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Overlay Routing Attempt towards Nontrivial Estimation Algorithm to Exhibit BGP Routing TCP Performance and VoIP Applications

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Abstract: ***In current trend overlay routing is a very striking scheme that allows improving important properties of the routing such as delay or TCP throughput without changing the standards of the current underlying routing. Overlay routing was used to recover TCP performance over the Internet, where the main idea is to break the end-to-end feedback loop into smaller loops. These focus all nodes performance capability using TCP Piping which would be present along with the route at relatively small distances. Considering BGP based shortest-path routing over the Internet, query is mapped to minimum number of relay nodes that are needed in order to make the routing between a groups of Autonomous Systems. The main attempt of this paper follows three continual phases of evaluation. First phase deals with development of a broad algorithmic framework that can be used with efficient resource allocation in overlay routing. Second phase extend a nontrivial estimate algorithm and prove its properties. Final phase exhibit the actual benefit one can gain from using our proposal in three sensible scenarios, namely BGP routing, TCP improvement, and VoIP applications.***

Keywords: Autonomous systems, BGP, VoIP applications, TCP piping, overlay routing

1. Introduction

An overlay network is a virtual network of nodes and logical links that is built on top of an existing network with the purpose to implement a network service that is not available in the existing network. Overlay networks allow both networking developers and application users to easily design and implement their own communication environment and protocols on top of the Internet, such as data routing and file sharing management.

2. Literature Survey

On Improving Dynamic Stochastic Routing Algorithms in Overlay Networks by Chengwei Zhang et al [1] exposed a stochastic Routing algorithm to determine the detours or relay paths between a pair of end-to-end nodes for performance enhancement by taking the stochastic properties of the overlay links. The simulation results show that the proposed stochastic routing algorithm outperforms other algorithms in various network scenarios in reducing packet loss and average delay.

Node Placement Analysis for Overlay Networks in IoT Applications by Yuxin Wan et al [2] describes that Internet of Things (IoT) has been regard as the future of internet and one of the key trends in order and communication technologies. The key idea of IoT is combining identification and communication technologies to provide a better description of physical processes.

Load-Balanced One-hop Overlay Multipath Routing with Path Diversity by Jingyu Wang et al [3] expressed that Overlay routing has emerged as a promising approach to improve reliability and efficiency of the Internet. For one-hop overlay source routing, when a given primary path suffers from the link failure or performance degradation, the source can reroute the traffic to the destination via a strategically placed relay node.

Cost-Effective Resource Allocation of Overlay Routing Relay Nodes Rami Cohen et al [4] added their contribution in Routing. According Cohen et al Overlay routing is a very attractive scheme that al-lows improving certain properties of the routing (such as delay or TCP throughput) without the need to change the standards of the current underlying routing. However, deploying overlay routing requires the placement and maintenance of overlay infrastructure.

Network Information Flow Yeung, R.W. Study identified the problem with one information source, and they have obtained a simple characterization of the admissible coding rate region. Author registered their result using max-flow min-cut theorem for network information flow. Contrary to one's intuition, their work reveals that it is in general not optimal to regard the information to be multicast as a “fluid” which can simply be routed or replicated.

How Good Is Random Linear Coding Based Distributed Networked Storage by Ralf Koetter et al [6] states the framework consideration in multiple storage locations, each of which only have very limited storage space for each file. Each storage location chooses a part of the file without the knowledge of what is stored in the other locations.

A High-Throughput Overlay Multicast Infrastructure with Network Coding by Mea Wang et al [7] recently proposed information theory as a new dimension of the information multicast problem that helps achieve optimal transmission rate or cost. End hosts in overlay networks are natural candidates to perform network coding, due to its available computational capabilities.

Polynomial Time Algorithms for Multicast Network Code Construction by Jain et al [8] expressed famous max-flow min-cut theorem which states that a source node 's' can send information through a network (V, E) to a sink node 't' at a rate determined by the min-cut separating 's' and 't'. Recently, it has been shown that this rate can also be achieved for multicasting to several sinks provided that the intermediate nodes are allowed to re-encode the information they receive.

