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Analysis and selection of high-speed network services for scientific data movement

by

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The Chinese University of Hong Kong

Abstract

The volume of scientific data collected by instruments, from experimental studies, and from imulations executed on supercomputers is growing rapidly. Scientists need to move these data files from the sources where they are generated to their laboratory compute clusters. Such scientific data transfers are "heavy-hitter" flows that consume an unfairly large portion of link bandwidth, and adversely affect general-purpose flows on IP-routed networks. First, we present our analysis of GridFTP transfers from a scientific computing center, NetFlow data from an ESnet router, and logs collected from a Climate data distribution project. Next, the feasibility of using new types of network services, such as optical virtual circuit services and multicast services, for these heavy-hitter flows is examined. Finally, a traffic engineering system for a hybrid network consisting of an IP-routed network and an optical circuit-switched network is proposed to enable individual providers to separate out the heavy-hitter flows from general-purpose flows.

Biography

Malathi Veeraraghavan is a Professor in the Charles L. Brown Department of Electrical & Computer Engineering at the University of Virginia (UVa). She received her Ph.D. degree from Duke University, Durham, NC, in 1988, and worked in AT&T Bell Laboratories and Brooklyn Poly University before joining the University of Virginia in 2003. She holds twenty-nine patents, has over 90 publications, and has received five Best-paper awards. She is serving as a Symposium Co-Chair for the Next-Generation Networking Symposium of the IEEE ICC 2013, Budapest, Hungary. She served as the Technical Program Committee Chair for IEEE ICC 2002, and as Associate Editor for the IEEE/ACM Transactions on Networking. She also served as Editor of IEEE ComSoc e-News and as an Associate Editor of the IEEE Transactions on Reliability.

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