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Bringing High-Performance Networking to HEP Users

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How do we get High Throughput data transport to real users? The MB-NG project is a major collaboration which brings together expertise from users, industry, equipment providers and leading edge e-science application developers. Major successes in the areas of Quality of Service (QoS) and managed bandwidth have provided a leading edge U.K. Diffserv enabled network running at 2.5 Gbit/s. One of the central aims of MB-NG is the investigation of high performance data transport mechanisms for Grid data transfer across heterogeneous networks.

New transport stacks implement sender side modifications to the TCP algorithm which enable increased bandwidth utilisation in long-delay high-bandwidth environments. This allows a single stream of a modified TCP stack to transmit at rates that would otherwise require multiple streams of standard RENO TCP. This paper reports on investigations of the performance of these TCP stacks and their use with data transfer applications such as GridFTP, BBFTP, BSCP and APACHE. End-host performance behaviour was also examined in order to determine effects of the Network Interface, PCI bus performance, and disk and RAID sub-systems.

In a Collaboration between the BaBar experiment and MB-NG we demonstrated high performance data transport using these new TCP/IP transport protocol stacks and QoS provisioning. We report on the benefits of this introduction of high speed networks and advanced TCP stacks together with various levels of QoS to the BaBar computing environment. The benefits achieved are contrasted with network behaviour and application performance using today's "production" network.

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