HpFP: A new protocol for LFNs with packet-loss based on UDP -A basic concept and detailed design of the protocol

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For LFNs (Long-Fat Networks) with 10 Gbps or more and satellite networks with large latency, a variety of TCP-based protocols have been proposed which show high performance on large latency network conditions. However, such TCP protocols are essentially unable to archive large bandwidth on high latency networks accompanied with packet-losses that are inevitable on practical LFNs or satellite networks. To overcome this issue, we designed a new data transfer protocol on TCP/IP transport layer built on top of UDP: High-performance and Flexible Protocol (HpFP). It constantly monitors latency (RTT) and packet losses, and conducts rate control and retransmission control based on them to enable higher bandwidth data transfer than 10 Gbps even on packet-loss conditions over LFNs. The basic concepts are addressed and protocol design of the HpFP are discussed. An applications to tansfer many data files in small size (e.g., 1MB x 10000 files) with almost wire-rate bandwidth (10 Gbps) is also addressed.