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Impact Analysis of Localization of DNS For High Performance Computing

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Abstract: DNS was made with two diverse engineering parts known as name servers and resolvers. They made a name space in which passages were case-obtuse, and the name space was made utilizing a tree-like structure. This took into consideration associations to see themselves as roots and be in charge of their own nearby name spaces, while keeping the structure sufficiently basic that there was comprehension of how top level root (organizations) servers could speak with one another. DNS made the thought of zones, which was an adjacent area of the name space, and the utilization of reserving to recover usually utilized records all the more rapidly and effectively. In this paper review on DNS for high performance computing is presented. The author of this paper portrays the procedure which was utilized to add to the first DNS. They clarify that the naming frameworks: HOSTS.TXT, XEROX and Clearinghouse.

Keywords: DNS, Name Server, Resolver, High performance computing.

I. INTRODUCTION

The role of Domain Name System (DNS) is to convert the user friendly domain names to unique IP addresses The domain name system (DNS) is a distributed database and provides name resolution service to the internet users. Distributed database Of DNS allows local control of the segments of the overall database, yet data in each segment are available across the entire network through a client−server scheme. Name resolution means to translate the easily memorable domain names to the numerical IP addresses needed for the purpose of locating computer services and devices worldwide. By providing a worldwide distributed database for name resolution, DNS is an essential component of the functionality of Internet. For human beings it is not easy to remember IP addresses therefore, DNS provides the mechanism of translating the easily memorable host names into IP addresses. There are different methods to resolve this problem.

The equipments used in computer network are very fast and research is continuously done to improve their performance by reducing the network latency so that the user can browse web pages fast and easily. Using the bandwidth in efficient manner is also the main concern. It is the responsibility of network administrator to design and implement the network carefully. A network is said to be efficient if it is reliable, fast, and robust and meets user requirements within the budget.

i) Host file: In this method a file named as HOSTS.TXT is created to resolve the IP addresses. A single file, HOSTS.TXT, contained all the information which user needed to know about those hosts or computers: it held a name−to−address mapping for every host connected to the internet. This method was used effectively during the initial phase of Internet. The HOSTS.TXT is maintained manually and is also known as manual conversion tables.

ii) DNS: The system of conversion tables requires manual updating of the tables for all computers when an addition or modification of a machine name is done. Therefore, it becomes very difficult to add IP addresses manually when internet is having billion computers. DNS provides a management system for names which is hierarchical and easier to administrate. Domain Name System (DNS) was developed in November 1983 by Paul Mockapetris. Domain Name System (DNS) provides the automatic mechanism for mapping the IP addresses into host name. DNS serves as a phone directory of internet. Unlike a phone book DNS can be updated quickly.

In the present study, a campus wide network is designed in a fashion so that it can be used for secured computing as well as high bandwidth availability of network for parallel computing. There will be a practical implementation of the DNS in a private network for high performance computing using open source.

II. RELATED WORK

This research discovers that a long bandwidth is not able to send or share proper data in parallel system. There are a lot of algorithms and related working platforms are available to describe the parallel processing system. Some related working algorithms are described bellow:-

A. DNS Corporate Network Bandwidth)

First, Mohit Dhawan et al (2013) studied the impact of Local DNS on corporate network bandwidth. Performance enhancement of internet and effective use of bandwidth has been a major concern for researchers in the field of computer networks. In this study concept of having a local DNS in the network is used so that impact of Local DNS on the bandwidth can be studied. In this study, Network Simulator (NS2) is used to analyze the behavior of network when local DNS is used. Two different scenarios are created in the simulation one without local DNS and the other having local DNS. NS2 traces the flow of packets and generates graphs, from which impact of local DNS is studied. [1]

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B. Experimental facts with results

The Ananya Tripathi et al (2011) presents an experimental study of DNS performance by the evaluation of a DNS server performance in the experimental backgrounds to establish the fact that frequent caching of results will improve the response time of the queries. It also simulates the client –server DNS model on OPNET. It thus proposes a performance-enhancing model for its better throughput keeping in mind, the various execution measures of DNS server like parallel requests, traffic distribution and least response time, which were tested on the DNS server. [4,5, 6]

Ridhi et al (2013) analyzed the performance characterization of DNS relay in geographically distributed LAN. In the present study, an attempt is made to study the effect of relay DNS over the distributed LAN or WAN. The caching of the DNS in the local server is effective in handling the repeated request which is meant for the local domains and virtual private network having dedicated bandwidth to access the central services. This proposed design of the geographical distributed network will be quite effective and responsive to the queries from the local computers.[7]

C. Critical part of the Internet's infrastructure

Pang et al (2004) studied The Domain Name System (DNS) as a critical part of the Internet's infrastructure, and one of the few examples of a robust, highly scalable, and operational distributed system. Although a few studies have been devoted to characterizing its properties, such as its workload and the stability of the top-level servers, many key components of DNS have not yet been examined. Based on large-scale measurements taken from servers in a large content distribution network, it presents a detailed study of key characteristics of the DNS infrastructure, such as load distribution, availability, and deployment patterns of DNS servers. Our analysis includes both local DNS servers and servers in the authoritative hierarchy. It is found that (1) the vast majority of users use a small fraction of deployed name servers, (2) the availability of most name servers is high, and (3) there exists a larger degree of diversity in local DNS server deployment and usage than for authoritative servers. [8] Furthermore, we use our DNS measurements to draw conclusions about federated infrastructures in general. It evaluates and discusses the impact of federated deployment models on future systems, such as Distributed Hash Tables.

