Performance of Different Routings in Online Environment

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Abstract–A recent trend in routing research is to avoid inefficiencies in network-level routing by allowing hosts to either choose routes themselves (e.g., source routing) or use overlay routing networks (e.g., Detour or RON). Such approaches result in selfish routing, because routing decisions are no longer based on system-wide criteria but are instead designed to optimize host-based or overlay-based metrics. A series of theoretical results showing that selfish routing can result in suboptimal system behavior have cast doubts on this approach. In this paper, we use a game-theoretic approach to investigate the performance of selfish routing in Internet-like environments based on realistic topologies and traffic demands in our simulations. We show that in contrast to theoretical worst cases, selfish routing achieves close to optimal average latency in such environments. However, such performance benefits come at the expense of significantly increased congestion on certain links. Moreover, the adaptive nature of selfish overlays can significantly reduce the effectiveness of traffic engineering by making network traffic less predictable.

***Keywords** – Source Routing; Detour; RON; Selfish Routing.*

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I. INTRODUCTION

FOR decades, it has been the responsibility of the network to route traffic. Recent studies have shown that there is inherent inefficiency in network-level routing from the user's perspective. In response to these observations, we have seen an emergent trend to allow end hosts to choose routes themselves by using either source routing or overlay routing these end-to-end route selection schemes are shown to be effective in addressing some deficiencies in today's IP routing. For example, measurements from the Detour project show that in the Internet, a large percentage of flows can find better alternative paths by relaying among overlay nodes, thereby improving their performance. Also demonstrates the benefits of overlay routing using real implementation and deployment. Such end-to-end route selection schemes are selfish by nature in that they allow end users to greedily select routes to optimize their own performance without considering the system wide criteria. Recent theoretical results suggest that in the worst case selfish routing can result in serious performance degradation due to lack of cooperation. In particular, Roughgarden and Tardos prove that the price of anarchy (i.e., the worst-case ratio between the total latency of selfish routing and that of the global optimal) for selfish routing can be unbounded for general latency functions. Despite much theoretical advance, an open question is how selfish routing performs in Internet-like environments. This is a challenging question because today's Internet is unique in the following respects.

II. LITERATURE SURVEY

The maladies of congestion collapse from undelivered packets and of unfair bandwidth allocations have not gone unrecognized. Some have argued that there are social incentives for multimedia applications to be friendly to the network, since an application would not want to be held responsible for throughput degradation in the Internet. Nevertheless, unresponsive UDP flows are becoming disturbingly frequent in the Internet, and they are an example that the Internet cannot rely solely on social incentives to control congestion or to operate fairly.

Some have argued that congestion collapse and unfairness can be mitigated through the use of improved packet scheduling or queue management mechanisms in network routers. For instance, per-flow packet scheduling mechanisms such as WFQ attempt to offer fair allocations of bandwidth to flows contending for the same link.

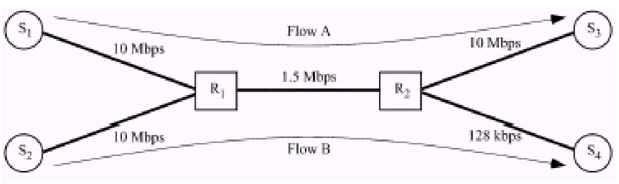


Fig. 1. Example of a network which experiences congestion collapse.

For illustration, consider the example shown in Fig. 1. In this example, two unresponsive flows (flow A and flow B) compete for bandwidth in a network containing two bottleneck links (- and -) arbitrated by a fair queuing mechanism at routers and, at the first bottleneck link (-), fair queuing at router ensures that each flow receives half of the link's available bandwidth (750 kb/s). On the second bottleneck link (-), much of the traffic from flow B is discarded due to the link's limited capacity (128 kb/s). Hence, flow-A achieves a throughput of 750 kb/s, and flow B achieves a throughput of 128 kb/s.Clearly, congestion collapse has occurred, because flow B's packets, which are ultimately discarded on the second bottleneck link (-), limit the throughput of flow A across the first bottleneck link (-). An allocation of bandwidth is said to be globally max-min fair if, at every link, all active flows not bottlenecked at another link are allocated a maximum, equal share of the link's remaining bandwidth [22]. A globally max-min fair allocation of bandwidth for the example shown in Fig. 1 would have been 1.372 Mb/s for flow A and 128 kb/s for flow B.

III. PROBLEM DEFINATION

A number of recent studies have reported that network-level routing is inefficient from the user's perspective. For example, Savage etaluse Internet measurements to show that the default routing path is often suboptimal in terms of latency, loss rate, and TCP throughput. The suboptimal performance of network- level routing is inevitable due to routing hierarchy and policy as well as different routing objectives used by network operators, whose goal is to avoid high utilization. Moreover, stability problems with routing protocols, such as BGP, could make things even worse. As a result, there has been a movement to give users more autonomy in choosing their routes by using source routing or overlay routing networks. The existing network level routing is used to send the packets from source to destination through router. The router which maintain the routing table and search the destination address in routing table if the destinations address available then the router send the packets to destination or else it send the packets to nearest router.

