Increasing TCP's Initial Window

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References:

Floyd, S., Allman, M., and Partridge, Craig, Increasing TCP's Initial Window Internet draft draft-floyd-incr-init-win-00.txt, July 1997.

The Proposal:

The initial window MAY be two packets (instead of the current initial window of one packet).

For packets of at most 1460 bytes, the initial window MAY be three packets.

For packets of at most 1095 bytes, the initial window MAY be four packets.

The Burstiness of Current TCP in Slow-Start:

cwnd = 1 packet:
$\Rightarrow$ send one data packet
$\Leftarrow$ receive one ACK

increase cwnd to 2 packets:
$\Rightarrow$ send two back-to-back packets
$\Leftarrow$ receive one ACK (a delayed ACK)

increase cwnd to 3 packets:
$\Rightarrow$ send three back-to-back packets

The Burstiness of Current TCP with a Dropped Ack:

cwnd = N packets, N packets are in pipe:

$\Leftarrow$ receive one ACK, acking two packets

$\Rightarrow$ send two back-to-back packets

$\Leftarrow$ receive one ACK, acking two packets

$\Rightarrow$ send two back-to-back packets

ONE ACK IS DROPPED IN THE NETWORK

$\Leftarrow$ receive one ACK, acking four packets

$\Rightarrow$ send four back-to-back packets

Disadvantages for the connection:

When does the increased burstiness of a larger initial window make it significantly more likely that the connection will have a packet dropped?

Disadvantages for the network:

When does the increased burstiness of larger initial windows lead to a significantly larger packet drop rate for the other traffic in the Internet?