

INCREASING TCP THROUGHPUT BY USING AN EXTENDED
ACKNOWLEDGEMENT INTERVAL

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BY

STACY R. JOHNSON

This thesis has been approved
for the Department of Mathematics
and the College of Arts and Sciences by

Shawn D. Ostermann

Assistant Professor of Computer Science

Harold Molineu

Dean, College of Arts and Sciences

To my family

ABSTRACT

Johnson, Stacy R.. M.S., Ohio University, June 1995. Increasing TCP Throughput by Using an Extended Acknowledgement Interval. Major Professor: Dr. Shawn D. Ostermann.

The Transmission Control Protocol (TCP) is a widely used network protocol that is usually layered over the Internet Protocol (IP). IP is not reliable; it does not insure data delivery. However, TCP is reliable, and insures data delivery through the use of acknowledgements and retransmissions.

The receiving side of a TCP connection currently acknowledges at least every other data block (segment) that it receives. Some of these acknowledgements may be superfluous. A large portion of a TCP connection's cost is the overhead of processing a new packet as it arrives. Consequently, it is possible that extending the acknowledgement interval may increase throughput by requiring less acknowledgement overhead per connection.

We implemented extended acknowledgement intervals in UNIX 4.4 BSD compatible network code. We compiled the code on a Sun IPC workstation running SunOS.

To test our hypothesis, we conducted throughput tests using machines on the same local network, a near network, and a distant network. Analysis of the data revealed that extending the acknowledgement interval does increase throughput by a statistically significant amount in the local and near network cases. In particular, in the local case the throughput was increased by as much as 4 percent in some cases. It is probable that congestion on the Internet and the resulting packet loss prevented the overall increase in throughput on the non-local connections.

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