IV.ARCHITECTURE

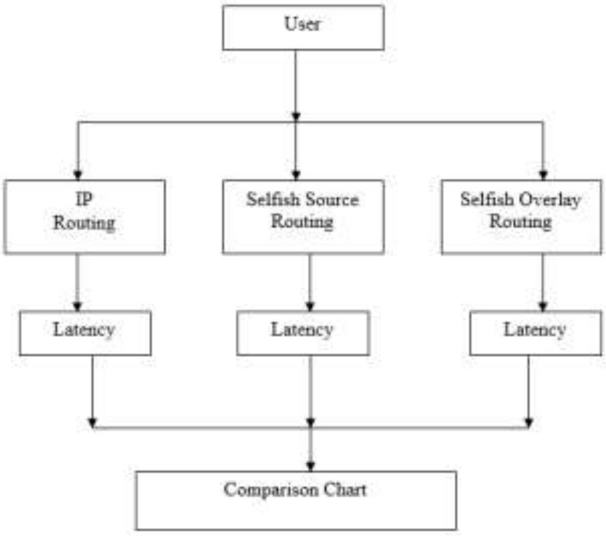


Fig. 1 Proposed work Architecture

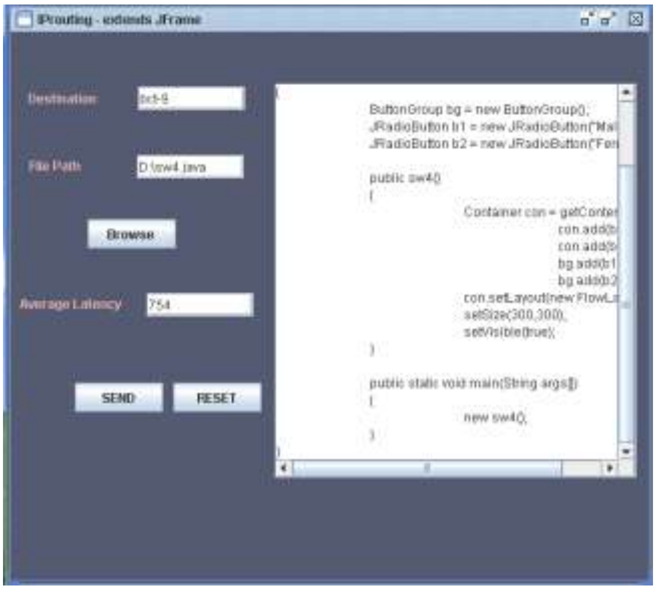
V. IMPLIMANTATION

This work on Selfish Routing in Internet-Like Environment is implemented as to evaluate the performance of selfish routing based on realistic topologies and traffic demands. Such performance benefits come at the expense of significantly increased congestion.

The main aim of this paper is to compare the performance of different routing schemes using realistic network topologies and traffic demands. In this paper, we use a game-theoretic approach to investigate the performance of selfish routing in Internet-like environments based on realistic topologies and traffic demands. Selfish routing achieves close to optimal average latency in such environments. However, such performance benefits come at the expense of significantly increased congestion on certain links. Moreover, the adaptive nature of selfish overlays can significantly reduce the effectiveness of traffic engineering by making network traffic less predictable.

VI. RESULTS

Fig. 2 Main Screen



Destination: bct-9

File Path: D:\sw4.java

Average Latency: 754

```
ButtonGroup bg = new ButtonGroup();
JRadioButton b1 = new JRadioButton("Mal
JRadioButton b2 = new JRadioButton("Fe

public sw4()
{
        Container con = getConte
                con.add(b
                con.add(b
                bg.add(b1
                bg.add(b2
        con.setLayout(new FlowL
        setSize(300,300);
        setVisible(true);
}

public static void main(String args[])
{
        new sw4();
}
}
```

Fig. 3 IP Routing Screen

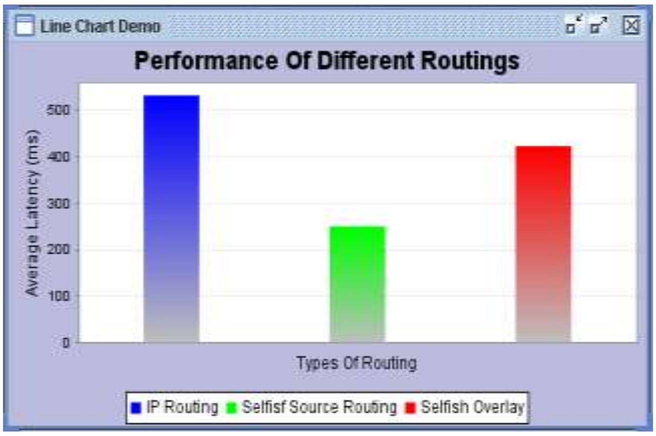


Fig. 4 Comparison Chart Screen

VII. CONCLUSION

In this paper, we use game theoretic approach to study the performance of selfish routing in internet like environments. Our results show that unlike the theoretical worst case, selfish routing in such environments achieves close to optimal average latency, when the network level routing is static. Moreover, compared with complaint routing (network level routing), selfish routing yields lower latency. This is true for both intra-domain and inter-domain scenarios. On the other hand, such performance often comes at the cost of overloading certain links. Moreover, when selfish routing and traffic engineering each tries to minimize its own cost by adapting to the other process, the resulted performance could be considerably worse.

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