Design and Implementation of Fast & Secure Network Protocols for Datacenters

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Abstract:

Datacenters have become a critical infrastructure for hosting online services such as web search, stock trading, social networking, and product advertising. Such services usually generate a large number of short but latency-sensitive flows and a small number of long but delay-tolerant flows. For short flows, even a fraction of a second increase in latency can make a quantifiable difference in application performance, which in turn, impacts user experience and operator revenue. For example, Amazon found that every additional 100ms of latency costs them 1% loss in business revenue. Similarly, with the design of new technologies, protocols introduce new security vulnerabilities. In this talk, first, I will focus on how we can improve the performance and design of datacenter networks. In this direction, I will present my work at i) task, ii) network, and iii) tenant level algorithms. Then, I will focus on how we can make network protocols more secure and I will present my work on multipath TCP security.