

# Locating High-loss Links for OpenFlow Networks by Multiple Hosts to Probe Packets

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**Abstract**—We previously proposed a measurement framework for OpenFlow-based networks to promptly locate high-loss links with a small load incurred by the measurement on both the data-plane (e.g., the number of transmissions of probe packets on each link) and the control-plane (e.g., the number of accesses to switches) until locating all high-loss links. One of key components is the multicast measurement route of probe packets traversing all links in both directions. However, the previously proposed Eulerian cycle-based measurement route scheme called the backbone-and-branch tree (BBT) that uses only a single measurement host (MH) may build a too long measurement path in a large network, resulting in a low measurement accuracy and an intolerance to very high-loss, e.g., failure, links located in upstream of a measurement path. Therefore, in this paper, we newly propose an enhancement of the BBT with multiple MHs, called BBT-mMH, which can control the measurement path lengths to maintain an acceptable measurement accuracy with a small overhead on both the control-plane and data-plane. The numerical simulation demonstrates potential benefits of our proposal.

**Keyword**—active measurement, link loss rate, multicast, OpenFlow, flow statistics, SDN



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