Design and Construction of Smart DNS System Based on Distributed Smart Router and Cloud

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With the rapid development of video streaming, gaming, and other data consuming services, the demand for low latency, low packet loss, and high internet bandwidth has constantly been increasing. Paying the Internet Service Provider for more bandwidth has been a standard solution to satisfy this high demand, while sometimes the true problem lies within the DNS system. Major websites and content distributors build servers worldwide to meet demands mentioned above. However, the current DNS system only returns a few IP address of the servers, but they are not necessarily the best ones. This project focuses on coming up with a new concept and solution by changing the DNS behavior to improve user experiences. This project develops a smart DNS system that consists of SmartDNS Servers and multiple distributed SmartDNS Router Clients. The Smart Router Client optimizes for the muti-server system by requesting a list of IP addresses of each domain from SmartDNS Servers, testing the latency and stability of each server, and choosing the best server for its user at any given time based on the results. The Smart DNS Router Client would also automatically collect new IP addresses of domain names for the SmartDNS Server to benefit others. Experimental evaluation of the SmartDNS system shows an average of 30% decrease in latency, 50% decrease in packet loss, and 20% increase in bandwidth. This project provides a possible direction to improve the future generation of the DNS.

Awards Won:

Association for Computing Machinery: Fourth Award of $200