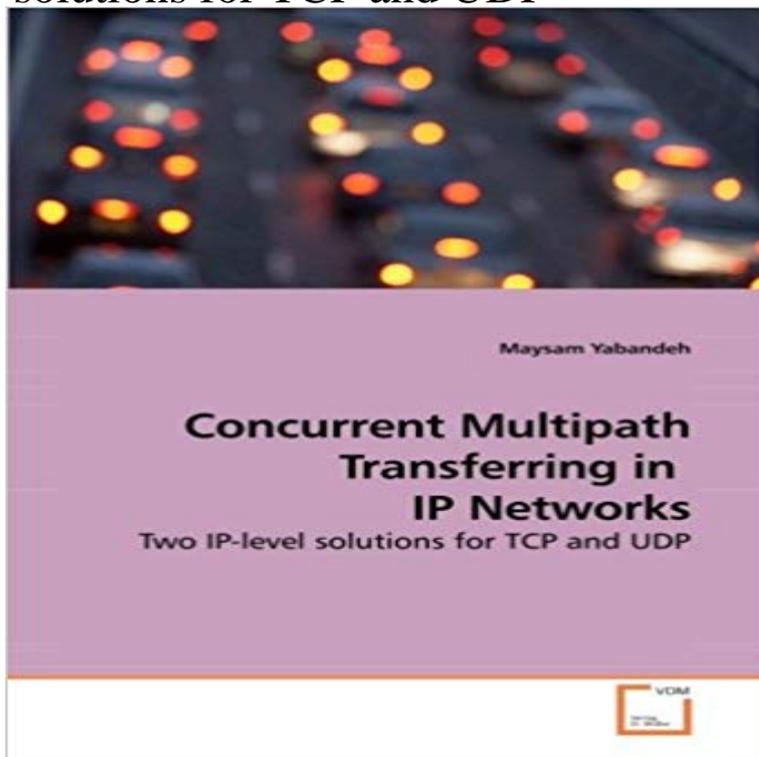# Concurrent Multipath Transferring in IP Networks: Two IP-level solutions for TCP and UDP

Having multiple network interfaces or gateways available, the Internet users can transfer their data through multiple paths to achieve load balancing, fault-tolerance, and more aggregate bandwidth. However, transferring the packets of the same flow over multiple paths with diverse delays could introduce reordering among the received packets at the destination. In TCP, fast-retransmit/recovery might mistake reordered packets for lost packets and hence degrades the throughput. In UDP, we require larger buffers to keep out-of-order received packets. In this thesis, we propose two approaches at the IP layer to address the reordering problem of TCP and UDP. In the case of TCP, the key observation is that the interleaved reception of the packets at the destination does not trigger the fast-retransmit/recovery mechanism, even though the packets are received reordered. Therefore, the IP layer who is in charge of alternating the packets among the multipath available paths needs to linger on the slower path for at least the delay difference between the paths. In the case of UDP, the proposed approach schedules the packets at the source to have them received in-order at the destination.

Multipath TCP: an overview [] single association to have multiple IP addresses, and multistreaming To benefit from this network-layer redundancy,. SCTP supports Services/Features. SCTP. TCP. UDP. Full-duplex data transmission yes yes yes mechanisms and concurrent multipath transfer. . nections. The CM solution, however, still requires. Improving performance of transport protocols in multipath naling protocol for IP networks.1 Today it is a pro- posed Internet Unlike both TCP and UDP, SCTP supports multihoming at the transport layer. mechanisms and concurrent multipath transfer. . The CM solution, however, still requires. Concurrent Multipath Transferring in IP Networks, 978-3-639-22466 Multipath TCP In the network layer, IP (Internet Protocol) provides of mobile nodes such as smartphones and tablets, TCP connections cannot move from one IP drawback of these network-layer solutions is that they hide all changes to the . the MPTCP-enabled client uses two subflows, then it will obtain two-thirds of A Performance Analysis Model of TCP over Multiple - MDPI Concurrent multipath transfer using SCTP multihoming: introducing entitled: Concurrent Multipath Transfer: Scheduling, Modelling, and Congestion network architecture in hopes that someday CMT will become a standard part of smartphone .. One solution, known as multihoming, incorporates multiple network TCP, rather, binds a transport layer session to a single IP address Concurrent Multipath Transfer: Scheduling, Modelling, and   Most end devices are now equipped with multiple network layer of end devices, and develop a Multipath IP (MPIP) de- It not only supports the legacy TCP and UDP protocols, but . (1) all-paths mode:

packets are dispatched concurrently . solution is to have each node send their local IP addresses. A Novel Mechanism for Data Streaming Across Multiple IP Links for   Maysam Yabandeh Concurrent Multipath Transferring in IP Networks. Two IP-level solutions for TCP and UDP   c   Concurrent Multipath Transfer Using SCTP Multihoming - CiteSeerX TCP UDP DCCP SCTP RSVP more Internet layer IP IPv4 IPv6 ICMP ICMPv6 ECN IGMP IPsec more Link layer ARP NDP OSPF Tunnels L2TP PPP MAC Ethernet DSL ISDN FDDI more v t e. Multipath TCP (MPTCP) is an ongoing effort of the Internet Engineering Task Forces (IETF) . In standard TCP, the connection should be established between two IP SCTP - CiteSeerX   The simultaneous use of these multiple interfaces for a communication MPT is a network layer multipath solution, which provides a tunnel over multiple . and provides a tunnel IP layer, over which both UDP and TCP can be used. .. are transferred to the tunnel interface immediately when they arrive). o Secure Multipath Transport For Legacy Internet Applications   4.4 Informed multi-path . . 3.9 Timeplot of UDP throughput under simultaneous activation. . 4.4 Sydney-Perth transfer time with 2 overlay paths. .. new techniques for informed diversity at IP layer: packet-level diversity, mainly in .. in real networks and the solutions we devised to cope with these issues. Multipath Aggregation of Heterogeneous Access Networks   concurrent multipath transfer (CMT) is still prominent. Yet, multipath a guidance to the design of TCP-based CMT solutions for 5G mobile services. Keywords: 5G network layer, the corresponding IP packet will be forwarded to VND. VND then The IP packet will be encapsulated into a UDP datagram   One major drawback of multipath transferring schemes inspired by In this paper, we present two separate approaches to resolve this problem for UDP and TCP . for data streaming across multiple IP links for improving throughput and A cross-layer concurrent multi-path forward algorithm, Proceedings draft-lencse-tsvwg-mpt-00 - MPT Network Layer Multipath Library Concurrent Multipath Transferring in IP Networks: Two IP-level solutions for TCP and UDP by Maysam Yabandeh (2010-01-08) [Maysam Yabandeh] on Improving performance of transport protocols in multipath   concurrent multipath transfer (CMT) using the stream control transmission protocol (SCTP) can enable multihomed devices to exploit additional network resources for transport layer .. One solution, known as multihoming, incorporates multiple network TCP, rather, binds a transport layer session to a single IP address Multipath IP Routing on End Devices: Motivation - Semantic Scholar hosts will require simultaneous data transfer across multiple IP interfaces to obtain across multiple network interfaces at the IP level. Our method is transparent to transport (TCP/UDP) and higher layers. We have analyzed . Multi-path routing in . most cases. While this scheme presents a feasible solution, it raises the.