D. DNS sustained phenomenal growth

Pappas et al (2004) studied that during the past twenty years the Domain Name System (DNS) has sustained phenomenal growth while maintaining satisfactory performance. However, the original design focused mainly on system robustness against physical failures, and neglected the impact of operational errors such as misconfigurations. Recent measurement effort revealed three specific types of misconfigurations in DNS today: lame delegation, diminished server redundancy, and cyclic zone dependency. Zones with configuration errors suffer from reduced availability and increased query delays up to an order of magnitude. Furthermore, while the original DNS design assumed that redundant DNS servers fail independently, measurements show that operational choices made at individual zones can severely affect the availability of other zones. It was found that, left unchecked, DNS configuration errors are widespread, with lame delegation affecting 15% of the DNS zones, diminished server redundancy being even more prevalent, and cyclic dependency appearing in 2% of the zones. It was also noted that the degrees of misconfigurations vary from zone to zone, with most popular zones having the lowest percentage of errors. Our results indicate that DNS, as well as any other truly robust large-scale system, must include systematic checking mechanisms to cope with operational errors. [2]

Park et al (2004) introduced CoDNS, a lightweight, cooperative DNS lookup service that can be independently and incrementally deployed to augment existing name servers. It uses a locality and proximity-aware design to distribute DNS requests, and achieves low-latency, low-overhead name resolution, even in the presence of local DNS name server delay/failure. Using live traffic, this paper show that CoDNS reduces average lookup latency by 27-82%, greatly reduces slow lookups, and improves DNS availability by an additional ’9’. This article also show that a widely-deployed service using CoDNS gains increased capacity, higher reliability, and faster start times.[3]

Ananya Tripathi et al (2011) defined DNS is a framework utilized for naming PCs and system administrations. This framework is composed into a various leveled plan of areas. Naming administration gave by DNS is utilized as a part of TCP/IP systems, for example, the Internet, to effectively find PCs and administrations like mail exchanger servers, through easy to understand names. At the point when a client enters a DNS name in an application, DNS administrations determines this name to other data connected with the name, for example, an IP address. This paper displays the assessment of a DNS server execution in the trial foundations to build up the way that regular storing of results will enhance the reaction time of the inquiries. It additionally recreates the customer –server DNS model on OPNET. It along these lines proposes an execution improving model for its better throughput remembering, the different execution measures of DNS server like parallel solicitations, activity dissemination and minimum reaction time, which were tried on the DNS server.[6]

E. DNS component to convey substance to end clients

Balachander et al (2001) studied Content appropriations systems (CDNs) are a component to convey substance to end clients for the benefit of source Sites. Content appropriation offloads work from starting point servers by serving a few or the greater part of the substance of Web pages. We found a request of greatness increment in the number furthermore, rate of prominent root locales utilizing CDNs between November 1999 and December 2000. In this paper we examine how CDNs are usually utilized on the Web and characterize a system to concentrate how well they perform. An execution study was led over a period of months on an arrangement of CDN organizations utilizing the strategies of DNS redirection and URL modifying to adjust load among their servers. Some CDNs for the most part give better results than others when we look at results from a set of customers. The execution of one CDN organization plainly enhanced between the two testing periods in our study due to a sensational increment in the quantity of particular servers utilized in its system. All the more for the most part, the outcomes show that utilization of a DNS lookup in the basic way of an asset recovery improves server decisions being made in respect to customer reaction time in either normal on the other hand most pessimistic scenario circumstances. [9]

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III. FORMULATIONS

Every PC in a network is identified by the unique Internet Protocol address (called IP address). High performance computer is connected with powerful computer node, which participates in the large calculations of the problem. It requires immediate resolving of the IP address for better performance of the network and overall computation time. The total computation time also include the communication time between the nodes.

Using the bandwidth in efficient manner is also the main concern. It is the responsibility of network administrator to design and implement the network carefully. A network is said to be efficient if it is reliable, fast, and robust and meets user requirements within the budget.

A timely discussion and analysis of CDNs. We have used multiple data streams: active measurements obtained via repeated crawls over a period of time and passive measurements representing large number of users from different organizations. We have also analyzed content types commensurate with traffic patterns on the Web. The primary performance study has been repeated more than once. Using the results of our work we reexamine the research questions posed at the beginning of this paper.[9]

DNS Tunneling tools, providing both a testing environment and a brief and global analysis of the whole set of results. Such analysis allowed us to relate a relationship among values of the test metrics to a proper tool. Further work will regard the exhaustive and detailed analysis of the results and a behavioral analysis of the tools for intrusion detection and security purposes.

A detailed analysis of traces of DNS and associated traffic collected on the Internet links of the ERNET India Laboratory. Also, the DNS server was analyzed in an experimental background on OPNET, thus testing the performance of DNS from client's perspective.[6]

IV. CONCLUSIONS

Before, this paper establishes the fact that some of the reasons why the old naming systems weren't feasible for their new requirements. DNS is going to help the repetitive queries to master node to identified the slave nodes minimized and thereby increasing the available bandwidth for data transfer. Each of the features, they pose as part of the new DNS design, are generally explained, and they empathize certain things that are important, like the top level nodes in the name space corresponding to the country. All the papers which have been studied include immense research efforts to improve DNS model some in case of traffic and other in case of configuration. This helps built up an enhanced model for the DNS, which utilizes successive reserving.

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