and that is Pure P2P, Hybrid P2P, and Centralized P2P. In structured P2P computer network architecture, workstations (nodes), and sometimes resources as well, are organized according to specific criteria and algorithms. This leads to overlays with specific topologies and properties.

Advantages of P2P:

- In P2P network, all client provide resources, including bandwidth, storage space, and computing power. Thus total capacity of the system is increase with client.
- The distributed P2P network increase robustness in case of failures by replicating data over multiple peers.
- Pure P2P networks has find data without need for any centralized index server.

Limitations to P2P and CDN:

CDN and P2p are two leading architecture of content distribution network. It can reduce the end users perceive latency, and decrease the deployment cost. But there are some disadvantages of its architecture. 1) Network cost: with increase the total network cost, it increase the network traffic. 2) Economic cost: The cost of service rate for web content distribution increases, resulting in increasing the running and investment cost of CDN. 3) Social cost: Content distribution has been centralized to CDN providers.

IV. HYBRID CONTENT DISTRIBUTION NETWORK

With the advantages of CDN and P2P, HCDN(Hybrid Content Distribution Network) has become a warm topic.

As Figure 4 shown, PeerCDN is one kind of typical 1+1 tightly-coupled hybrid model. PeerCDN realizes the management of regional autonomy when constructing the overlay network. The overlay network is constructed geographically to become a topology aware overlay network through redirecting of strong nodes. In PeerCDN architecture, each group of client peers is led by the nearest Strong Node.

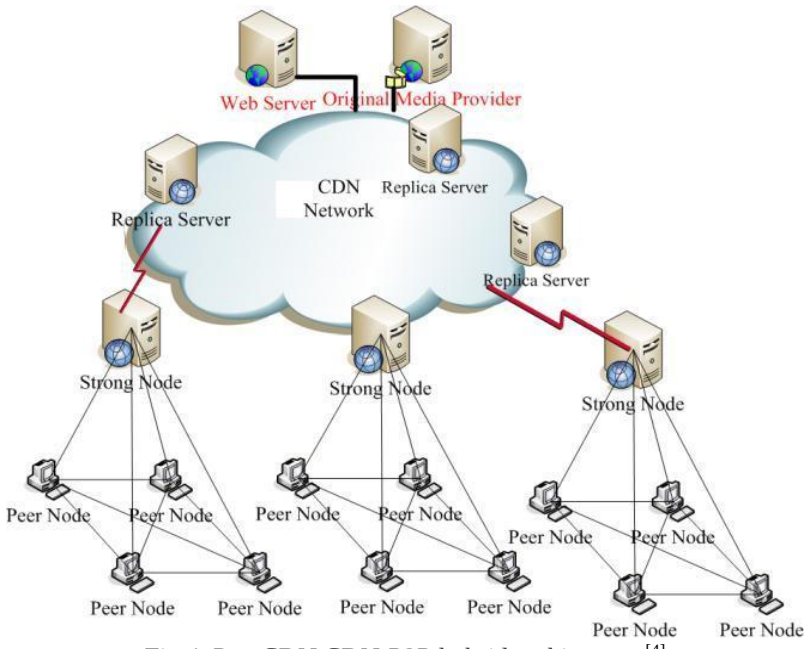

Fig 4. PeerCDN CDN-P2P hybrid architecture [4]

In this model, the P2P system is attached to the CDN system. In other words, CDN nodes lead to build P2P systems. This model is efficient for one CDN integrating with one P2P, but it is not suitable for one CDN integrating with several P2P. For example, PPLive and PPStream are two of the largest P2P streaming media operators, if PPLive and PPStream want to integrate with a CDN through such method, PPLive and PPStream have to break their current overlay construction and data transmission mechanisms to adapt to the CDN, which will increase the integration difficulty.

V. THE ARCHITECTURE OF CDN CLOUD

From the above, the CDN system can reduce user response time and provide better browsing experience. But with the increase of users and more network traffic, CDN need to constantly increase its IT infrastructure to meet user's requirements. Thus the advantage of cloud computing make it become an effective solution for the current CDN. It reduce the cloud export congestion and user access delay.

The Architecture of CDN cloud system is shown in Figure 5. Content provider puts content in the cloud, the master is responsible for content distribution. It allocates the location for content and saves the copies in other area. Content provider doesn't have to maintain the origin server. Master will be responsible for all data grouping after being store in the cloud. According different geographical location, the CDN is divided into different area. Each has one authority server and one cache server. CDN cloud adds a DNS server to realize the DNS redistribution mechanism.

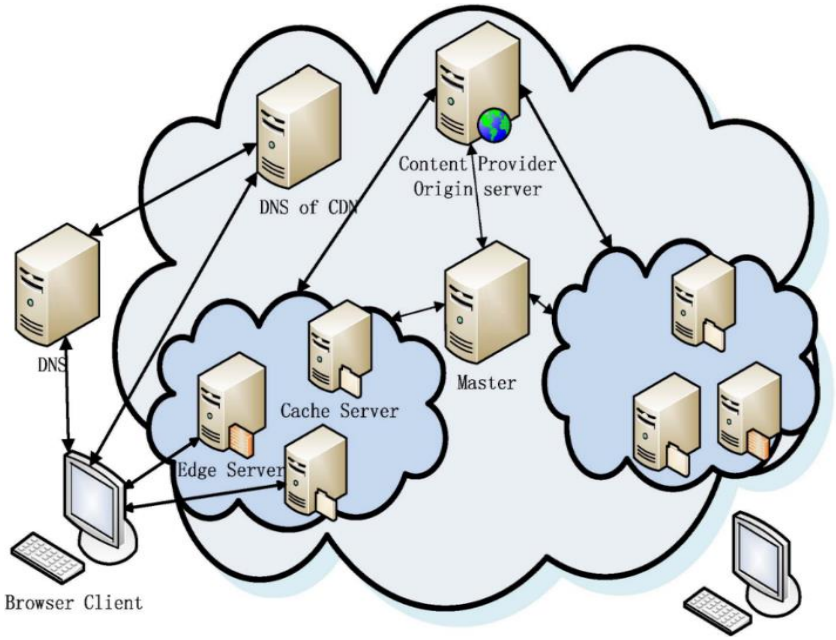

Fig 5. Overview of cloud CDN architecture[2]

Cloud storage is an important application of cloud computing, and many websites uses private cloud storage to distribute their content. Many cloud storage provider, such as METACDN, CloudFront, and it has low cost, faster response time. Many cloud storage suppliers can provide basic storage services, such as load balancing, load redirection, and monitoring.

VI. CONCLUSION

In this paper, we describe the CDN technology and its advantage for retrieving the contents from the internet. Then we discuss P2P technology and it has become an important part of content distribution network. CDN and P2P grouping is more useful over the internet. Then merging CDN with cloud is most effective to receive the content from the website, it has low cost, greater response time and better performance. CDN cloud is become next generation of content distribution network.

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