Content Delivery Networks – A Survey

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Abstract — Content Delivery Network is a network of servers hosted by a service provider in multiple locations of the world so that the content could deliver from a server that is nearest to the consumer requesting for it. It has evolved to overcome the inherent limitations of the internet regarding user perceived Quality of Service (QoS) when accessing the Web Content. It has been proposed to maximize bandwidth, improve accessibility and maintain correctness through content replication. The content is distributed to cache servers and located close to the users, resulting in fast, reliable applications and web services for the users. In this paper we provide a components, technologies and comprehensive taxonomy with a broad coverage of CDNs regarding the organizational structure, content distribution mechanisms, request redirection techniques, and performance measurement methodologies.

Keywords — Peer-to-Peer, Nodes, Architecture, Request Routing, Content Networks, Technologies, Components

I. INTRODUCTION

A content delivery network or content distribution network is a geographically distributed network of proxy servers and their data centers. The goal is to distribute service spatially relative to end-users to provide high availability and high performance. Content Delivery Network serve a fraction of the internet content today, including web objects, downloadable objects, applications, live streaming media, on-demand streaming media, and networks. Content Delivery Network spanning the different types of content delivery services: video streaming, software downloads, the web and mobile content acceleration, licensed/managed Content Delivery Network(CDN), transparent caching, services to measure CDN performance, load balancing, multi-CDN switching & analytics and cloud intelligence. It consists of two components: origin server and cache server. The origin server distributes the content over the internet and cache server duplicates the content. One origin server and many cache servers so that, when a consumer is requesting a particular content on the internet, content delivery network can be served by a cache server nearest to the geographical location if the content is available there.

II. ARCHITECTURE AND TECHNOLOGIES

Content delivery network replicating content on multiple servers in the internet and providing clients to determine the server to deliver the content. It consists of original server together with one or more distribution server called surrogate servers. Surrogate servers are periodically update the data and used to store static data while dynamic information. Content delivery network architecture are classified in the form of publisher, authorize, report, origin, data, request, deliver and subscriber. Content publishers is the network service provider to focus on the services of the network and gives the permission to deliver particular data to the authorizer, authorizer generate the report on the network and copy the original data to deliver the subscriber. Subscriber requests the content from delivery network to publisher. Functions of content delivery network; storage capacity, file servers, distribution of content, redirection of domain name systems delivery of broadcast or multicast streaming, content delivery, content routing and performance measurement. The Fig.1 illustrates the relationship between these components and the technologies that are used to offer content delivery network services.

A. Technologies in Content Delivery Network

A.1. Content Routing

The content delivery network of routing concepts to deliver the content from common place to the client request, after the deciding the place, several metrics to be effect on it. The metrics of content delivery networks are; network proximity, geographical proximity, and response time. The network proximity is derived from the routing tables of border gateway protocol, geographical proximity used to redirect the user within a certain region of post office protocol and response time maintain knowledge post office protocol. e.g., paying customer gets access to better service than non-paying. The user information could be based upon a cookie retrieved from the client system, or an authentication process.
A.2. Content Delivery
The content delivery component deals with the workflow and handling of the content from encode the process. To deliver the content from encoding the optimizing content and to deliver the end-user. The content is in the form of pictures, word documents, and software, audio and video data. Live content is the specialized form of content delivery network and also applicable for other types of data.

A.3. Performance Measurement
The component of performance measurement to monitor, understands, and end-to-end performance of the project in content delivery network. The performance measurement is to achieve the combination of hardware and software-based to distribute around the network as well as log the various servers. The performance measurement is to be performing the various contents to deliver of all types of content: i.e., documents, streaming of audio and video data and Web-based content.

III. RELATED WORK
3.1 Approaches to Building Content Delivery Networks
Content delivery network is specified in the form of two approaches; overlay model and network model. The overlay model is replicate the content to thousand of server and the network model to deploy the routers and switches, recognize the application types. These approaches include the devices that redirect content requests to local centres’ to specific servers to optimize the content types. Example of network based approach is the multicast internet protocol optimizes the delivery of specific content types and content delivery network use the overlay model to build to deliver of content to a distributed data. Some content delivery designs use both the network and overlay approaches, network infrastructure contains network transport components, such as IP routing, QoS, Multicasting and BGP peering.

3.2. Techniques in Content Delivery Networks
Content Delivery Networks techniques can be divided into 3 categories of Network Optimization Techniques, Content Optimization techniques and Cross Domain techniques

3.2.1 Network Optimization Techniques
Network optimization techniques are used for improving network performance, to enhance the robustness and effectiveness of data transmission but wireless networks does not perform the transmission control protocol.

3.2.2 Content Optimization Techniques
Content optimization techniques, is the concept of delivering the content and it mainly focus on solving the problem of content availability and reducing latency. This technique mainly focus on reduce the data volume over mobile networks.

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3.2.3 Cross Domain Techniques

Cross domain techniques can be classified into content adaptation techniques and protocol adaptation techniques, and this techniques interactions between content or application. Implementation of these techniques requires knowledge of mobile devices.

3.3. Components in Content Delivery Networks

A CDN focuses on building its network infrastructure to provide the services and functionalities. These services specify the some components, of delivery nodes, storage nodes, origin nodes and control nodes. Fig.2 shows the general architecture components of CDN systems

1) Delivery nodes – the delivery nodes is to delivery of data and its perform acquire/ share the data
2) Storage nodes – storage nodes to replicate the content or data and it’s perform acquire from on-net storage data. These nodes can also be used where pre-publishing of content is required rather than content being acquired on demand from origin servers.
3) Origin nodes – origin nodes are master sources for content and publish the content to the storage nodes, acquire from the external origins to the storage nodes.
4) Control node - control nodes is to perform the reporting, billing and network operations, and manage the delivery nodes & storage nodes. Redirect or request the operations from other components.

![Fig.2 Components of CDN](image)

IV. CONCLUSION

In this survey, we have presented the overview of content delivery networks. Studying the various network obstacles of technologies, components, techniques, architecture, and approaches of the content delivery network have been presented. In this paper can be useful for improving mobile networks. In proposed method, various algorithms can be implemented. Content Delivery Network is an overlay network which aims at efficiently delivering content.

REFERENCES