Electrical Engineering Department University of Delaware
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Highball: a High Speed, Reserved-Access, Wide Area Network

David L. Mills, Charles G. Boncelet, John G. Elias,
Paul A. Schragger and Alden W. Jackson

Abstract

This document describes a network architecture called Highball and a preliminary design for a prototype, wide-area data network designed to operate at speeds of 1 Gbps and beyond. It is intended for applications requiring high speed burst transmissions where some latency between requesting a transmission and granting the request can be anticipated and tolerated. Examples include real-time video and disk-disk transfers, national filestore access, remote sensing and similar applications. The network nodes include an intelligent crossbar switch, but have no buffering capabilities; thus, data must be queued at the end nodes. There are no restrictions on the network topology, link speeds or end-end protocols. The end systems, nodes and links can operate at any speed up to the limits imposed by the physical facilities.

This document presents an overview of an initial design approach and is intended as a benchmark upon which a detailed design can be developed. It describes the network architecture and proposed access protocols, as well as functional descriptions of the hardware and software components that could be used in a prototype implementation. It concludes with a discussion of additional issues to be resolve in continuing stages of this project.

Keywords: supercomputer networks, gigabit networks, reservation-TDMA, Highball architecture.

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