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A Case Study for Image Re-sizing using Content Delivery Networks (CDN)

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ABSTRACT: Most websites and applications that people interact with on daily basis run out of one physical location, but content on their site or application still needs to travel over wires over the entire world. For example, if a websites server is based in New York, the people in Miami will get the content faster as compared to people in China, to overcome the frustration of the users and to avoid latency issues, content delivery network was brought into the picture. With LTE providing throughput speeds like high speed internet access - the demand for mobile live streamed HD video has increased.

We will see how by using cloudinary which makes use of CDN we can improve the bandwidth and quality of the image. This article will describe on how we can work in the future and expand our scope on time metric and price hurdles concerned with CDN providers and users.

KEYWORDS: Content Delivery Networks (CDN), Video and Audio Streaming, Image Resizing.

I. INTRODUCTION

Web has evolved as a major source for exchanging data and services. It is now, not only a mean for accessing information, rather it is becoming a stage for business and society. Nowadays, constant improvement in the bandwidth of Internet infrastructure, for example, the availability of lightening last mile connection of the subscribers to the Internet and the mainstay fibres, as well as the increasing capacity of the different servers would lessen or eliminate the access delay problem. Majority of our activities in life are moving online, and web users are growing at an enormous pace. With the growing number of web users and services, retrieval of information from the web is posing various challenges such as latency, network gridlock, security and reliability problems Also, the internet users are no longer submissive limited; rather they have actively begun to contribute to the web. They are creating web contents by posting on social networking sites, shopping, tweeting, etc.

Content Delivery Networks (CDNs) has emerged as an important medium to overcome the intrinsic limitations of the Internet in terms of user perceived Quality of Service when accessing Web content.One of the common misconstruction about getting a CDN is that you don't need a web hosting. We indeed need it, since a CDN only helps upgrade your website. When you use a CDN our content exists on multiple servers, which causes the users to receive the data smoothly even when bandwidth is limited, or web traffic has spiked. The replica servers in a CDN store a very particular set of content and only the demanded requests for that set of content are provided by the CDN so that the hit ratio can reach 100%. This in fact implies that CDN can present short access delay and consume fewer network bandwidth. To provide flexibility to the system it is recommended that in the event of a content delivery failure condition being detected, requests may be satisfied from another cache of the content distribution system.The main aim is to explore the unique features of CDNs from similar and to provide a basis for categorizing present and future development in this area.

The typical functionality of a CDN includes:

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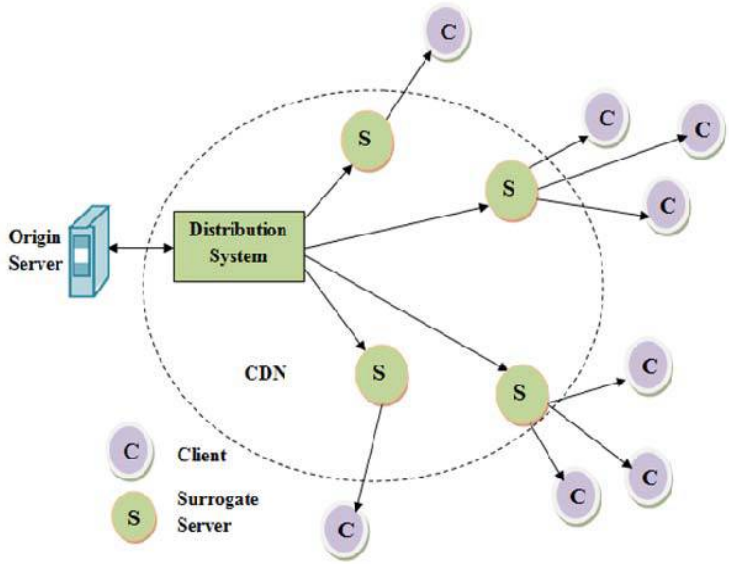
- Request redirection and content delivery services to direct a request to the closest suitable surrogate server using mechanisms to bypass congestion, thus overcoming flash crowds or Slashdot effects.
- Content outsourcing and distribution services to replicate and/or cache content to distributed surrogate servers on behalf of the origin server.
- Content negotiation services to meet specific needs of each individual user (or group of users).

II. PREVIOUS WORK

A Content Delivery Network (CDN) provider must cope with varying customer demands, assure acceptable quality of experience and run a profitable business model.
Muslim Elkotob and Karl Anderson proposed the rising demand for CDN and the aspect of dealing with the efficient ways that need to be proposed to overcome high cost hurdle and quality of experience level by using optimize service paths for video streaming platforms and major business model types.

III.SYSTEM ARCHITECTURE



The basic working of CDN is as follows:
1. Origin server provides the contents to be replicated to the Distribution System.
2. The Distribution System replicates the contents on surrogate servers and also maintains the consistency of data at the surrogate severs.
3. The Distribution system provides the information about replication to request routing system to help in surrogate server selection for redirecting end-users requests.
4. The end users request for the contents is directed to Request Routing System.
5. Request Routing System redirects the request to suitable surrogate server. This process is transparent to end-users.
6. The surrogate server is chosen to satisfy the end-users request on the behalf of the origin server.
7. Log data is transferred to Accounting System using these surrogate servers
8. Accounting System aggregates this information for use by the origin server and for billing purpose according to the agreement with content provider.

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9. Origin server uses this aggregated information for decision about that which contents should be replicated and where to further improve web performance as well to maintain the cost factor.

