

Application-aware Optimization of Networking Protocols for Data Centers

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Abstract— Data centers are a key component in cloud computing. Network performance within a data center accounts for a significant portion of application performance. Conventional TCP protocols are not adequate for data center applications and often waste network resources. Several researchers proposed new TCP protocols to resolve congestion caused by incast phenomenon. In this paper, we propose a framework where application programmers can optimize the network functions to meet the specific bandwidth and deadline requirements of data center applications. At the end host, we provide flexibility to choose application-specific data center protocols depending on the application requirements. In addition, we propose a programmable virtual router implemented on FiRST Platform which can handle different data center specific protocols. We demonstrate our concept by implementing two recent TCP variant algorithms, D3 and DCTCP.

Keyword— Data center, Network Protocols, TCP, Network Architecture, Computer Communication Networks.



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