AN OVERLAY ARCHITECTURE FOR THROUGHPUT OPTIMAL MULTIPATH ROUTING

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ABSTRACT

➢ Legacy networks are often designed to operate with simple single-path routing, like the shortest path, which is known to be throughput suboptimal. On the other hand, previously proposed throughput optimal policies (i.e., backpressure) require every device in the network to make dynamic routing decisions.

➢ In this paper, we study an overlay architecture for dynamic routing, such that only a subset of devices (overlay nodes) need to make the dynamic routing decisions. We determine the essential collection of nodes that must bifurcate traffic for achieving the maximum multi-commodity network throughput.

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➢ We apply our optimal node placement algorithm to several graphs and the results show that a small fraction of overlay nodes is sufficient for achieving maximum throughput.

➢ Finally, we propose a threshold-based policy (BP-T) and a heuristic policy (OBP), which dynamically control traffic bifurcations at overlay nodes. Policy BP-T is proved to maximize throughput for the case when underlay paths do no overlap. In all studied simulation scenarios, OBP not only achieves full throughput but also reduces delay in comparison to the throughput optimal backpressure routing.

EXISTING SYSTEM

➤ While the legacy nodes perform only forwarding on pre-specified paths, the overlay nodes are able to dynamically route packets.

➤ Dynamic backpressure is known to be an optimal routing policy, but it typically requires a homogeneous network, where all nodes participate in control decisions. Instead, we assume that only a subset of the nodes are controllable; these nodes form a network overlay within the legacy network.

PROPOSED SYSTEM

➢ Our proposed algorithms for applying backpressure in overlay networks can help reduce delay by reducing the number of nodes between which differential backpressure is formed.

➢ While our original motivation for studying backpressure in overlay networks was not to reduce delay, we believe that our scheme can be used as part of a delay-reducing solution.

HARDWARE REQUIREMENTS

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS

- Tool   -   Network Simulator-2
- Operating system   -   LINUX
- Front end   -   OTCL (Object Oriented Tool
                                              Command Language)

REFERENCES

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