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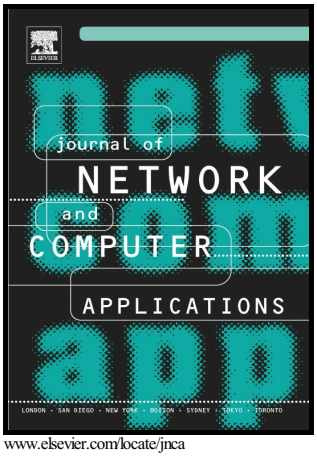

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Scalable Multicasting with Multiple Shared Trees in Software Defined Networking

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Abstract—

With Software Defined Networking (SDN), IP multicast becomes promising again. For IPTV applications over SDN, existing works would not scale well since they are based on per-source trees. As control-plane in SDN is logically centralized, constructing multiple shared trees is more feasible than that in traditional IP networks. Thus, in this work, we present a locality-aware multicast approach (LAMA) to construct multi-group shared trees in SDN, where each shared tree covers multiple multicast groups. In LAMA, the controller first clusters the multicast sources located in the vicinity into the same multicast cluster. For each multicast cluster, the controller selects the center switch which has the minimum distance to all multicast sources as its rendezvous point (RP) and then constructs a shortest-path multicast tree from the RP to its hosts. Finally, based on the multi-group shared trees, the controller can establish coarse-grained flow entries into on-tree switches to reduce the number of installed flow entries. Emulations on the Ryu controller and the Mininet emulator show that only 2 to 5 shared trees would suffice. The computation time in the controller using LAMA is around 70 ms, much less than hundreds ms required for per-source trees. Moreover, LAMA only establishes 2300 flow entries, 4% of that

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