An introduction to cloud based content delivery networks

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By 2020, it is estimated that 44 zetabytes of digital data will be created. Out of all internet traffic, almost 80% traffic will comprise of video by the end of this year.

These numbers provide us insight into the internet of the near future. The users or consumers expect fast, reliable connectivity in every corner of the globe.

Due to these requirements, any application must provide scalability, better Quality of Service, better interactivity and security.

To fulfill these requirements, Content Delivery Networks (CDN) were designed. There are some problems associated with CDNs. They are as follows -

1. To provide content, application owners or content creators must rely on a third party CDN provider like Akamai. The performance is based on the infrastructure available with that vendor in a particular geographical area.

2. The CDNs are useful for hosting static content. As more and more applications are going on the interactive mode, the CDN's inability to support content causes a lot of troubles.

3. The content provider has to depend on the third-party CDN vendor to monitor and regulate the performance of the service provided to the end-user.

4. CDNs do not allow content personalization. The ability to measure end-user's behavior, usage pattern is important to better fulfill the performance requirements.

As all these points speak against the CDN, a solution has been designed by few cloud computing providers.

It is Cloud based CDN. In this combination, cloud computing is used in conjunction with CDNs to solve the problems of CDN.

Typical infrastructure of a cloud based CDN consists of following components -

1. Origin server - Similar to CDNs, this server consists of all the content as well as metadata. It acts as a master and controls the distribution functionality. Based on user requests, it starts new slave or POP servers in different geographical locations.

2. POP servers - These are fired up and controlled by origin servers. They get their data from the master based on the user request.

There are lot of advantages of Cloud based CDN(CCDN) over generic CDN -

1. CCDN utilized the principle of economy of scale. The content generator or application owner pays according to the usage. There is no initial investment in hardware.

2. CCDN allows a virtual infinite supply of bandwidth, storage and other resources. As the content provider can use as many servers as available, it can be considered to be inexhaustible.

3. CCDN allows flexibility in terms of storage, required bandwidth, QoS and expected load.

4. CCDN contains cloud computing infrastructure, hence the application owners can use storage, distribution as well compute capabilities of cloud.

CCDN in this way offers a more economical way of hosting and deploying multi-tiered applications which are scalable to the ever changing user needs.

The following services are currently available which provide CCDN capabilities -

1. Amazon CloudFront - It is content distribution coupled with Amazon Elastic Cloud Compute service. It supports static as well as dynamic content. It uses Amazon S3 for storage. It uses URL pattern matching to find the nearest server. The ability to use any of the Amazon cloud services is one of the biggest advantages. It offers pay-as-you-go model. Amazon has approximately 32 CDNs which is not so efficient when it come to distribution.

2. Rackspace Cloud Files - This provides virtually unlimited and on-demand cloud storage. It offers high-speed content delivery. It uses pay-as-you-go model. It uses Akamai CDN for distribution, Akamai has approximately 219 CDNs making this one of the best services in CCDN category. It provides OpenStack for file storage functionality.

MetaCDN, LimeLight, MediaWise are some other service providers.

Conclusion -

Content Distribution Networks are the backbone of today's internet. There are few shortcomings of these distribution channels. To overcome those, cloud computing infrastructure is integrated with CDNs.

Few cloud vendors have started offering services in CCDN. They have lot of advantages over CDNs.

There is still research going on and few complexities are being worked on.

**Road Ahead**

The ability to deal with static as well as dynamic content generation needs to be worked on. As more and more applications go towards enhanced user interactivity, this will be the most important feature.

The end-user expects to create content; that facility should be made available through CCDN.

The application owner should be able to use more than one CDN, for example Akamai has more than 200 edge servers, on the other hand, Amazon has less than 50. The ability to combine and use services of two or more different vendors will help improve QoS drastically.

The security and privacy of the content is a major concern. All doubts regarding the data privacy should be alleviated.