



APPLICATION NOTE

BCM5805

IPSec Performance Measurement on Windows NT4.0 Firewall

10/9/01

REVISION HISTORY

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Broadcom Corporation
16215 Alton Parkway
[P.O. Box 57013](#)
Irvine, California 92619-7013
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Introduction

This document shows performance numbers taken on a pair of computers configured as firewalls with a 3DES/MD5 IPSec tunnel between them. Data traffic is generated and verified using a SmartBits device connected to a NIC on each firewall. Tests were run using a variety of packet sizes and also with the firewalls configured for hardware accelerated IPSec, software IPSec and clear text (no-IPSec). The parameters measured were the throughput achieved, CPU utilization and interrupts/sec. The following paragraphs show the configuration details and graphs of the resulting data.

CONFIGURATION DETAILS

For the test, 2 computers were used, where one was the sending firewall and the other was the receiving firewall. Measurements were made on the receiving firewall. The computer configurations were as follows:

Both computers:- Windows NT4.0 SP6

- 2 100M NICs
- BCM5805 ver B4
- third party firewall software

Sending computer: - single CPU 800 Mhz PIII

Receiving computer: - single CPU 600 Mhz PIII

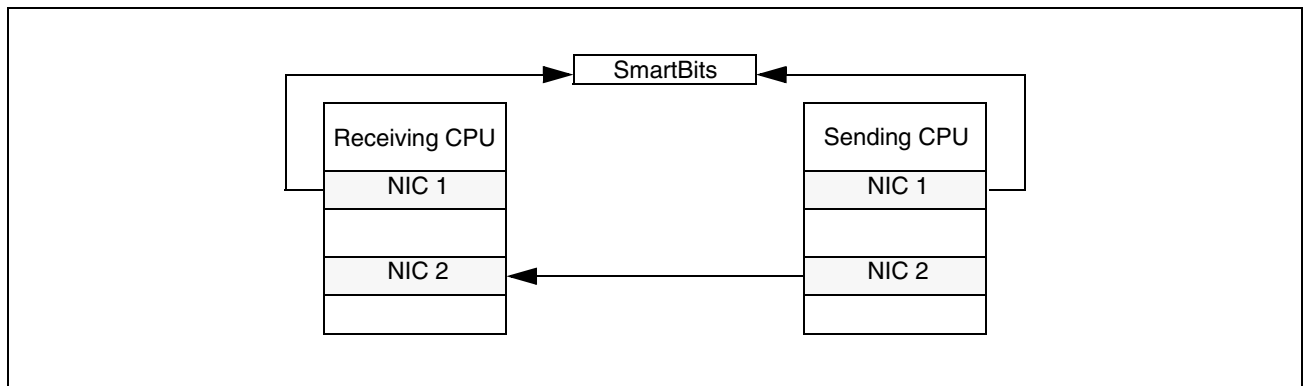


Figure 1: Test Configuration

TEST METHODOLOGY

For each case, the throughput test was done using the SmartApp tool, which is used in conjunction with the SmartBits test equipment. SmartApp is an automated tool which determines maximum throughput by interrupting through the range of throughputs, starting with 100% of maximum, sending packets of the given size and detecting any dropped packets. The

resultant throughput is the maximum achieved without any packets being dropped. For this test, SmartApp is configured to use 15 second intervals for throughput tests.

Once the throughput has been determined, another tool is used to generate traffic for measuring CPU utilization and interrupts per second. The inter-packet gap used for the maximum throughput determined by SmartApp is used along with the desired packet size to set up a constant traffic stream using the tool SmartWin.

Measurement of processor utilization and interrupts/second are made on the receiving computer using the Windows performance monitor.

RESULTS

The graphs below show the resulting measurements taken from this test set-up. [Figure 2](#) shows the throughput achieved for each packet size and configuration combination.

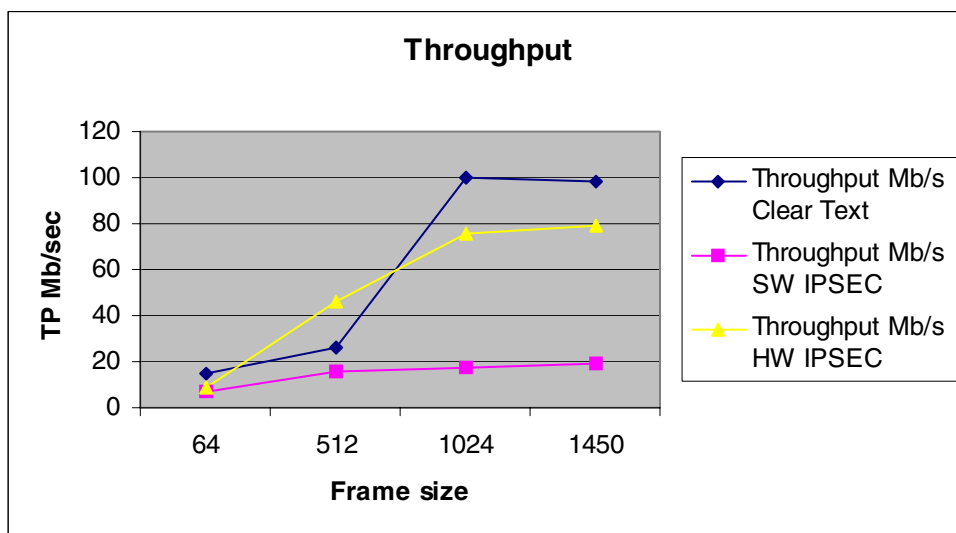


Figure 2: Throughput by Frame Size and Configuration Combination

[Figure 3](#) shows the processor utilization on the receiving CPU for the same combinations.

