Detection and avoidance technique of anomalous congestion at the network gateways

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ABSTRACT
Active queue management (AQM) techniques are used to maintain congestion at network routers. Random Early Detection (RED) is the most used technique among the existing AQMs, as it can avoid network congestion at the early stage. The RED technique avoids congestion by prompting users to reduce their windows size when the queue average exceeds a predefined threshold. However, RED technique is unable to identify users who do not respond to these notifications, and therefore, RED drops all packets in the queue. This generates false positive alarms as packets of legal users will be dropped as well. This paper proposes a technique for monitoring gateways' queues and discarding only the misbehaving traffic. In particular, the proposed technique monitors users' behavior at the network gateways to identify the real sources of misbehaving traffic that causes the congestion on the network. Congested RED-gateways report the packet transfer rate (PTR) of end-users connected with them to service level agreement unit (SLA-unit). The SLAunit then discovers end-users who have exceeded their bandwidth shares predefined in the SLA as sources of the anomalous congestion on the network. The obtained results show that the proposed technique is promising in detecting and avoiding anomalous congestion without dropping normal traffic of legitimate end-users.

KEYWORDS:
anomalous congestion; AQM; RED; SLA; Misbehaving users