Microsoft Windows – TCP receive window size note

The most fundamental tuning issue for TCP is the TCP window size, which controls how much data can be in the network at any one point.

If it is too small, the sender will be idle at times and get poor performance. The theoretical value to use for the TCP window size is the *bandwidth delay product*,

bottleneck = bandwidth * round trip time

In the this analysis, the bottleneck link is a shared 1.544 Mbit/sec T1 link in city A and the round trip time measured with an average ping is 146 ms.

The bandwidth delay product is:
1.544 Mbit/sec * 146 ms
= (1.544 Exp 6) * (146 Exp -3)
= 225424 bits
= 28 KByte

Since Microsoft Windows 2000/XP have a default window size of **8Kb**, there we should adjust each workstation registry to enhance the WAN connection performance.

The TCP window is the amount of unacknowledged data in flight between the sender and the receiver. Data is sent by TCP in segments that are typically 1460 bytes in length. If the sender is permitted a window size of only 1 segment, the sender transmits a single segment, and waits for an acknowledgement from the receiver. If the transmission delay between sender and receiver is long, this means very low throughput (very few segments transferred per unit time). Both sender and receiver spend most of their time waiting for messages to be transmitted from one end of the connection to the other.

In order to improve throughput, the sender transmits multiple segments without waiting for the next acknowledgement from the receiver. The TCP window is an estimate of the upper bound on the number of segments that will fit in the length of the pipe between sender and receiver. The window size is increased during a TCP transfer until the end-to-end path becomes too full (indicated by a segment being dropped somewhere in the network), then the size is backed off and then increased slowly again until the limit is reached. This cycle of shrinking and slowly expanding window size continues throughout the TCP connection. In this way, TCP tries to optimize the transmit window to maximize throughput over the lifetime of the connection. The receiver advertises his maximum window size to give the sender an idea of how much buffer space the receiver has available. This puts a hard limit on size of the window, even if more bandwidth is available in the network.

TcpWindowSize
Key: Tcpip\Parameters
Value Type: REG_DWORD - Number of bytes
Valid Range: 0 - 0xFFFF
Default: The smaller of 0xFFFF
OR
(The larger of four times the maximum TCP data size on the network
OR
8192 rounded up to an even multiple of the network TCP data size.)
The default is 8760 for Ethernet.
Description: This parameter determines the maximum TCP receive window size offered by the system. The receive window specifies the number of bytes a sender can transmit without receiving an acknowledgment. In general, larger receive windows will improve performance over high (delay * bandwidth) networks. For highest efficiency, the receive window should be an even multiple of the TCP Maximum Segment Size (MSS).

New workstation window size

REGEDIT4

[HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Tcpip\Parameters]
"TcpWindowSize"=dword:00007d78

1460 x 22 = 32,120 (x'7d78')

IPerf command format

C:\>**iperf -c 172.16.1.191 -t 240 -i10 -f k**

Server side '**Iperf.bat**' configuration setup to run automatically at signon for all users.

```
rem Network performance tool - bandwidth measurement
rem
rem This utility should startup with the desktop
rem Support for this application is in the NCL Miami office
iperf -s -D -w 32K
```