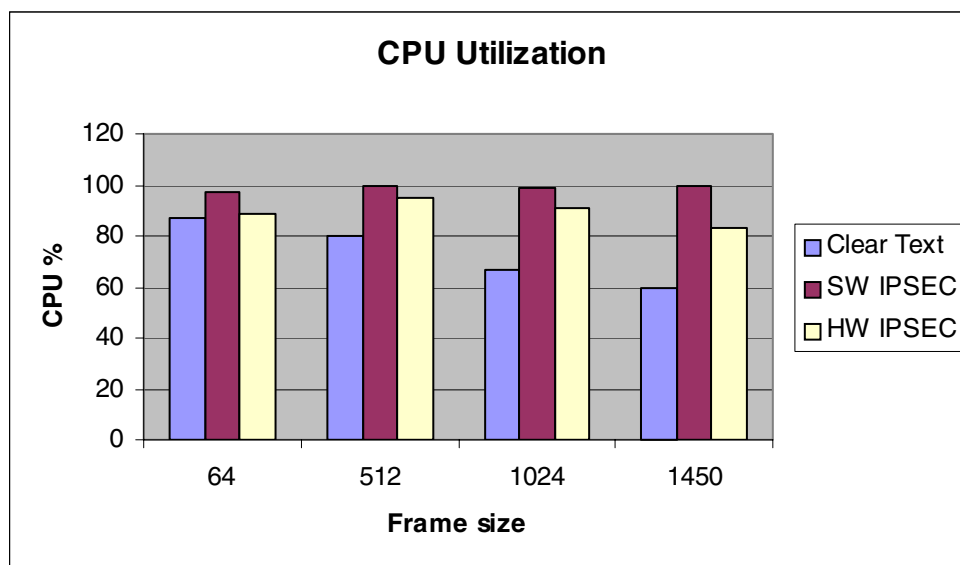


Figure 3: CPU Utilization by Frame Size and Configuration Combination

Figure 3 shows the number of interrupts/second on the receiving CPU. Note that this is the sum of all interrupts and would therefore include both NIC and BCM5805 interrupts.

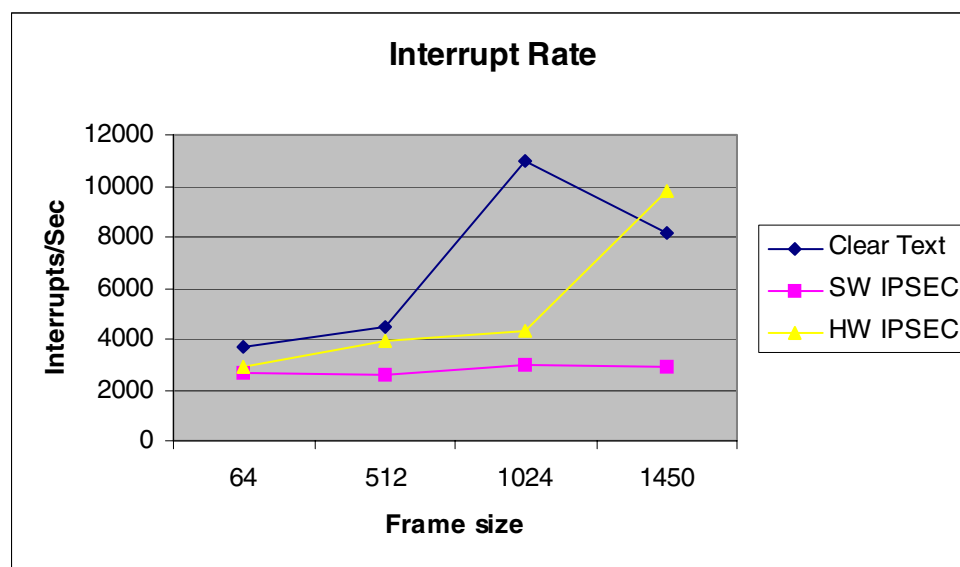


Figure 4: Number of Interrupts/Second on the Receiving CPU

NUMERICAL DATA

Table 1: Throughput Mb/s

<i>Frame Size</i>	<i>Clear Text</i>	<i>SW IPSEC</i>	<i>HW IPSEC</i>
64	15	6.88	8.75
512	25.67	15.62	45.67
1024	100	17	75.63
1450	98.17	18.73	79.4

Table 2: CPU Utilization

<i>Frame Size</i>	<i>Clear Text</i>	<i>SW IPSEC</i>	<i>HW IPSEC</i>
64	87	97	89
512	80	100	95
1024	67	99	91
1450	60	100	83

Table 3: Interrupt Rate

<i>Frame Size</i>	<i>Clear Text</i>	<i>SW IPSEC</i>	<i>HW IPSEC</i>
64	3673	2656	2932
512	4442	2620	3939
1024	10958	2,988	4345
1450	8151	2929	9773

Broadcom Corporation

16215 Alton Parkway
P.O. Box 57013
Irvine, California 92619-7013
Phone: 949-450-8700
Fax: 949-450-8710

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