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New services with low-latency (LL) requirements are one of the major challenges for the envisioned Internet. Many optimizations targeting the latency reduction have been proposed, and among them, jointly re-architecting congestion control and active queue management (AQM) has been particularly considered. In this effort, the Low Latency, Low Loss and Scalable Throughput (L4S) proposal aims at allowing both Classic and LL traffic to cohabit within a single node architecture. Although this architecture sounds promising for latency improvement, it can be exploited by an attacker to perform malicious actions whose purposes are to defeat its LL feature and consequently make their supported applications unusable. In this paper, we exploit different vulnerabilities of L4S which are the root of possible attacks and we show that application-layer protocols such as QUIC can easily be hacked in order to exploit the over-sensitivity of those new services to network variations. By implementing such undesirable flows in a real testbed and characterizing how they impact the proper delivery of LL flows, we demonstrate their reality and give insights for research directions on their detection.

References:
Letourneau, M., Doyen, G., Cogranne, R. *et al.* A Comprehensive Characterization of Threats Targeting Low-Latency Services: The Case of L4S. *J Netw Syst Manage* **31**, 19 (2023). https://doi.org/10.1007/s10922-022-09706-z

Additional information

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