IV. IMPLEMENTATION

- I have shown the comparison between the traditional approach of sending content over the network with the one that makes use of CDN.
- Giving an example of loading an image from the internet I have written an HTML code where I have included links of three images and the other code where I have called the same three including CDN from the website Cloudinary.com which makes use of Java Plugins.
- I have recorded the time it takes to achieve the image on the user end, also the image quality inspite of low resolution matches the one with the original image.
- Also, I have included an example of one image in our screenshot to show how we can make adjustment to the image size dynamically and still preserve its quality.
- Then by including the URL in our code we can directly call the images.

Traditional Approach or Code to download an imageCode to download an image using CDN

```
<html>
<body>
<div class ="container">
<h1>Responsive images</h1>

<hr>
<h2>Nice image grid</h2>
<div class="row">
<div-class="col-sm-6 col-xs-12">
<a href ="#" class ="thumbnail">
<img  src-"image1.jpg">
</a>
</div>
<div-class="col-sm-6 col-xs-12">
<a href ="#" class ="thumbnail">
<img  src="image2.jpg">
</a>
</div>
<div-class="col-sm-6 col-xs-12">
<a href ="#" class ="thumbnail">
<img  src="image3.jpg">
</a>
</div>
<script src="../js/jquery.cloudinary.js"> </script>


</body>
</html>
```

```
<html>
<body>
<div class ="container">
<h1>Responsive images</h1>

<hr>
<h2>Nice image grid</h2>
<div class="row">
<div-class="col-sm-6 col-xs-12">
<a href -"#" class -"thumbnail">
<img  src="http://res.cloudinary.com/druoqc2oc/image/upload/v1512246312/image1_b1orhr.jpg">
</a>
</div>
<div-class="col-sm-6 col-xs-12">
<a href ="#" class ="thumbnail">
<img  src="http://res.cloudinary.com/druoqc2oc/image/upload/v1512246260/image2_wzhbot.jpg">
</a>
</div>
<div-class="col-sm-6 col-xs-12">
<a href ="#" class ="thumbnail">
<img  src="http://res.cloudinary.com/druoqc2oc/image/upload/c_scale,h_516,w_466/v1512246251/image3_wgj8le.jpg">
</a>
</div>
<script src="../js/jquery.cloudinary.js"> </script>


</body>
</html>
```

Image resizing to improve speed and bandwidth issues

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V. SOLUTIONS PROPOSED AND RESULTS

Important CDN Metrics

We have discussed the area in which CDN can grow and improve in the future. After diving in some topics from the papers that I went through.Since video files have a varying range of length, and since routing over the core network could take place in multi-path mode for better load balancing and network utilization, defining a generic metric which reflects CDN video transport time is practically impossible. Therefore, to introduce a web-server metric is the "Time to first byte" and this will help the providers to track the time it will take right from the request has in CDN network has been initiated till the desired data is play-ready on user terminal."This will create a benchmark and a Service Level Agreement between the CDN providers and its users the TTFB will be taken into consideration.In CDN networks, packet size and stream encoding and bundling are key features for link shaping and network performance modelling in both the access part and the core part.

Graph to show the Internet Traffic using CDN

"The CDN market had evolved rapidly over the last decade with CSPs, Internet Players/Content Providers (like Google, Yahoo, Microsoft etc.) and even new Pure-play CDN providers (like Akamai, Limelight, Level 3, CDN

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Networks etc.) all building their own content distribution networks. As per Cisco 2014 VNI, more than 55% of total Internet traffic will be CDNized by 2018."
As we have seen in the graph above how the Internet traffic has grown with a span of 5-6 years, and the Exabytes per month that has spiked is clearly seen.
For example, for every 1 second of improvement to load time, Walmart site experienced a 2% increase in conversions.

VI. CONCLUSION AND FUTURE IMPROVEMENT

Future Improvement

A few recommendations for improvement are as follows:

- Be able to distinguish between popular cached content and less popular content that takes longer to buffer and stream.
- Simulate larger LTE networks with more phones and more towers, so we can have better efficiency for video traffic and bandwidth control.
- Create more accurate models of the CDN servers and the links.

Conclusion

My project explores the difference in the images/video quality even after reducing the resolution and the issues that have been resolved after using CDN with respect to the bandwidth issue and downloading speed. The ever-increasing demand for video content is accelerating the deployment of CDNs globally and is resulting in the flattening of the internet We have supported the authors idea of introducing time metric to track the CDN network routing path as well as to create mutual understanding among the stakeholders and content network providers to make it cost friendly for users. The more distributed a CDN is – the better it performs. This mass deployment of CDNs is critical to lower bandwidth and delay. This in turn improves the user's overall video experience.

REFERENCES

[1] Niven-Jenkins Benjamin P, Burke Paul W, "Content distribution network", Jun 30, 2011
[2] Gang Peng, "Content distribution network" State University of New York at Stony Brook, Feb 2008
[3] Yufang Tang, Xueming Li, Yang Liu,"Distribution of content distribution network architecture "IEE, Oct 13,2013
[4] Al-Mukaddim Khan Pathan and Rajkumar Buyya, "A taxonomy and survey of content delivery network".
[5] Muslim Elkotob, Karl Andersson,"Challenges and Opportunities in Content Distribution Networks: A Case Study" IEEE,2012.
[6] Meenakshi Gupta and Atul Garg," Content Delivery Network Approach to Improve Web Performance: A Review", International Journal of Advance Research in Computer Science and Management Studies, December 2014.
[7]https://kshahzadblog.wordpress.com/2015/03/08/how-nfv-impacts-content-delivery-strategies-of-telcoscsps/