3. Implementation

The form First Service Provider get an IP address to make communicate, subject of message and a message to transform from First Service Provider (refer fig 1) to the Main Service Provider by clicking Transform button. The status will be showed as message transferred if message delivered else message failed. Browse option is to select a text document to store a message.

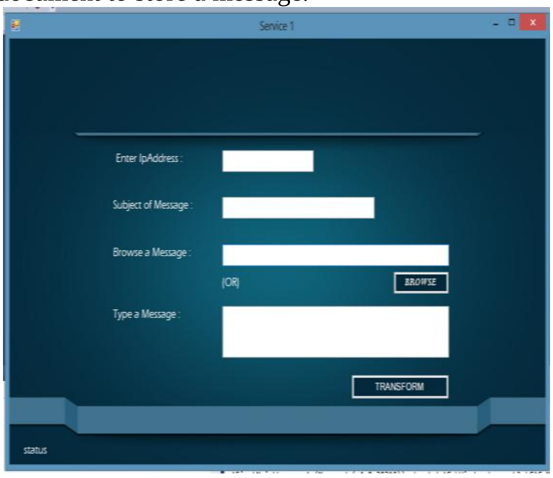

Figure 1: First Service Provider

The form Second Service Provider and the form Third Service Provider is similar to the form First Service Provider to get an IP address, subject of message and a message to transform from the Second Service Provider and the Third Service Provider to the Service Provider by clicking transform button. The status will be display as same in First Service Provider.

The Main Service Provider form uses centralized and distributed algorithm (refer fig 2) is to display the transforming subject and message of the First Service Provider, Second Service Provider and Third Service Provider .After receiving it, display the status as received. It displays waiting until it receives the data of the Service Providers.

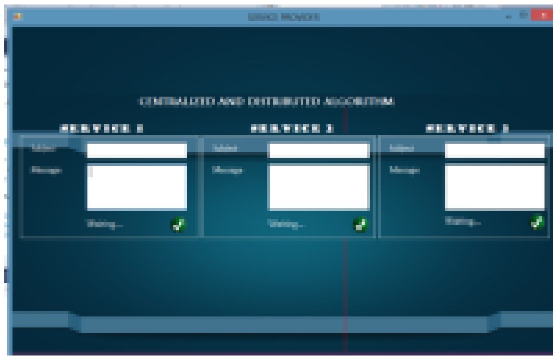

Figure 2: Service Provider

The co-operative transmission (refer fig 3) S and R is to show the network node while transforming the message from Client Services. The blue R represents initial node, Pink R Relay node, Green R Data Transmission node.

Figure 3: Co-operative Transmission

The RV indicate Roadside Vehicle, RR indicate Roadside Router, SR indicate Service Request, SP indicate Service Provider, RI indicate Region of Interest. While transforming message the initial node R and the relay node R will be blink to identify the data transmission node R. The synchronization chart (refer fig 4) of co-operative transmission represents the average response time in seconds of responses using number of requests schemes.

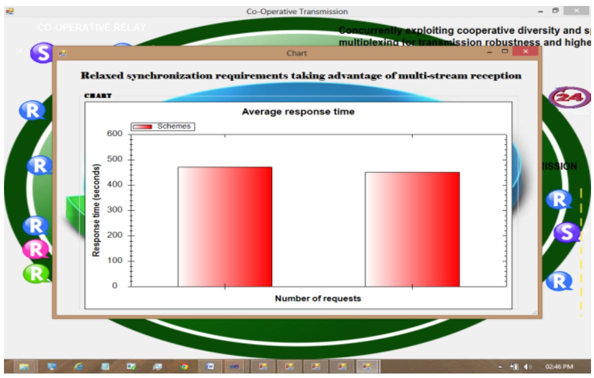

Figure 4: Synchronization chart

The capacity and reliability chart (refer fig 6) of co-operative transmission is to show the max and min lifetime of the capacity and reliability of requests.

