

Assignment 1 Benchmark Report

Industrial Application Development – CNTR 2155

Dan Heironimus

(6403646)

Ryan Pink

(6474571)

## Change Process

1. **Scope**

To determine the performance differences between communications sent via UDP and TCP/IP protocols between Linux and Windows systems. The benchmarks will be performed by sending a series of data blocks in sizes of 1000, 2000, 5000, and 10000 bytes and measuring the differences in time taken for a complete transfer between UDP and TCP/IP protocols. The test will be performed separately between two Linux systems and two Windows systems.

1. **Target Audience**

The metrics and terminology used within this report is intended for people who are interested in computer and network programming. It is expected that readers will possess a basic understanding of bits, bytes, and the purpose behind the TCP/IP and UDP protocols.

## Results

1. **Linux - TCP/IP vs. UDP**

|  |  |  |  |
| --- | --- | --- | --- |
| Test #1 – 500,000 Blocks of 1,001 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 20 | **Duration (seconds):** | 21 |
| Avg Blocks/second: | 25,000.00 | **Avg Blocks/second:** | 23,809.52 |
| Avg Kbytes/second: | 24,438.48 | **Avg Kbytes/second:** | 23,274.74 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test #2 – 250,000 Blocks of 2,001 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 21 | **Duration (seconds):** | 18 |
| Avg Blocks/second: | 11,904.76 | **Avg Blocks/second:** | 13,888.89 |
| Avg Kbytes/second: | 23,263.11 | **Avg Kbytes/second:** | 27,140.30 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test #3 – 100,000 Blocks of 5,010 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 15 | **Duration (seconds):** | 17 |
| Avg Blocks/second: | 6,666.67 | **Avg Blocks/second:** | 5,882.35 |
| Avg Kbytes/second: | 32,617.19 | **Avg Kbytes/second:** | 28,779.87 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test #4 – 50,000 Blocks of 10,001 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 19 | **Duration (seconds):** | 14 |
| Avg Blocks/second: | 2,631.58 | **Avg Blocks/second:** | 3,751.43 |
| Avg Kbytes/second: | 25,701.58 | **Avg Kbytes/second:** | 34,880.72 |

1. **Windows – TCP/IP vs. UDP**

|  |  |  |  |
| --- | --- | --- | --- |
| Test #1 – 500,000 Blocks of 1,001 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 22 | **Duration (seconds):** | 15 |
| Avg Blocks/second: | 22,2727.27 | **Avg Blocks/second:** | 33,333.33 |
| Avg Kbytes/second: | 22,216.80 | **Avg Kbytes/second:** | 32,584.64 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test #2 – 250,000 Blocks of 2,001 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 19 | **Duration (seconds):** | 12 |
| Avg Blocks/second: | 13,157.89 | **Avg Blocks/second:** | 20,833.33 |
| Avg Kbytes/second: | 25,711.86 | **Avg Kbytes/second:** | 40,710.45 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test #3 – 100,000 Blocks of 5,010 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 12 | **Duration (seconds):** | 14 |
| Avg Blocks/second: | 8,333.33 | **Avg Blocks/second:** | 7,142.86 |
| Avg Kbytes/second: | 40,771.48 | **Avg Kbytes/second:** | 34,946.99 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test #4 – 50,000 Blocks of 10,001 Bytes | | | |
| UDP | | **TCP/IP** | |
| Duration (seconds): | 10 | **Duration (seconds):** | 12 |
| Avg Blocks/second: | 5,000.00 | **Avg Blocks/second:** | 4,166.67 |
| Avg Kbytes/second: | 48,833.01 | **Avg Kbytes/second:** | 40,694.17 |

## Conclusion

We’ve come to conclude that we went in completely the wrong direction when it came to measuring the benchmarks. Our implementation of the TCP/IP class disabled the Nagle Algorithm in order to get a speed boost. Our measurements, we discovered, were only tracking the speed at which the computer can send data out through the network card, and as a result our numbers showed they were on par with each other.

TCP/IP should be used when the data be transferred is required to arrive, and arrive in order. Due to its reliability and guaranteed delivery, TCP/IP works well for applications such as E-mail, chat, file transfer, bank transactions, GPS coordinates, etc. TCP/IP favours reliability and ordered arrival over speed of transfer. The guaranteed delivery and order comes at a price however. A TCP/IP header is 20 bytes vs. UDP’s 8 bytes. TCP/IP also provides basic error checking and will request a packet if it incorrect.

UDP is an ideal protocol for applications that favour fast transmission over reliability and packet ordering. Many games make use of UDP because it is more efficient to just send a new control input rather than pickup and resend a dropped or corrupted one.

## Bibliography

. N.p.. Web. 28 Jan 2014. <http://www.diffen.com/difference/TCP\_vs\_UDP>.

"Make for Windows." *GNUWin32*. N.p.. Web. 28 Jan 2014. <http://gnuwin32.sourceforge.net/packages/make.htm>.

"Unix/Linux Forum." *CPlusPlus.com*. N.p.. Web. 28 Jan 2014. <http://www.cplusplus.com/forum/unices>.

Krzyzanowski, Paul. "Programming with UDP Sockets."*Rutgers CS417*. N.p.. Web. 28 Jan 2014. <http://www.cs.rutgers.edu/~pxk/417/notes/sockets/udp.html>.  
  
  
"Disable Nagle-Algorithm to Increase your Internet Speed for Quick Response." *Optimize MS Windows*. N.p., 20 Aug 2013. Web. 28 Jan 2014. <http://www.optimizemswindows.com/disable-nagle-algorithm-to-increase-your-internet-speed-for-quick-response/>.