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TCP / IP OVER WIRELESS LINKS

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Abstract

In wireless networks, where the links out of efficiency constraints are more error prone than wired links, the error and the reordering sensitivity of TCP have motivated link layer protocols that perform retransmissions and enforce in-order delivery. We investigate the potential gains of using a reordering robust TCP, like TCP-Aix, with a wireless link layer that allows out-of-order delivery, compared to using in-order delivery with a standards-compliant TCP. We found that the smoothness of TCP is strongly affected by the link layer configuration. In-order delivery leads to burstier traffic and larger network layer buffering needs, than out-of-order delivery and TCP-Aix. The interference and power consumption in foremost wireless networks make it important to reduce the communication overhead. The TCP receiver acknowledges each or every second segment. We study how to reduce the acknowledgment frequency while preserving throughput performance also in wireline networks where frequent acknowledgments generally are not problematic. To preserve throughput, the sender should use byte counting and be involved in determining the acknowledgment frequency. The results show that acknowledging four segments per send window is sufficient to maintain throughput performance also in wireline scenarios. This indicates that a lower acknowledgment frequency than provided through the delayed acknowledgment algorithm is possible today for general usage. A key service to the successful merging of traditional Internet technology and wireless cellular networks is Voice over IP (VoIP). Channels to be shared by both VoIP and TCP-based traffic are being considered for wireless cellular systems. It is challenging to provide VoIP over a shared wireless cellular channel; because VoIP is a low bitrate service with high demands on channel availability to bound the delay. The scheduling algorithm, controlling access to the channel, is central to achieve efficiency as well as to