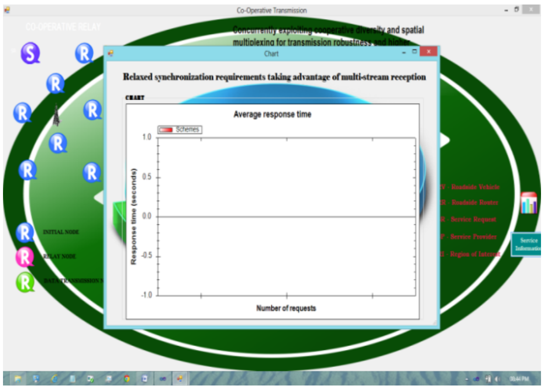

Figure 5: Scheme Chart

The security chart (refer fig 7) of co-operative transmission is to show the security range of the client requests and response of the server through reliability and capacity.

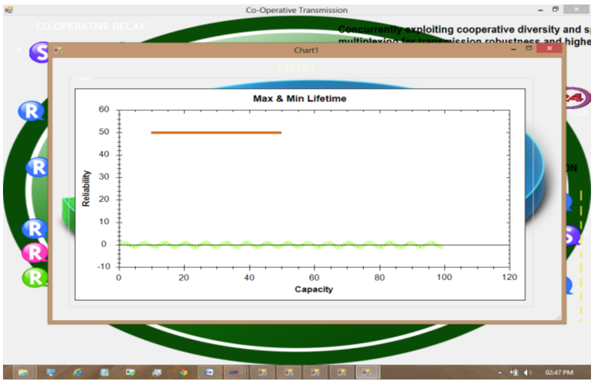

Figure 6: Capacity and Reliability Chart

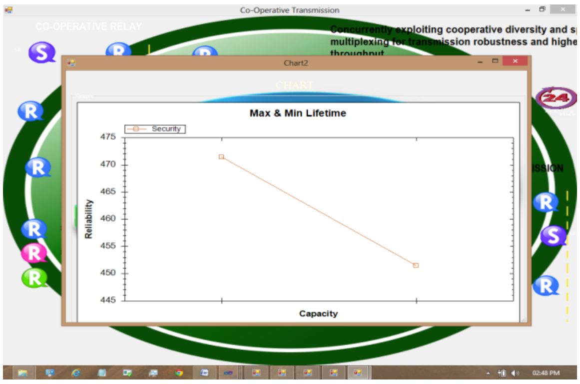

Figure 7: Security Chart

The Service table timer (refer fig 8) of co-operative transmission is to show the average and total time of requests and response

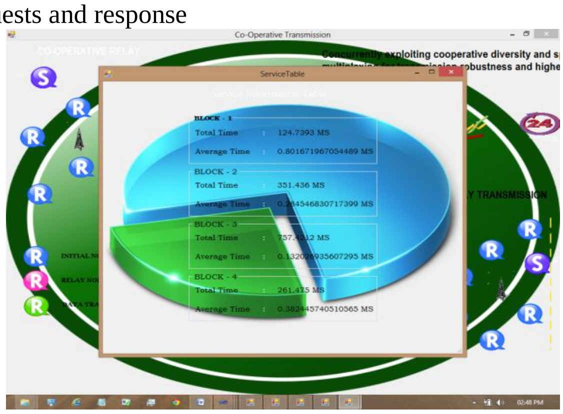

Figure 8: Service Table Timer chart

4. Conclusion

In this paper, we addressed the fundamental problem by developing an approximation algorithm to the problem. Rather than considering a customized algorithm for a specific application or scenario, we suggested a general framework that fits a large set of overlay applications. Considering three different practical scenarios, we evaluated the performance of the algorithm, showing that in practice the algorithm provides close-to-optimal results. Improving routing properties between a single source node and a single destination, then the problem is not complicated, and finding the optimal number of nodes becomes trivial since the potential candidate for overlay placement is small, and in general any assignment would be good. However, when we consider one-to-many or many-to-many scenarios, then a single overlay node may affect the path property of many paths, and thus choosing the best locations becomes much less trivial. For example, the one-to-many BGP routing scheme can be used by a large content provider in order to improve the user experience of its customers. The VoIP scheme can be used by VoIP services such as Skype, Google Talk to improve call quality of their customers. Many issues are left for further research. One interesting direction is an analytical study of the vertex cut used in the algorithm.

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